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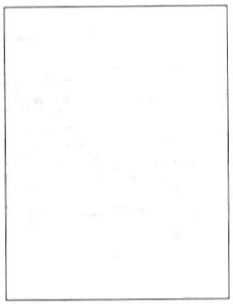
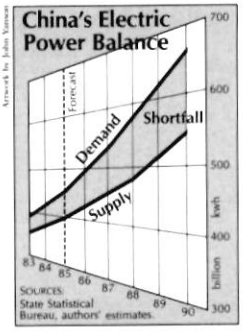
Cover: A building boom will soon alleviate the real estate crunch for foreign firms in Beijing. *Map of the capital published by Tianjin People's Printing Factory.*





Electric power: Thermal, hydro, and nuclear power capacity struggles to keep up with rising demand in a pivotal sector. **Page 14.**

Renewable energies: Biomass, solar, wind, and water are becoming more important power sources, especially in rural areas. **Page 33.**

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摘要

CHINA FEVER SPREADS

Three of China's neighbors are showing that the PRC has no monopoly on pragmatism in Asia. For various political reasons, businesses in Taiwan, South Korea, and Indonesia have not been allowed to trade with China. In fact, some firms in all three have long subordinated ideology to profit and exchanged goods indirectly with China—usually through middlemen in Hong Kong, Singapore, or Japan. In recent years, this thinly camouflaged indirect trade has been growing in value, and becoming increasingly direct.

Each of the three neighbors has its reasons for re-evaluating China's status as an off-limits trading partner. Taiwan fears stagnation in the purchasing capacity of its traditional export markets—America and Japan. It is thus pleased with the mainland's interest in its motorcycles, electrical appliances, and synthetic fabrics and glad to import Chinese cotton, wool, minerals, and seafoods in exchange.

By its nature, indirect trade is measured in unreliable statistics. But even Taiwan government figures put total two-way trade last year at $560 million, up 125 percent on 1983, with a $300 million surplus for Taiwan. The US Commerce Department reckons the 1984 total could have been as high as $790 million. Most PRC–Taiwan trade goes through Hong Kong. The colony appears to be replacing Japan as Taiwan's second biggest export market—clear evidence of booming trade with the mainland.

The Taiwan government's pleasure with the boost to local exports is balanced by worry that any overreliance on the Chinese market could foreshadow creeping economic integration. There is talk of legalizing the indirect trade so the government could exert more control over it. Direct trade, however, is a line Taiwan authorities are not prepared to cross. Designated "smuggling," this commerce is probably worth much less than the indirect trade pursued by Taiwan's big companies. Taiwan's parliament recently adopted stiffer penalties for those engaging in direct trade.

South Korea's motivation for trading with China is clear: Seoul imports food and oil, and China exports these commodities at prices that beat the competition. Though officially still at war with South Korea, China sold that country a reported $85 million worth of corn last year, to the discomfort of US grain exporters. While America supplied two-thirds of South Korea's corn imports last year, Chinese farmers snatched three-fourths of the market through the first four months of 1985. Like Taiwan, South Korea is also helping meet the surging Chinese demand for consumer electronics.

Total two-way trade was estimated at $800 million last year, with China enjoying the surplus. Again, most is handled through Hong Kong, but China increasingly ships grain directly from its northeastern ports, after Hong Kong intermediaries arrange the deal. China also made it first direct sale of crude oil to South Korea last year.

Given its close relations with North Korea, China is less keen to publicize its growing trade with South Korea. Nevertheless, the two countries are becoming increasingly open about their commerce. South Korean companies in Hong Kong have been invited to a trade fair in Beijing later this year, and the State-run Korean Trade Promotion Corporation recently held a seminar on doing business with China.

Indonesia, faced with falling oil revenues, is seeking to tap the China market to sell more non-oil commodities. Traders in the two countries have had to exchange goods through third parties ever since Indonesia accused China of supporting a coup attempt in 1965, but limited direct trade is believed to have resumed last year. Total two-way trade is reportedly now around $250 million, with a sizable deficit for Indonesia.

Like their counterparts in Taiwan, Indonesian firms are out ahead of their government on the issue. Yet despite lingering suspicions of China's intentions, Indonesian officials reached an agreement with China on formalizing direct trade in July. Maybe that will help reduce the deficit.

YOUTH TO THE FORE

Deng Xiaoping has recently taken important steps to ensure that the economic reforms he is promoting will survive him. By naming nine new government ministers, reshuffling the nation's military regions, and appointing new Communist Party leaders in Shanghai, Deng has succeeded in moving younger, better educated people into positions of influence—a fact that bodes well for the long-term stability of China's reforms.

Most of the new ministers are in their mid-50s. Vice-Premier Li Peng, 56, adds the chairmanship of the new State Education Commission to his growing list of duties. The commission officially replaces the Ministry of Education, a step that reflects the importance China's leaders currently attach to education. Naming Li to head the State Education Commission reinforces speculation that he is Premier Zhao Ziyang's heir apparent. Younger men also take over in the ministries of Radio and Television (Ai Zhisheng), Railroads (Ding Guan'gen), Electronics (Li Tieying), Astronautics (Li Xu'e), Petroleum (Wang Tao), Coal (Yu Hongen), and Ordnance (Zou Jiahua), and the State National Defense Science, Technology, and Industry Commission (Ding Henggao).

In one case, the person who's leaving a ministry is as important to note as the one who's arriving. Outgoing Minister of Electronics Industry Jiang Zemin is headed for Shanghai, where he'll become the Party's deputy secretary and also replace Wang

Daohan as the municipality's mayor. Shanghai's Party secretary is also departing, to be replaced by Rui Xingwen. Both retiring Party men reportedly obstructed economic reforms in China's largest industrial and commercial city. Mayor Wang's retirement at 69 may have been part of a 'package deal' to induce the two offending Party officials to step down, since Wang himself is generally viewed as a proponent of reform.

The Central Military Commission headed by Deng has also reportedly trimmed the number of military regions from 11 to seven and appointing several younger, academy-educated officers to top positions. The consolidation of military regions signals a significant change in China's powerful military bureaucracy, part of an ongoing streamlining of the military that includes the "demobilization" of about a quarter of the army's 4 million troops. While some in China praise the troop reduction as a sign of peaceful intentions, the military's view is that the army is becoming "smaller but more highly trained, . . . therefore more combat effective." —TE

A FREER CHINESE PRESS?

Freedom of the press as defined in the West still seems to be an alien idea in China, although a much-discussed Chinese press law, now on the drafting table, should help clarify the role of the media. Meanwhile, signals are mixed. Last April, Chinese and foreign observers were surprised by the sudden release of a speech Party leader Hu Yaobang had delivered in February. "Journalism," he declared, "works on behalf of the party and government . . . to arouse the people to work with one heart and one mind for realization of the party's objectives." Hu's message was blunt: while China's 300,000 journalists may adopt the gadgetry used by Western reporters, they are still expected to tow the Party line.

Things seemed to be loosening up last December, when writers attending the Fourth National Writers Congress were told they were free to choose their subjects and styles—a far cry from the 1970s when workers, peasants, and soldiers were the only characters allowed. In several incidents over the next few months, official newspapers jumped to the defense of reporters who were harassed, detained, and even beaten while investigating alleged corruption by lower-level cadres. On several occasions the government almost seemed to be encouraging Western-style muckraking by Chinese reporters.

But Hu's uncompromising statements have dashed hopes that the forthcoming press law, being drafted by the Beijing-based Institute of Journalism, will institutionalize a more liberal outlook. Some observers speculate that the government only encouraged reporters to be more aggressive in hopes of ferreting out cadres opposed to Deng Xiaoping's economic policies. They believe the Party used the same tactic with Democracy Wall activists of the late 1970s and artists during the Hundred Flowers movement of the 1950s. Despite the ongoing anticorruption campaign, officials apparently prefer to expose abuses themselves, rather than delegate this role to the media.

The recent tightening of policy may have been partly motivated by government repugnance at some of the unofficial tabloids appearing on Chinese newsstands. These publications provide spicier reading than the dry reprints of government-issued speeches and documents carried by official newspapers. But some contain sensational stories deemed pornographic by the State. When the tabloids began luring readers away from officially sanctioned newspapers, the government tightened registration procedures. Ironically, some of the tabloids are published by government departments that apparently use profits earned from the popular tabloids to subsidize the officially sanctioned papers that lose money.

Chinese officials say the new press law will allow journalists to decide how best to disseminate the Party's views, rather than merely publishing official news releases as before. There have also been proposals for more original thought in commentaries and for shortening the reprinted speeches in *People's Daily*, in hopes of making the paper more interesting to read and boosting circulation. But thoroughly objective reporting probably is not in the offing. Hu suggested, for instance, that only 20 percent of newspaper coverage should discuss "shortcomings, dark aspects, and criticisms" while 80 percent be devoted to "achievements, bright aspects, and things good." —MEW

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CITIC: Pacesetting Corporation

Can this unique group of former industrialists sustain its recent success?

Tom Engle

In 1978 China's new and more pragmatic leadership sought to tap the nation's enthusiasm for an ambitious modernization drive. Among the groups they turned to first were the country's veteran business leaders, who had owned or managed factories until the mid-1950s. Founded in 1979, the China International Trust and Investment Corporation (CITIC) has become one of the principal vehicles for re-enlisting the skills of these so-called former industrialists, bringing them back into the economic mainstream. With high-level support, they are in turn building CITIC into a thriving, diversified concern, and training a new generation of managers to see to the corporation's future.

CITIC has always had a special character. The corporation's statutory function is "to introduce, absorb, and apply foreign investment, advanced technology, and equipment . . . for China's national construction," and CITIC's leaders interpret this mandate broadly. The corporation's business activities range from manufacturing to merchant banking to issuing bonds on international capital markets. Its investments range from timber to chemicals to real estate. And with China's recent emphasis on attracting direct foreign investment, CITIC has been at the forefront of organizations involved in soliciting and applying outside capital and technology.

There is no denying CITIC's relentless expansion. Total assets in 1984 exceeded ¥2.1 billion, more than eight times the 1981 level. Profits last year reached ¥47.6 million on total income of ¥113.7 million, up from just ¥2.5 million on total income of ¥14.4 million in 1981.

But the company's record may be a difficult act to follow. A number of questions hang over CITIC's future that could make it difficult to maintain the growth and success of the recent past. Much of the corporation's rapid growth is due to its tax-free status, a perquisite that ends in 1987. A second ingredient in CITIC's boom has been the close ties between its leaders and China's top political leaders, another potentially temporary bonus. Third, the corporation faces stiff competition in several of its business lines from the much older, better established Bank of China (BOC). For now Beijing seems to encourage this kind of competition, but should that policy change, CITIC could find itself in a precarious position. Nevertheless, predicting anything in China five or 10 years down the road is a hazardous undertaking. Gauging the viability of a relatively new and on-the-go organization like CITIC is especially so.

Studied sophistication

As CITIC has expanded its business scope, it has fashioned a colorful corporate culture that stands out against the Chinese milieu. Corporate Chairman Rong Yiren and his well-heeled associates combine elements of both brash entrepreneurship and the sophisticated competence of the international financial set. In contrast to the bureaucratic immobility many Chinese organizations display, CITIC cultivates an image of high-powered efficiency.

The corporation's can-do image was on display at the fifth anniversary celebration it threw for itself in Beijing last October. Guests at the Symposium on China's Economic Cooperation with Foreign Countries included chairmen and chief executives from many of the world's largest corporations, as well as leading private and central bankers. Chinese organizers hailed it as the largest assemblage of foreign capitalists in China since 1917. It was before this gathering that Deng Xiaoping chose to deliver his now famous remark that China's open door policy would endure another 50–70 years.

Rong Yiren, former industrialist par excellence, exemplifies the CITIC image. Born in 1916, Rong was scion of a family whose textile, flour milling, and banking interests in Shanghai made it one of the country's largest holders of private property. Unlike many capitalists who fled to Taiwan, Rong remained on the mainland and continued to hold executive positions under the Communists, mainly in the textile industry. In the 1950s he served as a Shanghai deputy to the National People's Congress, vice-mayor of Shanghai, and vice-minister of textile industry. But like many other former industrialists, Rong was branded a "class enemy" during the Cultural Revolution, and essentially disappeared from 1966 to 1972. The new leadership has compensated Rong for his losses during that period, and returned his large home staffed with servants and chauffeur. Now reputed to be one of the richest men in China, Rong enjoys the trust of top Chinese politicians, chairs board meetings in the Great Hall of the People, and travels widely in service of the corporation.

Rong was on hand to receive 20 Cadillac limousines CITIC recently bought from General Motors. At a ceremony outside the corporation's new Beijing headquarters, the chairman said the cars—some equipped with TV and bar—would be used by visiting VIPs and possibly top Chinese leaders.

As at least one observer has commented, the current Chinese leadership realizes it takes a capitalist to

catch a capitalist. Judging from the respect he and his organization have earned abroad, Rong Yiren has been busy catching quite a few.

Foreign business people generally like dealing with CITIC. One US businessman who has dealt with the corporation describes his firm's experience as "more than favorable." CITIC staffers "are very professional. They move with a speed not typical of Chinese organizations. If you plan to do business with CITIC, you'd better be ready to respond. They're Western-educated, grasp Western business practices, and have a clear line to major decision makers." Another executive whose firm is still negotiating a joint venture with CITIC said, "Our experience has been very positive. We're still having big arguments over foreign exchange, but we'll go straight to Rong Yiren and tell him this could break the deal. We'll find out—I think he can do it, he's got the friends." Still another whose company has already signed a joint venture with the corporation offered this advice for US firms contemplating business in China: "See CITIC at first blush. There's no one-stop shopping in China, but if there is, it's CITIC."

Industrial investment

This reputation has enabled CITIC to take equity positions in about 30 Sino–foreign joint ventures and more than 80 domestically owned enterprises. Policy statements say the corporation invests mainly in the State's priority sectors of energy, transport, and communications. In fact, CITIC's investment portfolio is much more diversified. While these sectors are important, CITIC also stresses chemicals, textiles, food processing, and service industries.

The corporation's investments are beginning to pay off. Investment income jumped from just ¥2.4 million in 1983 (6 percent of total income) to ¥26.6 million (23 percent) last year. CITIC's President Xu Zhaolong, owner of a Shanghai chemical factory before 1949, predicts this trend will continue as more of CITIC's industrial investments begin to produce a return.

In its joint ventures with foreigners, CITIC often plays a matchmaker role in bringing potential Chinese and foreign partners together. The actors are usually a well established Chinese factory in need of technical

CITIC'S JOINT VENTURES WITH FOREIGN COMPANIES

Venture/ Location	Total Investment (CITIC share)	Partner(s)	Activity
Citifor Inc./ Moses Lake, WA		MD Trading Co. (US)	Cut and process timber for China's domestic needs in Washington State.
China Investment and Finance Ltd./ Hong Kong	$4.1 mil (50%)	Royal Bank of Canada	Full-service merchant bank and deposit-taking company.
Togen Int'l Investment Co. Ltd./Hong Kong	N/A	N/A	Buy timber in Southeast Asia.
Sandeli Foodstuffs Co./ Lianyungang, Jiangsu	$12 mil (10%)	Suntory Ltd. (Japan)	Food processing.
China Tianjin Otis Elevator Co./Tianjin	$5 mil (5%)	Otis Elevator Co. (US), subsidiary of United Technologies	Produce, install, and service elevators and escalators for Chinese market and export.
Shanxi Antaibao Open Pit Mine/Shanxi Province	$600 mil (10%)	Occidental Petroleum (US)	Coal mining.
China Nantong Huafeng Co. Ltd./Nantong, Jiangsu	$3 mil (15%)	A-Z Trading Co. (Japan), Nantong Light Industrial Bureau	Produce cellophane, imitation leather, and plastic wallpaper.
China Jiangsu Suntory Foods Co. Ltd./ Lianyungang, Jiangsu	$35.7 mil (10%)	Suntory Ltd. (Japan), Lianyungang Brewery, Jiangsu ITIC	Process foods and beer and other beverages.
China Int'l Steel Products Co. Ltd./Fuzhou, Fujian	$29 mil (20%)	Wai Hing & Co. (HK), Fujian Gen'l Metallurgical Ind. Corp.	Produce steel rods using Austrian equipment.
Nanjing-Skipper Electronics Co. Ltd./Nanjing, Jiangsu	$0.6 mil (30%)	Skipper Electronics Co. Ltd. (Norway), Huijiang Development Co. Ltd. (Min. of Communications)	Manufacture navigation instruments.
China Orient Leasing Co. Ltd./Beijing	$3 mil (N/A)	Japan Orient Leasing Co. Ltd., Beijing Machinery and Electrical Equipment Co.	Lease equipment.
Guangzhou Peugeot Automobile Co./Guangzhou	$60 mil (28%)	Peugeot (France), Guangzhou Automobile Factory, Banque Nationale de Paris	Manufacture light vehicles at a factory in Huangpu.
Guangmei Foods Co. Ltd./ Guangzhou	$10 mil (10%)	Beatrice Cos. (US), Guangzhou Foodstuffs Co.	Produce soft drinks and snacks.
Beatrice–CITIC Development Co./Beijing	$100 mil (40%)	Beatrice Cos.	Set up factories in several Chinese cities to produce beverages and fast foods.
CIT–UIC Corp./Beijing	$11 mil (50%)	United Industrial Corp. (Singapore)	Will establish joint ventures inside and outside China in food, medical, and tourist industries.
China Swire Development Co. Ltd./Hong Kong	N/A	John Swire & Sons Ltd. (UK)	Invest in property in Hong Kong and the mainland.
China Nantong Rikio Co. Ltd./Nantong, Jiangsu	$1.2 mil (10%)	Rikio Co. (Japan), Nantong No. 2 Light Industrial Bureau	Make safety shoes for export to Japan.
Zhuoxian–Kobe Nonferrous Metals Fabrication Co. Ltd./Zhuoxian, Hebei	N/A	Kobe Steel Co. (Japan), China National Nonferrous Metals Industry Corp.	Make fabricating equipment.
No name yet/Wuxi, Jiangsu	No final agreement yet. (20%)	Sperry Corp. (US), China Computer Technical Services Corp., Wuxi Electronics & Instruments Industry Bureau.	Make Chinese-language MAPPER-based general data processing system.
Sino–American Biotechnology Company/ Zhengzhou, Henan	$1 mil (N/A)	Promega Corp. (US), Sinogenetik (Can.), Luoyang Biochemical Factory in Henan	Make genetic biochemicals.
Macao Cement Co. Ltd./ Macao	N/A (30%)	N/A	Make cement.
China Nantong Hymo Co. Ltd./Nantong, Jiangsu	$0.8 mil (10%)	Hymo Co. Ltd. (Japan)	Make linen for garments.
Jingying Chandelier Co. Ltd./Beijing	$1 mil (12%)	Concel (HK)	Make crystal chandeliers.
Shanghai Lianhua Synthetic Fibers Ltd./ Shanghai	$24 mil (15%)	Li-On Group (Thailand)	Make polyester filament.
Tianjin Liming Cosmetics Industrial Co./Tianjin	N/A	N/A	Make shampoo, hair conditioner.
Beijing–Dah Chong Motor Service Ltd./Beijing	$0.5 mil (20%)	Dah Chong Ltd. (HK)	Automobile maintenance.
Sino–British Joint Printing Co. Ltd./Beijing	$3 mil (20%)	Richard Clay Group (UK)	Printing.
Union Car Rental Co./ Beijing	$5 mil (50%)	Shortridge Ltd. (HK)	Rent and service automobiles.
CIFIDECO Ltd./ Hong Kong	$0.4 mil (10%)	Cedeco (Italy)	Trading and transportation in the fishing industry.
SOACHIP S.A./Dakar, Senegal	N/A (3%)	Simpeche SA	Fishing.

Source: CITIC and National Council files.

renovation and a well known foreign company in that industry. CITIC typically takes part in the joint venture negotiations, and then contributes 10–30 percent of the new venture's equity capital.

Companies with such household names as Otis Elevator, Peugeot, and Beatrice number among CITIC's foreign partners. President Xu stresses that CITIC's financing role is secondary to its catalyst role: "Our policy is not to make a big investment—usually 30 percent maximum." Still, the corporation is taking increasingly greater equity positions in the joint ventures it helps organize. It is providing 40 percent of the $100 million investment in a new food processing venture with Beatrice, and is a 50–50 partner with the Royal Bank of Canada in a new merchant banking institution based in Hong Kong. CITIC is also a 10 percent partner in the long-discussed contractual joint venture with Occidental Petroleum Corporation to develop the huge Antaibao open-pit coal mine in Shanxi Province. Since the project's total investment is reported at $650 million, CITIC's share would appear to make this the corporations' largest single investment in a deal involving a foreign firm.

In domestic projects, importing foreign equipment and technology is usually CITIC's principal role. Here again, the corporation functions as a bridge between the needs of the domestic economy and the technical help offered by foreign manufacturers. CITIC dips into its foreign exchange reserves to import advanced equipment, again usually for existing enterprises. The machinery and/or know-how represents CITIC's investment in the refurbished enterprise.

The corporation followed this model when it took a stake in the Yizheng Chemical Fiber Plant in Jiangsu Province, where its partner is the Ministry of Textile Industry. The plant has a reported total equity capital of ¥1 billion; CITIC's 30 percent share apparently makes this the corporation's largest single industrial investment. CITIC also helped pay for a Xiamen factory's purchase of technology from Eastman Kodak, and imported West German and Japanese luxury cars as its contribution to a joint venture with the Beijing Taxi Company, to name just a few others.

In its domestic investments, CITIC is developing a reputation for rescuing enterprises in trouble—something China does not lack. Construction of the Yunnan Phosphate Fertilizer Factory in Kunming began in 1973, but was suspended in 1979. The Chinese government approved resumption in 1981 only after the plant took CITIC on as a partner to help it import needed foreign equipment. Similarly, CITIC rescued three textile mills being built in Heilongjiang Province whose construction had halted due to a lack of funds. According to a *China Daily* report, "The mills turned to CITIC to bail them out." The financial white knight turned things around by forming partnerships, putting up 40 percent of the ¥120 million construction costs, importing foreign machinery worth $1.2 million, and taking control of export marketing.

Photo courtesy of New China Pictures

CITIC President Xu Zhaolong

Such success stories have helped generate virtually boundless demands on CITIC's investment resources from enterprises throughout China. This surfeit of investment opportunities has in turn helped the corporation stick to its stated investment criteria. As Xu Zhaolong puts it, "CITIC's special aspect is that it pays attention to profit. Our guidelines for investment are: 1) economic results—we perform feasibility studies to ensure that a project will have an internal rate of return of at least 15 percent; and 2) maintaining a balanced foreign exchange account." Xu adds that not every project must meet the latter requirement. Some projects will generate a foreign exchange surplus while others leave a deficit, but CITIC strives for a corporation-wide balance in its foreign exchange account.

Even with these criteria, CITIC has a tough time sorting out competing demands, for example between coastal areas now actively courting foreign investment and the resource-rich interior. Xu admits the tension. "We attach more importance to the 14 open coastal cities, but they're more capable than interior areas of doing business on their own without our help. Also, it's easier for foreigners to do business in the coastal areas. Some interior provinces have rich resources that really need to be developed and a lack of experience, so we try to help them."

Finance and banking

Although CITIC's income from manufacturing investments is now growing rapidly, most of the corporation's income in its first four years came from lending and borrowing on international capital markets. In 1983 the corporation had net interest income of ¥6.7 million, almost three times its investment income. While gross interest income has dropped from 80 percent of total income in 1983 to 62 percent last year, net interest last year was a healthy 57 percent higher than in 1983.

CITIC claims to have established relations with some 60 large financial institutions worldwide. CITIC knows where to put its money: by the end of last year, the organization had deposited the equivalent of ¥979 million with foreign banks, compared to just ¥21 million with domestic banks. Foreign banks also extend credit to CITIC in the form of long-, medium-, and short-term loans. The 1984 balance sheet shows loans totaling the equivalent of ¥473 million, almost six times the 1981 level. Most of the funds CITIC raises abroad are for its own use, but it also occasionally borrows for clients in China.

CITIC has other ways of raising cash, thanks largely to permission granted last October by the State General Administration of Exchange Control for CITIC to deal in foreign exchange. This allows the corporation to accept trust funds and other deposits in foreign currency, in effect creating a new foreign exchange bank that breaks the monopoly formerly held by the BOC. By the end of 1984, CITIC had received ¥962 million in trust deposits, up from ¥22 million in 1983, although it is not clear how much of this is in foreign currency.

CITIC began issuing foreign currency bonds on international markets even before it was allowed to set up a foreign exchange bank. Indeed, the corporation has probably made its biggest financial splashes with two

yen bond offerings, the first (also China's first) a J¥10 billion private issue in January 1982 and the second a J¥30 billion public issue last January. CITIC is also expected to follow the Bank of China into the Eurobond market with a Deutschemark issue, possibly later this year. The corporation hopes to raise the equivalent of $200 million in various international bond issues this year and next. According to corporate leaders, however, the US market remains off limits until the Huguang railway bond issue is resolved. This involves the current Chinese government's refusal to honor bonds issued by the Qing dynasty imperial government in 1911; suits brought by American holders of the bonds are pending in two states.

CITIC's expanded banking operations and its Hong Kong-based joint venture with the Royal Bank of Canada will raise the corporation's profile in international banking. But there is speculation that this might involve transferring control of CITIC's financial activities from the State Council to the People's Bank of China, the country's central bank and parent of the BOC. CITIC's leaders would surely lament such a severance of their direct line to the State Council, although it would help ensure a unified national credit plan.

Overseas investment

China is a newcomer to investing abroad, and here again CITIC is in the forefront of the national effort. Since the State Council granted the corporation this authority in 1983, CITIC has invested in tracts of standing timber in southeast Asia and the northwestern United States, and explored other investments in phosphate, potash, and copper resources abroad.

According to CITIC President Xu, corporate leaders are still deciding whether their overseas investment strategy should rely only on buying shares in foreign companies or on riskier, more complex forms of cooperation with overseas firms. In any case, CITIC's emphasis will be on obtaining secure supplies of natural resources that China lacks. The corporation will be "very flexible" in choosing an overseas investment policy, and invest perhaps $50 million per year outside China, says Xu.

Owning assets abroad is an ideologically touchy subject in socialist China, and the new drive has almost surely generated lively internal controversy. In an apparent response to the critics, Chairman Rong told a *China Daily* reporter last year that, "CITIC is not bent solely on profit, but is tapping potential funds and natural resources overseas for China's modernization drive."

Real estate

At home, CITIC is taking advantage of its location in one of the world's tightest real estate markets, and using its financial assets to alter Beijing's skyline. The corporation recently moved into its new 29-story office building on Jianguomenwai Avenue. Most of the building will be occupied by foreign businesses paying rent at a rate of about $1.40 per square meter per day, much higher than rates even in Hong Kong and Paris. Given the severe shortage of office space in the Chinese capital, CITIC had no trouble leasing the space well before the building was completed.

The corporation has hired a Japanese firm to design a second, 50-story office/apartment building for Beijing exclusively for foreign companies. Also financed and managed by CITIC, the second skyscraper is scheduled for completion in 1988. CITIC is also making other commercial and residential real estate investments in Beijing and the Xiamen special economic zone.

Trade, leasing, and consulting

If one of CITIC's domestic investment projects produces export goods, CITIC usually takes responsibility for the overseas marketing. Otherwise, CITIC generally does not get involved in export activities, although it will handle importing for enterprises other than those in which it has invested. In this importer role, CITIC functions as a traditional trade agent, earning a commission for its services.

CITIC takes credit for introducing industrial equipment and technology leasing to China. Besides its own in-house leasing division, CITIC has two partners in the leasing business. The corporation joined forces with the Japan Orient Leasing Co. Ltd. and a Beijing industrial bureau to form the China Orient Leasing Co. Ltd., and with the State Administration of Supply to form the China Leasing Co. Ltd. Officials say all three organizations remain under CITIC's unified leadership and management. Last year alone the network undertook 400 leasing projects, concluded contracts worth $284 million, and imported technology and equipment worth $232 million. CITIC clearly sees leasing as another important way to fulfill its function as a conduit between foreign technology and Chinese enterprises needing technical renovation.

CITIC established an in-house research and consulting arm shortly after its founding to support its investment activities. This later developed into the China International Economic Consultants, which now provides financial, legal, and technical consulting services to Chinese and foreign clients. CIEC ranks among the most sophisticated of a new generation of Chinese consulting organizations discussed on page 11.

Bureaucratic ins and outs

CITIC is proud of the fact that it reports directly to the State Council, which gives its leaders considerable authority. President Xu reveals, for example, that CITIC did not require

AN INTERVIEW WITH RONG YIREN

Rong Yiren is chairman of the Board of Directors of the China International Trust and Investment Corporation and a vice-chairman of the Standing Committee of the National People's Congress. He spoke to The CBR *in May, while in Washington to address the National Council for US–China Trade's annual meeting. Following are excerpts from this interview.*

Photo courtesy of New China Pictures

CBR: CITIC's domestic investments seem to be spread over a wide range of industrial sectors, even though policy now stresses energy, transport, and communications. Will CITIC's investments remain so diversified?

Rong: Energy, transport, and communications are just part of our emphasis. We also must renovate old enterprises in different fields. Our investment scope cannot be restricted.

CBR: Press reports have said CITIC's recently announced joint venture with Beatrice Foods will market its products nationwide in China—is this correct?

Rong: The agreement with Beatrice creates what I believe you would call an "umbrella corporation." This is a new form of cooperation for China. It was proposed a few years ago, but I thought then that the time was not ripe. Now I think we should pursue this type of cooperation with certain companies.

CBR: How will Beatrice repatriate its profits?

Rong: The company will market some products domestically and some products overseas. The latter will earn foreign exchange. In this way, Beatrice will be able to repatriate profits in foreign currency. Beatrice has a foreign exchange guarantee.

CBR: Many foreign companies say they are reluctant to invest in China because of the difficulty of repatriating foreign exchange. Has a formula been worked out in the Beatrice deal that could serve as a model for future deals?

Rong: The Beatrice deal is the first of its kind in China, but we plan to make several more. This is a good form of cooperation.

CBR: What will be CITIC's role in the Antaibao coal mine joint venture with Occidental Petroleum Co.?

Rong: CITIC is cooperating with the China Coal Development Corporation. But this is not actually an equity joint venture. CITIC's participation in the deal might be around 10 percent.

CBR: How would you characterize CITIC's progress in raising money in international capital markets? Does CITIC plan future bond issues?

Rong: CITIC was the very first Chinese organization that issued bonds in Japan. We are now preparing to enter second and third markets. However, there's a problem in the United States, so we have to avoid that market. Some of the practices in the United States do not benefit US–China commercial relations. A small minority is hurting the interests of the majority. But we're negotiating in Europe and one other area. CITIC plans to raise more than $200 million in bonds worldwide in the next two years.

CBR: What is CITIC's relationship to the Bank of China? Do CITIC and BOC coordinate their respective bond issues on international markets to minimize competition?

Rong: There is mutual understanding between CITIC and the Bank of China. We solve problems internally.

CBR: If there's a dispute between the two organizations, how is it resolved?

Rong: The Bank of China is under the People's Bank of China. CITIC is under the State Council. So far, I haven't had occasion to take any problems to the People's Bank.

CBR: The Chinese government has recently announced a tightening of the guidelines on lending funds to domestic enterprises. Some foreign companies have complained that they are having trouble being paid for goods shipped. Could you comment on this?

Rong: There are two aspects to this problem. First, the Chinese enterprises involved didn't adequately consider their finances. Second, the foreign enterprise involved didn't consider all factors in choosing its Chinese partner.

CBR: How does this new development affect CITIC's business? Has CITIC been told to restrict its investments?

Rong: This problem doesn't arise in our company. CITIC has not been told to restrict its investments. This is my own company—I decide these things.

higher approval to form a joint venture with the United Industrial Corporation of Singapore, even though that country does not have diplomatic relations with China. When it must, Xu says, CITIC reports to the premier or a vice-premier, generally through the State Economic Commission.

CITIC actually has two boards of directors. The more powerful executive board has only 13 members. The nonexecutive board has 60 members representing various government ministries, provinces, and the 14 coastal cities open to foreign investment. Another famous former industrialist, Wang Guangying, the head of China's Hong Kong-based Everbright Company, also serves as a nonexecutive director. The membership of the larger board helps ensure that demands for investment from numerous localities reach the corporate leadership.

CITIC's staff has grown along with its income and range of business activities. The corporation started with 33 in 1979, and now has more than 300. Besides the Beijing headquarters, they serve in branch offices in Hong Kong, Tokyo, Paris, and the newly opened New York office that recruits investors throughout North America. If attendance at the gala June opening is any indication, the New York office's capable three-man staff will be kept very busy.

Challenges and prospects

Business agreements between CITIC and most Chinese provinces and leading municipalities help strengthen and broaden the organization's domestic base. Many of these localities have formed their own international trust and investment corporations. President Xu says these provincial and municipal 'ITICs' remain independent of the national corporation and may, for example, approach potential foreign investors and enter joint ventures on their own. The prospect of competition for investment projects between the national and local corporations is minimized by the inexhaustible supply of such projects: "We have so many things to do. China has so many needs. Only 10 percent of the conceivable projects can receive investment." Still, the relationship can hardly be one between equals. Relations are known to be tense between CITIC

and the Shanghai Investment and Trust Corporation, the largest of the local corporations. CITIC and SITCO are widely held to be the two most influential organizations in Shanghai, and competitive sentiments run high. SITCO's reported plans to open an office in San Francisco would clearly help it compete in the US arena with CITIC's New York base.

Strains are also evident between CITIC and the Bank of China, largely because the expansion of CITIC's business scope has brought it into direct competition with the BOC in many areas. Besides ending the BOC's exclusive authority to deal in foreign exchange, CITIC also competes with the bank in attracting foreign investment, issuing bonds, accepting trust deposits, and performing consulting services. "Of course there is competition," says Xu, "but coordination between CITIC and the bank takes place at a higher level."

A source at the BOC concurred that coordination of China's total borrowing was necessary to prevent the country from becoming another Mexico or Brazil. The same staffer predicted that when the time came to issue bonds in the US market, the BOC would lead the way. CITIC's New York office might make it more competitive, but the BOC's experience, he maintains, should enable it to remain ahead of the younger upstart.

The fact that Rong Yiren serves as one of the BOC's managing directors undoubtedly facilitates coordination between the bank and CITIC. But from the point of view of foreign bankers, all this remains behind the scenes. While cheering the end of BOC's foreign exchange monopoly, bankers complain of increased confusion in the system. For some, the tangle between CITIC and the BOC poses a question of 'which horse to back.' As one US financier put it, "The only course for now seems to be to back both."

Many of China's former industrialists have beaten the odds and returned from oblivion to establish a corporation that promotes the country's modernization and enhances its reputation abroad. Their successors at CITIC will face a whole new set of challenges and perhaps only marginally better odds as they chart the corporation's progress through an uncertain future. 完

Prospective clients should pick one judiciously

Consulting Groups Proliferate

Carroll Bogert

Their slogan reads: "In the United States there is Rand Corporation; in Japan there is Nomura. The Lida of Qinghua will be their counterpart in China." Formed last year by students of Beijing's Qinghua University, the Lida Consulting Center is another sign that the Chinese are entering the consulting business with enthusiasm and high hopes.

The liberalization of domestic commerce means that Chinese enterprises need to know more about each other, to identify potential partners and competitors. Thus, most of the new consultants seek only domestic clients. But a number of them have their eye on the international market, and seek clients among foreign traders and existing or prospective foreign investors. American firms may want to consider consulting such organizations as they conduct business with China. But be careful: it can be difficult to determine what they offer and how well they deliver.

Chinese consulting services fall into three basic categories: domestic groups such as Lida; international operators that are closely tied to a government ministry (such as CONSULTECH, under the Ministry of Foreign Economic Relations and Trade); and relatively independent international operators. All three types have multiplied in recent years, especially the domestic consultants.

According to *China Daily*, in the period from July 1983 to November 1984 the number of consulting offices in Shanghai almost quadrupled, to 228, while the number of people employed full- or part-time in providing specialized advice to others reached 16,000 in that municipality alone. An outdoor consulting fair organized by the Lida center in Beijing drew over 3,000 participants, many of them young people interested in starting their own consulting services. Not all of the new domestic groups will succeed, but their activities have received official encouragement as part of the new emphasis on promoting the service sector. Thus, consulting companies in China are likely to continue to expand even as the less efficient fold.

Some American business people see this phenomenon simply as part of China's desire to make money. "They're trying to perform what we would consider bona fide professional services," says Robert MacLeod, formerly a registered representative of Coopers and Lybrand in Shanghai. When the Chinese saw firms such as Coopers and Lybrand earning a profit by selling accounting advice, it wasn't long before they set up the China Consultants of Accounting and Financial Management, the first in that field. A number of provincial financial consultants followed in its wake.

Profits are not the only spur to the growth of Chinese consulting firms. The Chinese increasingly request that joint venture partners study the feasibility of proposed projects in depth. The China International Trust and Investment Corporation (CITIC) formally requires such feasibility studies for all its joint ventures, and has set up its own consulting service, the China International Economic Consultants (CIEC), to perform them, and to provide other services to outside clients.

Promotion vs. consultancy

Most of the new consulting groups

Carroll Bogert is a free-lance writer living in China, and is completing her Masters degree in East Asian Studies from Harvard University.

that offer services to foreign clients are tied closely to government ministries and departments. For this reason they may act more like agents of trade promotion than independent consultants. The board of directors of the new Chongqing International Technology Consultancy Corporation, for example, is basically a new constellation of the old stars in the city's foreign trade bureaucracy, including the deputy director of the Foreign Affairs Department, the head of the Import Office, and the deputy manager of the Travel and Tourism Company. The organization seeks to introduce clients and organize negotiations between local firms and foreign business people. While they may provide useful market information and other services, their primary goal often seems to be trade promotion rather than objective consultancy.

The number of Chinese offices providing consulting services overseas is also growing quickly, spurred by economic decentralization in China. Among the largest in the United States is China United Trading Corporation, the New York-based umbrella group for PRC trade representatives. Most divisions of China United offer advice of some kind. They can research the market for particular American products, organize seminars and distribute leaflets in China for US companies, and help locate possible customers. But in most cases their advice is intended ultimately to promote trade. "Our consulting service is always closely tied to the business involved," admits a China United staff member.

However, China United also operates a separate department devoted to more general consulting services. The department does not conduct market research, which is the specialty of a different division at China United Trading, but it does furnish economic data and introduce trade partners. While other divisions of China United Trading may offer similar services, they do so on specific industrial topics. "We can do consulting on a more general basis," explains Zhuang Mulan, director of the consulting department.

The fine line between consultancy and promotion is less clear-cut at some of the other Chinese representative offices in the United States. Under pressure to show a profit, some operations support themselves by charging commissions for a growing variety of activities loosely grouped around helping firms do business in China. But particularly in cases where these offices represent subsidiaries of larger operations in China, US firms increasingly complain of being asked to pay just for the privilege of signing a contract or even merely communicating with Chinese principals through these offices.

There are some American firms with no qualms about retaining Chinese consultants simply to make connections in the vast Chinese bureaucracy. For example, one firm admits it sought the advice of the Bank of China "more for access within China" than for the value of the bank's recommendations. Another West Coast consultant has said of CONSULTECH, "Their specialty is working within the bureaucracy. I enjoy talking with them because a lot of what they say is part of the current thinking in the government."

But other US firms have experienced problems with lack of confidentiality when working with PRC intermediaries linked closely to the Chinese government. One US vice-president for marketing complains that, "We found it very difficult at times. They wore 80 percent a Chinese hat and 20 percent our hat. . . . We'd hold confidential discussions on one side, and then you'd find out the information's on the other side of the table."

Still others have found the connection between Chinese representatives in the United States and their parent office in China not strong enough. As one long-time China trader put it, "They have the same problems American companies do in China: their telexes are not answered promptly, and they can't get information out of China . . . China's got to start responding to their needs." But the US offices of Chinese firms often do not have anyone working exclusively for them back in China. This trader claims that, "Without back-up support from China, they will be useless, absolutely useless, to anybody."

Higher marks for the independents

Consultants who are not linked to government ministries seem better able to provide objective information and independent opinions. Respected figures such as Tao Zuji of Shanghai Industrial Consultants, and Jing Shuping, head of CIEC, win praise from US clients. One West Coast consultant calls them "knowledgeable and savvy, with English skills probably better than mine." Jing says CIEC differs widely from consulting services attached to China's foreign trade corporations. When doing feasibility studies, he claims, "They *make* it feasible, they are promoters . . . I promote, but I also demote."

In its first three years, CIEC was involved in more than 100 projects outside of its work for CITIC, according to corporation President Xu Zhaolong. CIEC has a staff of about 70, but many only work for CIEC part-time, in addition to their primary duties with research institutes or as factory engineers.

The vice-president of one large US firm says he was "very pleased" with the feasibility study CIEC did for the firm. The executive also points to the fact that second-rate Chinese consulting groups have no monopoly on providing less than objective information: "US consulting companies often tell CEOs what they want to hear. CIEC told us what we needed to know."

Another US corporate client of CIEC's that wanted to market a particular product in China asked CIEC to find out how many plants China had producing the product, along with their locations and capacities. "The CIEC study contained a good amount of usable information," according to one company executive. But the study had asked only for factual information, and not much value judgment. The firm has now commissioned CIEC for a second, more difficult study to determine not only which industries are currently using this product, and how much they are using, but also its potential use in various industries. CIEC's ability to make such predictions remains to be seen.

Most Chinese consulting services are just getting off the ground, and it may be too early to judge their performance. One trend is clear, however: their fees are rising. Gone are the days when CIEC charged as little as $50 a day. Prices may not have reached American levels yet, but US firms should still select consultants very carefully to make sure they're getting their money's worth. 完

"我不知道你是谁
" I don't know who you are.
我不知道你的公司
I don't know your company.
我不知道你的公司的产品
I don't know your company's product.
我不知道你的公司代表什么
I don't know what your company stands for.
我不知道你的公司有那些顾客
I don't know your company's customers.
我不知道你的公司办得怎样
I don't know your company's record.
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Electric Power and the Chinese Economy

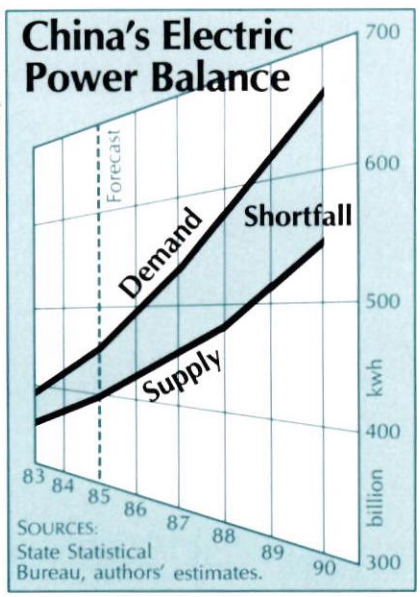
David Denny

China's shortage of electric power was recently impressed upon a prominent American expert on socialist economies. The economist was not overly surprised to see dim and flickering lights in the hotels in China. He was more surprised to find one of China's most important heavy industrial plants closed for the day because of power shortages. But the seriousness of the situation was brought home forcefully when his hosts announced that they could not visit the city's Friendship Store because the power supply to that area of the city was cut off for the afternoon. To a student of socialist economies, the closing of such an important source of hard currency was a sure sign of extreme power shortages.

China's electric power shortages are real. Chinese leaders regularly cite estimates that 20 to 30 percent of China's industrial capacity goes unutilized because of insufficient power supplies. One official spokesman estimated that the gap between power demand and supply is on the order of 40 billion kilowatt hours (kwh) per year. The seriousness of the situation is such that top priority has been attached to investment in electric power generation and transmission, with foreign equipment and technology being acquired as part of this effort (*see* page 17).

This national power shortage was not unforeseen; Chinese and Western analysts alike predicted it. But despite their forecasts of a resulting slowdown in economic growth, the Chinese economy has sustained a vigorous expansion in the mid-1980s that has brought benefits to all important sectors. Moreover, this has been accomplished with a comparatively modest growth in electric power availability. How has this been accomplished, and can it be sustained?

Artwork by John Yanson



Experts predicted severe constraints

To most analysts, China's energy picture looked gloomy at the beginning of the decade. The previous three-decade-long industrial expansion had been fueled by the increasing availability of cheap energy. But a dramatic change in the energy demand and supply equation forced a hard-headed appraisal of China's real energy situation in the early 1980s. The looming energy shortage was one key factor in Chinese planners' decision to jettison the lofty goals of the overambitious 1978 economic plan in favor of lower economic growth targets and a period of economic readjustment. Planners feared sharp reductions in the growth of oil output and were pessimistic about finding major new reserves either offshore or on land. They were reluctant to make the heavy investment required to develop the massive coal mines, hydropower projects, and power plants that might alleviate the situation. Thus the Chinese expected economic growth of only 4 percent per year in the Sixth Five-Year Plan 1981–1985.

Western analysts viewed the situation in even more dire terms. US government and World Bank experts both forecast drastic declines in the rate of industrial growth, virtual stagnation of heavy industry, and China's possible shift from an energy exporter to an energy importer. The World Bank's 1981 analysis put special emphasis on the power shortage. Its "moderate growth" scenario forecast increases of only 2.5 percent for heavy industry and 7 percent for light industry through 1985.

In fact, China has done much better than expected. In the first three years of the five-year plan, the gross value of industrial output (GVIO) grew at an average annual rate of 7.4 percent, despite average growth in power output of only 5.3 percent per year. In 1984 and the first third of 1985, GVIO grew by 14 and 23 percent respectively, while electric power output managed just 6.6 and 9.1 percent.

The earlier pessimism was based to a large extent on the historical relationship between China's industry and electric power. As the graph on page 15 shows, increases/declines in industrial production almost always accompany increases/declines in power output. And while there have been occasional year-to-year differences in the growth rates of power and industry, the changes in the growth rates are usually of the same general order of magnitude. The

David Denny, an economist with the National Council, follows developments in China's energy industries.

other striking lesson drawn from the historical record is that despite this close connection, electric power actually grew more rapidly than industrial output from 1953 to 1983—12.9 percent per year as compared to 10.9 percent.

Does China's recent economic boom mean the country has broken the link between industrial and electric power output and reversed a significant historical trend? In other words, is China finally improving the efficiency of its utilization of electric power and getting more industrial bang for its electric power buck? Although there has been some improvement in the use of electric power, the evidence to date is mixed. It would be premature to conclude that the relationship between electric power and industrial growth has changed radically.

Seeking the link between power and industrial growth

In the face of the generally perceived shortage of electric power, how did China sustain the average annual rate of industrial growth of 8 percent from 1978 (the start of the economic reforms) to 1983? Three factors played a role: 1) growth in supply of electric power to industry; 2) a shift in the industrial output structure from heavy industry to light industry; and 3) raising the value of industrial output per kwh of power consumed, or in other words improving the efficiency of electric power use.

The growth in electric power supply to industry is the most significant factor in "explaining" China's industrial growth. Industrial power consumption grew by 6.3 percent per year in this period. With no change in industrial structure and no improvement in output per kwh, the same industrial growth rate would have resulted. Thus, increased consumption of power by industry accounted for more than 70 percent of industrial growth in the period.

Another 20 percent of the industrial growth can be attributed to a shift from heavy to light industry. Industry as a whole consumes about 80 percent of the power produced in China. The proportion of the total allocated to light industry increased from 10.7 percent in 1978 to 12.5 percent in 1983. The value of output per kwh used in light industry is about four times that of heavy industry. Thus this shift provided an important boost to the total industrial growth rate during this period.

A reduction in the intensity with which electricity was used (as measured by increases in the value of output per kwh consumed) comes in a weak third, explaining less than 10 percent of the industrial growth.

Clearly some industries have begun to utilize power more efficiently. But there was no dramatic, across-the-board improvement between 1980 and 1983. According to official statistics for 26 different commodities, the electric power requirements per unit of output dropped for half of the products, but increased for the other 13.

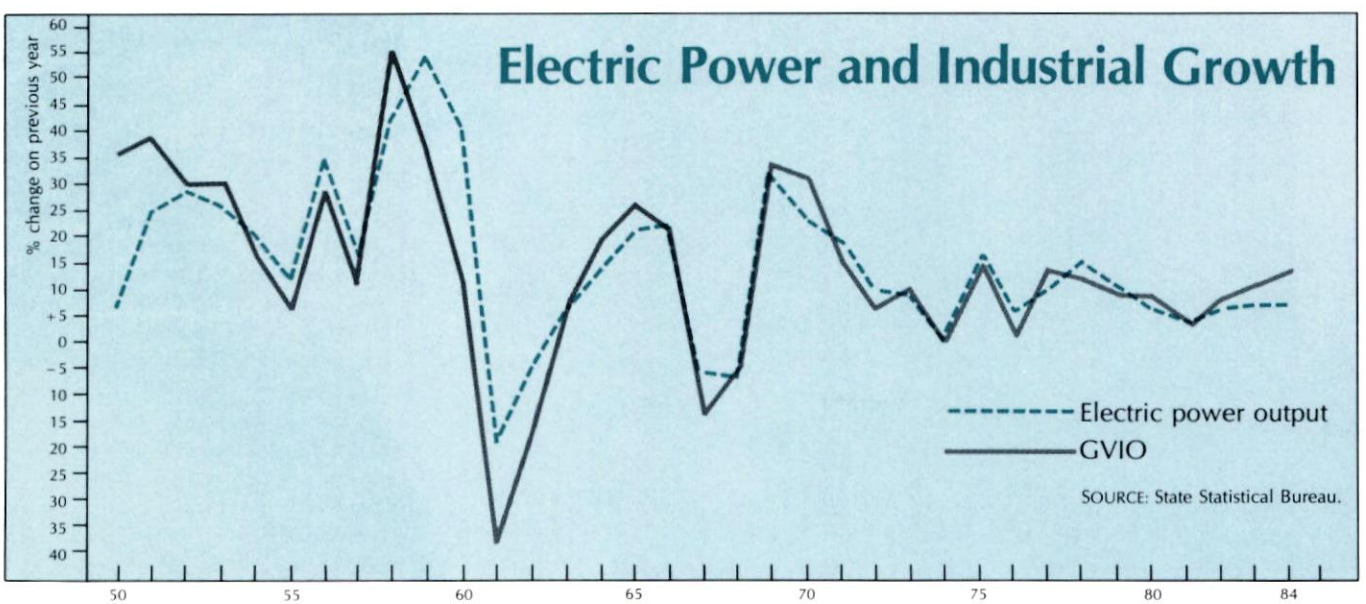
In aggregate terms, the gross value of agricultural and industrial output (GVAIO) per kwh consumed rose from ¥3.1 in 1978 to just ¥3.3 in 1983. There was no improvement in heavy industry's use of electricity. And the slight improvement in light industrial efficiency was partially offset by a decline in the efficiency of power consumption in the agricultural sector.

It may, of course, turn out that the 1978–1983 period is too short to draw any firm conclusions. But the absence of a strong trend toward higher output per kwh used must worry Chinese planners—particularly since they strongly emphasized energy conservation throughout the period. The bottom line is that trends in power consumption through 1983 indicate that it has not been easy to effect improvements in the use of electricity. The record suggests that plans for China's industrial growth that depend largely on achieving higher values of output per unit of electricity input should be viewed with a measure of skepticism.

The recent boom

This analysis may suffice for the 1978–1983 period. But what about the economic boom of this year and last? Judging from early indicators, it appears that there has been significant improvement in the utilization of electric power for all three sectors: light and heavy industry and agriculture. 1984 GVAIO (in constant 1980 prices) jumped to ¥3.5 per kwh consumed. Since light and heavy industry grew at about the same rate, a shift in industrial structure was not responsible for this improvement in output per kwh.

A full analysis of this apparently significant phenomenon will not be



possible until the State Statistical Bureau releases more complete information on economic performance in 1984 and 1985. However, the data will probably show a substantial increase in the industrial activities of smaller, less energy-intensive enterprises in rural and urban areas. A Shanghai report credited these industries with "pushing up the city's overall growth rate."

More generally, the economic reforms introduced in an experimental manner over the last few years are beginning to have some impact on the efficiency of China's industrial management. As bonuses become more closely tied to cost reductions made by enterprises, the incentive to better utilize energy resources rises. In addition, Chinese reports claim that new flexible channels of marketing and distribution result in less wasted time and more efficient use of existing equipment and materials. These factors could be responsible for Shanghai's claim that, "energy consumed in manufactured goods dropped by 10.5 percent in the first quarter of 1985. This means that 80 percent of the energy for increased production came from energy conservation."

Another possible factor in the greater efficiency of energy use could be a decision to increase imports of certain energy-intensive products, rather than produce them at home. In 1983 and 1984 there were very significant increases in imports of copper and aluminum ingots, chemical fertilizers, and cement. This permitted slower growth in domestic production of these energy-intensive products and allowed incremental electric power output to be shifted to products with higher output-per-kwh ratios. However, other factors may be of equal or greater importance in explaining increased imports of these products. It is too early to determine whether these purchases are only a short-term phenomenon or part of a longer lasting policy to utilize electric power more efficiently.

Future demand for electric power

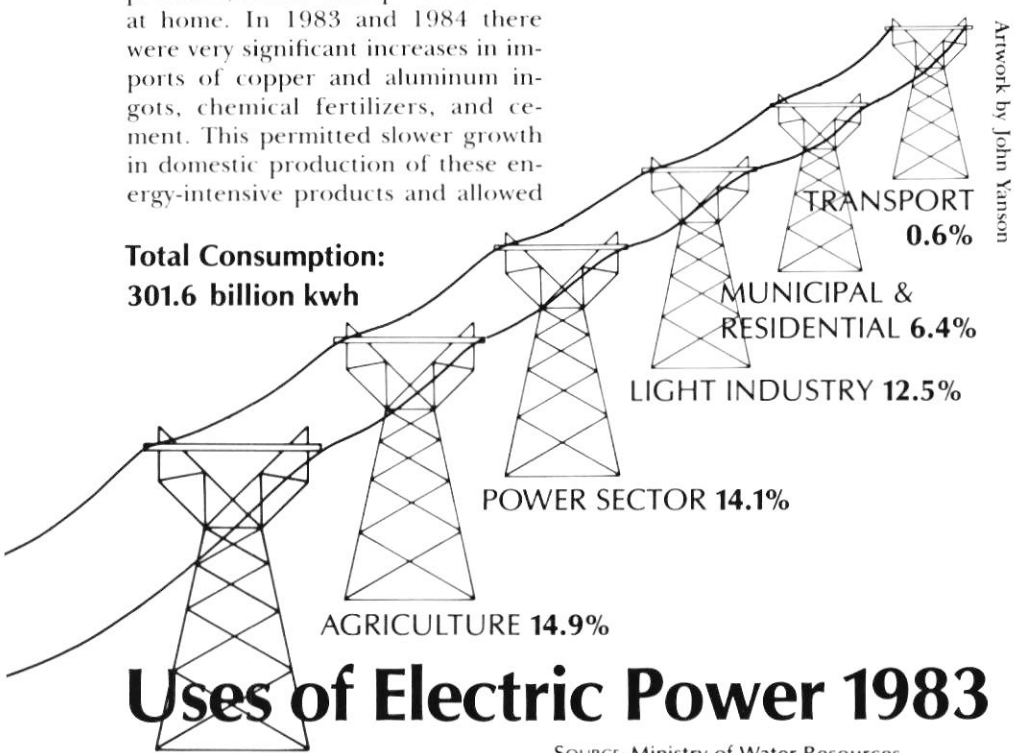
China's concrete economic targets for the remainder of the 1980s still must be spelled out. However, China's leaders appear to be discussing a planned growth rate for GVAIO of more than 7 percent per year. Most observers believe that agriculture cannot maintain the same phenomenal rates of growth it has registered in the past few years. Thus, Chinese planners appear to anticipate that industrial growth will continue to approximate its long-term trend of 8–10 percent.

The key question is whether China's industry can sustain improvements of the past 18 months in the way it utilizes electric power. Unlike the 1978–1983 period, heavy industry is expected to grow as rapidly as light industry. As a result, the industrial growth rate figure over the next five years will not receive the boost it had in the past few years by shifting electric power from heavy to light industry.

To make substantial inroads on the problem of energy inefficiency, China's planners will eventually have to face the difficult problem of eliminating literally thousands of small-scale industrial plants that are extremely inefficient utilizers of electricity. The country's small-scale chemical fertilizer plants, for example, consume almost 100 times as much electricity per tonne of output as the large-scale imported plants. Chinese officials have closed some small industrial plants, but not enough. As one foreign economist has remarked, "The Chinese have learned how to use the profit incentive to get plant managers to expand their facilities, but they are unwilling to force deficit-ridden plants to shut down."

The most important variable affecting the future effective use of electric power is the degree of success of the new urban industrial reforms. Central planners are now more seriously considering real economic costs, comparative advantage, and energy shortages. New decision-making powers and new incentives for factory managers, combined with a much more efficient supply and distribution system, could significantly increase the efficiency of China's industrial enterprises. However, the reforms will also bring their own set of problems and inefficiencies. In any case, it is highly doubtful that the reforms can sweep over China's urban landscape in the same rapid and overwhelming way as in the rural areas.

While industrial reform may enhance efficiency in some sectors, these savings will be offset to some extent by increasing utilization of electric power in other sectors. For example, the electricity intensity of coal and oil output is increasing as China tries to exploit more difficult geologic structures. This trend seems destined to continue, since the country has only recently bought a new generation of electric equipment for extracting coal and oil. Technical help may come from three World Bank programs designed to act as catalysts for rationalizing and improving the energy efficiency of three power-intensive sectors: machine tools, urea fertilizer, and cement. The enterprises receiving attention will certainly reduce electricity consumed per unit of output. But how quickly



Artwork by John Yanson

Uses of Electric Power 1983

SOURCE: Ministry of Water Resources and Electric Power.

these results spread to other enterprises will not be clear for many years.

Therefore, while China's industry should continue to use electricity more effectively than in the past three decades, it is unlikely to continue the impressive efficiency gains of the past 18 months. A relatively conservative projection would be that China's industrial demand for electric power will grow about as rapidly as the rate of growth of industry.

Demand for electric power will also grow in other sectors of the economy. Demand by the transportation sector (currently a small consumer) will increase rapidly as ports are automated and especially as the large program to electrify more of China's railroads unfolds.

Rural demand for electricity is subject to offsetting trends. Traditionally, agriculture has consumed less than 15 percent of total power output. On the one hand, the current emphasis on the household responsibility system reduces the ability to construct and operate large-scale, collective irrigation schemes—which are the most important consumer of power in rural areas. On the other hand, rural household income is rising rapidly; where households have access to electricity, the demand for electric appliances is high. In addition, a large part of rural China is still without electric power. As new areas gain access to power there will be rapid, "first-time" increases in electric power consumption. Finally, farmers are being encouraged to diversify, move into higher value-added agricultural processing, and develop rural industry. These undertakings generally require more electric power per unit of output than traditional agriculture.

The urban/residential sector's share of total power consumption remained fairly stable at 5–6 percent for many years because of strict power rationing and a lack of electrical appliances. But the last five years have seen an explosion of imported and domestically produced refrigerators, washing machines, TVs, and other consumer durables. These are now within reach of the average urban household, and will generate equally explosive growth in demand for power to operate them.

A reasonable projection for total electric power demand growth over the remainder of the decade would be on the order of at least 8–10 percent per year—the same as the expected rate of growth of industry, the largest user of power. Demand in the household and transport sectors could significantly exceed the growth of industrial power demand.

Thus, unless power output grows by more than the next article predicts, there is every reason to believe that the gap between power supplies and power demands will grow even wider by 1990.

Central planners in China, of course, are generally powerful enough to ensure power supplies to key industrial enterprises. In any case, the projected rate of growth of electric power supplies will be sufficient to support continued impressive industrial growth, even though the economy appears to face continuing severe power shortages.

Planners' choices in the future, however, will be more complicated. Chinese consumers (particularly the large numbers that have recently bought electric appliances) can no longer be blithely ignored. Nor will it be possible (or wise) to ignore the rising needs of commerce, transport, and the rapidly diversifying rural economy. In fact, Chinese planners may well eventually adopt the advice of World Bank economists (*see* page 46) and focus less on GVAIO as a measure of progress and put more emphasis on the service sectors. In addition to directly improving consumer welfare and providing useful services for the industrial and agricultural sectors, such a policy would have the very useful side effect of reducing the gap between power supply and demand that China faces for the foreseeable future. 完

Attempting to catch up

China's Power Industry

Martin Weil

The unprecedented announcement that China will import 10,000 megawatts (mw) of thermal power plant capacity for coastal cities over the next two years—worth a potential $2 billion to foreign suppliers—indicates that power may finally be receiving the priority it deserves. A nationwide campaign to install 5,000 mw of new capacity this year, a feat accomplished only once before in PRC history, is further evidence that the nation's curiously schizophrenic policy toward electric power development may be ending.

Since 1979, China's top officials have repeatedly described the power shortage as one of the country's most serious economic problems. But concrete action has lagged far behind the rhetoric until recently.

From 1979 to 1984 power output increased at an average annual rate of about 5.5 percent to 370 billion kilowatt hours (kwh), less than one-sixth the US total. While respectable, this was well below the post-1949 average of about 13 percent per year. Generating capacity, now at about 85,000 mw, increased by a smaller absolute amount between 1979 and 1984 than in the preceding five years.

Most telling, capital investment in the power industry, a key determinant of future growth, lagged in this period and actually declined below 1978–79 levels in the 1980–82 period. Investment recovered somewhat, but still reached only an estimated ¥6.4 billion in 1984, a mere 28 percent above the 1978 figure. Somewhat embarrassed by such numbers, Premier Zhao Ziyang indicated apologetically during his announce-

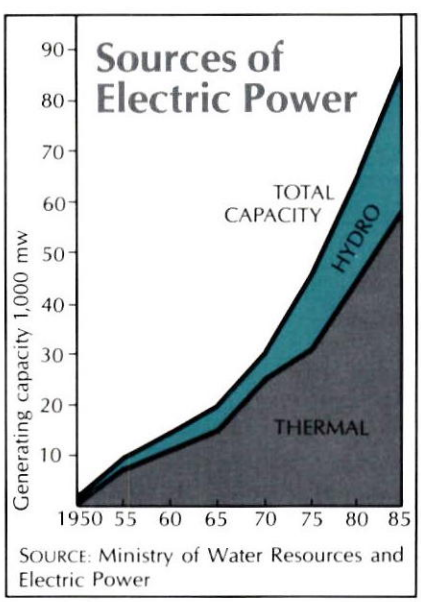
ment of the Sixth Five-Year Plan in 1982 that funding for the electric power industry was insufficient—the only sector for which Zhao explicitly revealed such a problem.

Three years later, the move to increase both imports and investment confirms that China's electric power sector will occupy a more important position in the Seventh Five-Year Plan period, 1986–1990. Earlier this year, Vice-Premier and chief energy planner Li Peng indicated that the goal for the Seventh Five-Year Plan would be 6,000 mw of new capacity each year, implying an average annual capacity growth rate of 6.2 percent. In more recent statements, Li has raised the target to 7,000 mw per year.

Judging from the projects already under construction, China may well be able to add 5,000–6,000 mw per year through 1988. Stepped-up investment in the next year or two could result in even higher capacity additions in subsequent years. But long construction lead times and other potential problems will probably delay any significant easing of the country's chronic power shortage until well into the 1990s.

New capacity: thermal first, hydro second

Deciding the size, type, and location of China's new power plants is an extremely politicized subject. Localities fight for as much electricity as they can get, and coal power, hydropower, and nuclear interests compete for limited funds. Thus, on the eve of the announcement of the Seventh Five-Year Plan, there is probably still some tugging and hauling over the exact shape of the new power plant construction program.



SOURCE: Ministry of Water Resources and Electric Power

It seems virtually certain, however, that despite the publicity given to nuclear power plants and big hydropower projects such as Three Gorges, coal-fired power plants will receive the most emphasis in the short term. Best estimates are that more than two-thirds of the 30,000–40,000 mw of capacity the Chinese hope to construct in the next five years will be coal-fired. This could push thermal power's share of total capacity from 68 percent to 72 percent in the next five years, according to calculations by James Lewek in a report soon to be published by the Congressional Joint Economic Committee.

Vigorous debate continues over whether coal-fired plants, after mine and railroad development costs are included, are really cheaper to build than hydropower plants. But the lower fixed costs of coal-fired plants themselves continue to look attractive to planners concerned with short-run costs, while the relatively short construction lead times for thermal projects usually prove persuasive to power users.

More and more, the Chinese are turning to so-called "mine-mouth" coal-fired power plants located several hundred kilometers from load centers, in the belief that it is cheaper to transport power than coal. Planners have identified nearly 15,000 mw of mine-mouth capacity that they hope to build between 1986 and 1990, primarily in the north China coal belt of Shanxi, Shandong, and Henan provinces, with several plants in Heilongjiang and northeast Inner Mongolia. A few medium-sized plants are to be built in Shaanxi, Gansu, and Ningxia in the northwest, and Yunnan and Guizhou in the southwest. Four or five large mine-mouth plants are planned in Jiangsu and Anhui provinces to provide power to the lower Yangzi River Valley, especially Shanghai.

China's major coastal and northeastern load centers demand reliable sources of power, and have prevailed upon the central government to allocate substantial new capacity for them. The 10,000 mw of new capacity that the Ministry of Water Resources and Electric Power (MWREP) pledges to import will go entirely for coastal areas—probably on the assumption that increased power availability will generate increased industrial exports that, in effect, pay back the foreign exchange spent on the power plants. The first plants to be imported, for which negotiations with many companies are believed to be underway, are targeted for Dalian, Shijiazhuang, Nantong, and Fuzhou. Other cities to use imported power plants include Shanghai (at the Wujing facility), Xiamen, Tianjin, Shenzhen, and probably Qingdao.

The Chinese are discussing building an additional 5,000–10,000 mw of coal-fired capacity on their own. These plants are to be located near major load centers all over the country, including Beijing, Tianjin, Shanghai, Guangzhou, Sichuan, and the northeast. Several, including one in Beijing, will replace oil-fired units.

Oil-fired capacity peaked at about 12,000 mw in the late 1970s, about half of which was originally designed to burn coal. The Chinese have already converted most of that portion back to coal, and will probably reconvert the rest soon. A few units designed for oil will also be converted to coal, including one unit at the Wangting plant in Jiangsu for which Denmark is providing assistance. But since the process is very expensive and involves a considerable loss of capacity, the Chinese prefer to keep units designed for oil as reserve capacity and gradually phase them out as new coal units are built. As of 1983, oil-fired plants still accounted for about 15 percent of total power generation.

The Chinese already operate 5,000 mw of what they call "co-generation" plants that generate both electricity and steam that can be provided to nearby users. The most modern of these facilities use gas turbines that greatly increase the efficiency and output of ordinary coal-fired power units. China now seems to be more interested in the use of gas turbines for power generation. A power facility at Daqing oil field recently bought a 36 mw unit from General Electric, and the South Xinjiang oil field has signed with Rolls Royce for three 21 mw units. Fujian Province made the first known purchase that did not involve an oil field application when it bought two stations with three 25 mw units each from Alsthom Atlantique (France).

Hydropower hangs on Three Gorges project

Hydropower plants account for about 30 percent of China's total generating capacity. The country is now building a number of large dams that will add about 11,000 mw of capacity. While a few have been started recently, most were begun before 1980 (*see The CBR*, July–August 1982). Spending on hydro projects, which pulled even with that for thermal projects in 1981, has fallen behind again in recent years. This is surprising for a country as well-endowed with hydro resources as China is and with a power minister as keen on water projects as Qian Zhengying.

The direction of future hydro development critically depends on the fate of the Three Gorges project on the Yangzi River in Hubei. The giant dam has long been touted as the ultimate solution to Yangzi River flooding dangers, but has also been controversial because of its long lead time, high cost, uncertain ecological effect, and the large number of people it would displace.

In its latest incarnation, the dam would have a generating capacity of 13,000 mw. MWREP won a go-ahead from the central government several years ago to do an intensive feasibility study on the dam on the assumption that it would ultimately be built. There is ample evidence, however, that its high cost still concerns many people in the central planning apparatus. Many believe that the dam will have to be built in phases—with concrete power benefits available after each phase—before the central government will finally commit the money for it. MWREP will submit a formal report on project design and relocation of residents this year, according to Minister Qian.

As long as the Three Gorges project remains unsettled, it is naturally difficult for Chinese planners to know how much money can be allocated to other projects. It is clear, however, that the Ministry of Power has ambitious hydropower construction plans beyond the Three Gorges.

Two major projects, Tianshengqiao Phase I (1,320 mw) and Yantan (1,375 mw), have already been initiated on the Hongshui River in Guangxi/Guizhou—the best suited river in China for large hydroelectric projects. Minister Qian proposes that work on two additional Hongshui projects, Tianshengqiao Phase II (high dam, 1,080 mw) and Longtan (at 4,000 mw the biggest Hongshui project of all), begin in the next five years. Other large projects believed to be on the ministry's list include Lijiaxia (2,000 mw) on the Upper Yellow River in Qinghai, Ertan (3,000 mw) on the Yalong River in Sichuan, Dongfeng (500 mw), and Pengshui (1,200 mw) on the Wu River in Guizhou/Sichuan, as well as new dams on the Dadu River in Sichuan, the Gan River in Jiangxi, and in Hunan.

Such planning suggests that hydro construction could pick up considerably in the next few years. But it is still not clear if and where the ministry will find the resources to support all the proposed projects.

Alternatives to new power plants: better utilization and distribution

In addition to building new power plants, China also needs to take advantage of the great potential for increased efficiency at existing stations. In fact this has already started to happen in recent years, as power output has consistently grown at a faster rate than additions to capacity. From 1980 to 1983, heavy rainfall enabled the country's hydropower plants to increase their utilization from 3,046 to 3,763 hours per year.

Last year, hydropower output actually declined, but thermal power plant utilization increased over 5 percent to about 5,700 hours (237 days). As researcher James Lewek points out, that is still short of the 1978 record of 247 days for thermal plants, indicating potential for further improvement—particularly in coal-fired plants where utilization ratios have been consistently lower than for oil-fired plants. The 9.4 percent growth of thermal power output in the first four months of 1985 provides encouraging evidence that the growth trend in thermal power plant utilization is continuing, mainly because the Chinese are doing better at delivering coal to the power plants.

Improving the power distribution system would also do much to ameliorate the shortage. Currently, China is divided into five large regional power grids and several smaller ones. Links between these grids are weak or nonexistent, while links within the grids often depend on single 220 kilovolt (kv) lines. Seven or eight provinces are not connected to the outside at

all. The situation is exacerbated by the fact that China's load centers are generally concentrated in coastal areas and the northeast, while coal deposits and hydro resources are mostly located in the interior.

Intra- and inter-grid links will be strengthened with the construction of 30,000 kv of new transmitting capacity planned by 1990, half of which will come from about 10 powerful 500 kv lines. The rest will be new 220 kv lines (the standard in China now), and 330 kv lines in the northwest. Shanghai will be tied to central China and to coal-fired plants to the northwest. The Beijing–Tianjin area will be tied much more firmly to coal-fired power sources to the west. Hydropower from the northwest, the only power-surplus area in China, may well begin to reach eastern load centers. Several of the provinces outside the grids, including Guangdong, will be connected to one of them (*see* map). All of this is likely to add up to less power necessary to meet peak loads.

Planners are also making a more conscious effort to locate power-intensive industries in areas of power abundance. A good example is the decision to place a new 200,000-tonne aluminum smelter in Qinghai Province, where surplus hydropower will be available.

Decentralization provides new funding sources

How will China finance its new power stations and pay for improvements at old ones? Increased funding from the central budget is likely, but there are limits to what can be offered to a sector that already consumes more investment funds than any other. Fortunately, the ground rules are changing in a way that will allow the power industry to tap sources outside the central budget.

Local governments previously financed only small power plants, mainly hydro, for local use. Now they are being encouraged to pool their resources to build large plants that may be partially funded by MWREP. The localities are being allowed to control at least part of the power supply from these plants.

Even industrial enterprises, which under the financial reforms of the last several years control greater amounts of funds, can now invest in "shares" of power plants in return for either a fixed repayment, or more often a share of power from the new plant. A recent example is the Jiamusi power plant in Heilongjiang, funded by the Daqing oil field and Heilongjiang Province. When its two 200 mw generators are completed in the late 1980s, Daqing will get 80 percent of the power, and Heilongjiang 20 percent.

The Ministry of Power says projects totaling 5,000 mw will be completed under such arrangements in the 1986–90 period. Even such megaprojects as the 1,400 mw Manwan dam in Yunnan Province are being considered for this type of funding. The first project to be built with shares from enterprises, the 200 mw Longkou plant in Shandong, was completed last year.

There are, of course, complications. It is difficult for local governments to guarantee construction materials and fuel supply for the power plants. MWREP has been historically loath to cede control over the power network to outsiders, and in the past has occasionally confiscated power plants, even those owned by and specifically designated for individual users such as steel mills or petrochemical plants. Each locally financed large power plant thus involves hardnosed bargaining over terms, conditions, and duration of local control.

The Power Ministry now says localities can not only own power plants, but also charge market prices to users.

The clear intent, however, is to loosen the regulations, and the Power Ministry, at least on the outside, is playing along. A ministry spokesman stated unambiguously in June that localities, including cities, can not only own power plants, but also charge market prices to users. A number of localities are clearly developing plans completely independent of MWREP. Guangzhou, for instance, recently announced a feasibility study that will be carried out by a Bechtel–Ministry of Coal joint venture engineering company, rather than by a power industry design institute.

Foreign capital is another potential source of funds. The 10,000 mw of imported capacity will likely be financed by government export agencies of supplier countries. As in the past, the Chinese may also buy significant volumes of power plant equipment from Eastern Europe, which they can repay on a barter basis. Foreign capital also means concessional financing from the World Bank, which has already funded the 600 mw Lubuge hydropower project in Yunnan Province, and plans to fund a 600 mw thermal unit at a new plant at Beilun Harbor in Zhejiang Province. Foreign governments also provide concessional financing: Japan will fund the 880 mw Tianshengqiao low dam in Guangxi Province, Kuwait the 300 mw Shaxikou hydropower project in Fujian, and Denmark a 300 mw boiler renovation project at the Wangting plant in Jiangsu.

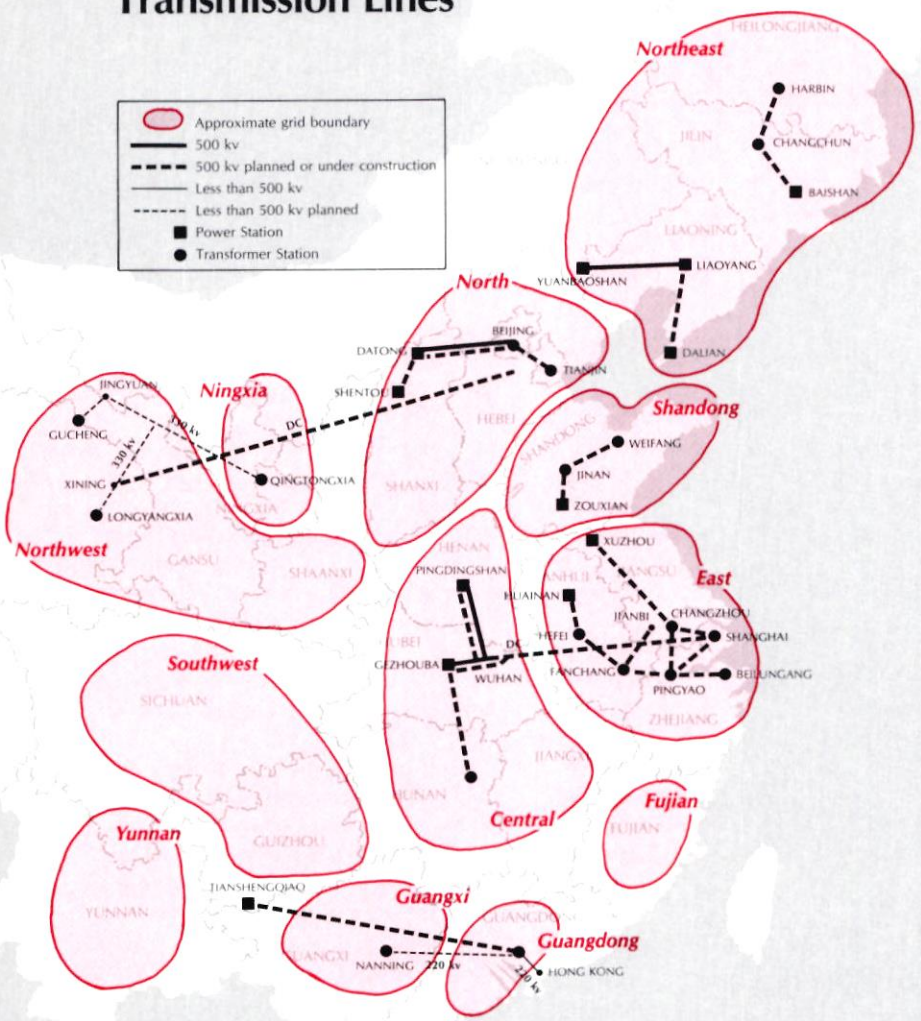
Many localities, particularly coastal cities, even hope to attract direct foreign investment in power plants. The majority of such schemes are unlikely to get off the ground, because of profit repatriation difficulties. Few foreign investors are likely to take their chances on recovering their money by buying local products for export with the renminbi they have generated from power sales. In the Shenzhen special economic zone, however, agreement has reportedly been reached for the Hong Kong firm Hopewell Holdings to split ownership with Shenzhen in a 700 mw addition to the Shajiao power plant. Under the 10-year pact, the plant will sell power for foreign exchange to users in the zone and perhaps export some power to Hong Kong as well. Similar arrangements might be possible in other power plants near Hong Kong and Macao, or other areas that develop as great a concentration of locally held foreign exchange as Shenzhen.

Potential problems

For all the positive signs of action, there remain a number of unresolved issues that will affect the pace of power sector expansion in the next few years.

Construction priorities. Power industry planners and enthusiastic local governments talk as if China could support great numbers of hydro, thermal, and nuclear-fired projects all at once. In fact, priorities

Power Grids and Principal Transmission Lines



SOURCES: Grid boundaries from article by James Lewek in the forthcoming China volume published by US Congress Joint Economic Committee. Line information from National Council files and MWREP.

Artwork by John Yanson

must be set. Much depends on whether China goes ahead with the massive Three Gorges dam and with nuclear power plants in coastal areas. Top planners in MWREP clearly favor such large projects. But given their especially long lead times, such big projects will inevitably divert resources from smaller projects with shorter turnarounds. This may cause slower growth in power generating capacity in the short run.

Construction lead times. Construction delays have been endemic in the power industry, as in all others in China, because of such difficulties as acquiring land, the dispersal of too few construction materials among too many projects, and the inability to coordinate auxiliary facilities such as railroads with the main projects. It often takes six years to build large coal-burning power plants and 10 years or more for hydropower projects. The program for the Seventh Five-Year Plan assumes lead times of under three years for some large thermal plants. This will be hard to achieve given China's expanded scale of construction and economic reforms that make it even more difficult for the central government to guarantee materials for its key projects. If the timetables are not met, however, it will be difficult for stepped-up investment to have much impact before the 1990s.

Upgrading power machinery. For China consistently to add 5,000 or more mw per year to generating capacity, it must standardize production of 300 mw and 600 mw boilers, turbine-generators, and auxiliary equipment to replace the smaller and less efficient units that predominate today. Power machinery factories in Shanghai have made about 10 Chinese-designed 300 mw units since 1975, and power planners are demanding that these and other major factories in Harbin, Sichuan, and Beijing increase their aggregate capability to 10,000 mw per year of mainly 300 mw and 600 mw units by 1990.

China has licensed the technology for most key power plant components from US and other Western firms. The most important licenses were signed in 1980. Factories in Harbin bought the know-how to build 600 mw boilers (Combustion Engineering) and turbine generators (Westinghouse), while Shanghai factories bought similar 300 mw technology from the same companies. The first units made under these licenses, composed primarily of parts shipped by the licensors, should be completed within the next year or two. The central government is encouraging factories to seek tie-ups with foreign firms, and there has already been preliminary announcement of a $12 million joint venture between Babcock and Wilcox and the Beijing Boiler Works, and of an agreement between General Electric and a Sichuan factory for co-production of 600 mw turbine generators.

Technology absorption. Many knowledgeable observers believe China already has sufficient factory capacity to reach the 10,000 mw per year goal, but simply does not know how to fully utilize it. A symptom of the problem is the apparent failure to begin serial production of licensed equipment. The issue thus turns not so much on building more machinery as on absorbing the foreign technology purchases, improving management and quality control, and coordinating better with endusers.

The Power Ministry is very dissatisfied with the slow delivery and defective quality of the machinery it buys—twice in recent years, disputes have gone all the way to the heads of the Power and Machine-Building ministries. Earlier this year, the Ministry of Machine-Building Industry announced with a flourish that it would station factory representatives at power plant sites to assist in instal-

lation and catch quality problems. A radical step for China, such a practice would be standard operating procedure for a Western equipment supplier.

Power plant managers undoubtedly welcome moves like this. But time alone will tell whether the machinery industry is reformed sufficiently, and whether the pace of foreign technology absorption is accelerated sufficiently, to fundamentally change the situation. It is quite possible that in the end China will have to import even more generating units to fulfill overall power targets.

The transmission equipment situation is analogous. China must begin serial production of 500 kv alternating current transmission equipment, and has already licensed most of the key components from ASEA (Sweden) and other suppliers. But the four- to five-year period required to complete the first domestically built 500 kv line in Liaoning Province suggests that the technology absorption process has not been smooth. China has gone to foreign companies through a World Bank loan for a 500 kv AC line that must be built quickly to bring power from the Xuzhou power plant to Shanghai. All substation equipment for China's first high-voltage direct current (HVDC) line (from the Gezhouba dam on the Yangzi River in Hubei Province to Shanghai) will be supplied under a December 1984 contract with a Brown Boveri–Siemens consortium. Equipment for other HVDC lines built in the near future will probably be imported as well.

Coal supply. Meeting thermal power plant expansion targets over the next five years will probably require an increase in coal supply on the magnitude of 40–50 million tonnes, close to a third of what the power industry now burns. A significantly smaller increase would suffice if the Chinese systematically replaced small, inefficient boilers with large, efficient ones, according to Lewek. But this is unlikely to happen because power-starved local governments and enterprises will use any available generating units, no matter how inefficient. The central government, in fact, is offering coal-rich localities tax incentives to build new, small thermal projects.

Transport. Coal production per se may well grow quickly enough to supply the plants, judging from the active coal development efforts now underway (*see The CBR* March–April 1984). The real bottleneck is in transportation, particularly railroads, which fail by tens of millions of tonnes per year to move all the coal stockpiled at mines. The situation is so bad that 4–5 tonne trucks are often used to move coal 400–500 km, an extremely inefficient and expensive method of transport. When a flood curtailed production at the Kailuan coal complex near the Hebei Province coast last year, the Chinese actually imported Australian coal to fill the gap.

The move to build more power plants at coal mines will help to alleviate the transport problem, since electricity can be moved more easily than coal. But thermal power plant capacity along the coast is still targeted to increase by well over 10,000 mw in the next five years. Supplying coal for these plants depends on the progress of two key projects: construction of the new 640 km heavy-duty coal train line with planned 70 million tonne capacity from Datong to Qinhuangdao, the nation's largest coal port, and expansion of the Qinhuangdao port from about 45 to 75 million tonnes of coal-loading capacity. Much coal will then be able to move by train from Shanxi and neighboring areas to Qinhuangdao, where it will be shipped by sea to coastal power plants.

The central government attaches great importance to completing these projects by 1988. A gargantuan effort and smooth coordination will be required to meet the target, since under ordinary circumstances the railroad would require several years more to reach its full designed capacity. One sign of difficulty is a recent Chinese press report to the effect that construction in one Hebei county halted for a month because of peasant resistance to expedited land requisition.

These difficulties and constraints do not obscure the fact that China has begun to make serious efforts to alleviate its power problem. These endeavors should start to pay dividends within the next five years. The country may well succeed in maintaining growth in power generation of 6–7 percent, but the problems discussed above will make higher growth rates difficult to achieve. Success in the short run may have to be defined as preventing the gap between power demand and supply from widening. 完

Nuclear Power Shapes Up

But will the opportunities be as large as expected?

Matthew J. Matthews

Foreign suppliers of nuclear power plants and equipment are justifiably optimistic about China's commitment to develop nuclear power. Earlier this year the country signed a joint venture agreement for Guangdong's Daya Bay nuclear power plant, and preliminary construction is underway. In March 1984 the central government also gave preliminary approval to plans for plants in Liaoning and Jiangsu provinces, where construction will start in the Seventh Five-Year Plan (1986–1990).

Now that discussions are turning into reality, however, foreign vendors are reevaluating China's nuclear development plan and the strategy that underlies it. One result: early foreign estimates of a potential $10 to $20 billion market in China by the year 2000 may need to be revised downward. It is increasingly apparent that China plans to stress technology purchases to develop domestic production capacity, rather than buy a series of complete plants from abroad. Earlier estimates also assumed a rapid construction schedule through the end of the century. This may have been overly optimistic, given the inevitable construction delays that affect any major Chinese project and the continuing debates over economic and safety features of China's proposed nuclear power plants and the overall plan itself.

The country's nuclear plan calls for construction of nuclear power plants with a total generating capacity of 10,000 megawatts (mw) by the year 2000. The first generation of plants will be pressurized water reactors, targeted for three areas: south China (Daya Bay near Hong Kong), east China (the Sunan and Jinshanwei plants near Shanghai), and northeast China (Liaoning). Foreign technology and equipment will be used at the start to construct 900 mw reactors, with China producing as much equipment as possible on its own after construction of the second or third plant. At the same time, China will build a 300 mw reactor of domestic design at Qinshan, in Zhejiang Province, to provide experience for Chinese technical personnel.

Longer range goals laid out by the Technical Advisory Group of the Ministry of Nuclear Industry call for development of breeder-reactor technology in the early part of the 21st century and, subsequently, the construction of fusion power stations. In fact, the Chinese inaugurated their first fusion power testing station this year.

Even if China fulfills these targets to the letter, the role of nuclear power will remain strictly of third priority in the country's overall energy mix for sometime. As Li Peng, the State Council vice-premier responsible for energy policy, stated in January, "From now until the end of this century, we will rely mainly on thermal power plants while making hydroelectric power plants subsidiary and nuclear power plants supplementary." Li sees nuclear plants providing about 5 percent of total electricity-generating capacity in the year 2000. Nuclear power is thus viewed as a partial domestic substitute for oil and gas, which China wants to export and use for other higher value purposes. The minor role nuclear power will play highlights the fact that China could indeed rely on coal and hydro resources to provide for its total energy needs in the year 2000 if it chose to do so. Therefore, China can continue to exercise flexibility in deciding how far and how fast to push its nuclear program.

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Nuclear advocates stress long-term self-reliance

The oft-stated rationale for nuclear power is that China's coal and hydropower resources are located too far from the nation's large coastal load centers to be economic sources of energy supply. These densely populated coastal areas are chronically short of power and planners are acutely aware of the difficulties of transporting more coal on already saturated railroad lines. Nuclear power, the thinking goes, obviates the need for long-distance transmission lines and/or new railroads, and involves dramatically lower operating costs than thermal plants because of the small volume of fuel needed.

The argument is bolstered by the success of China's nuclear weapons industry, which began developing in the mid-1950s. China already has adequate uranium mining capabilities, a relatively complete system for nuclear fuel production, and a corps of trained technical experts (*see* page 28). Given the large investment China has already sunk into its nuclear industry, why not try to reap some urgently needed economic benefits in the form of power generation? And unstated but omnipresent is the conviction that China should prove it is as capable as any other country of building nuclear power plants.

The government has defused the issue of whether to pursue self-reliance or an open door policy by arguing that an initial, limited import of

foreign nuclear technology is necessary to establish an economically viable nuclear industry, even as China continues to develop its own domestic nuclear capabilities. Li Peng was certainly addressing this issue in March when he announced that China will provide all the fuel for its nuclear stations, participate in the construction of imported nuclear plants and the domestically designed Qinshan power plant, and press on in nuclear research. Jiang Shengjie, chairman of the Science and Technology Commission of the Ministry of Nuclear Industry, expects that of China's planned nuclear power capacity of 10,000 mw in the year 2000, only 2,000–3,000 mw will come from imported technology and equipment.

Harmful domestic turf battles have also been adroitly circumvented by carefully dividing responsibility for the programs among several ministries with a stake in nuclear power. The most notable bargain struck so far is a compromise that gives the Ministry of Water Resources and Electric Power overall jurisdiction for constructing large nuclear power plant complexes, while delegating primary responsibility for building nuclear islands (the nuclear reactor and primary cooling system) to the Ministry of Nuclear Industry.

Another important step in promoting the nuclear program was the establishment of the State Council's Nuclear Power Leading Group, headed by Li Peng. This body should ensure better coordination among ministries involved in the program. Other new organizations include the State Bureau of Nuclear Safety, which has ministerial rank, and the Nuclear Power Society, a group of experts from various disciplines. These groups will support the development and specialization of the domestic industry, and are expected to engage in a much-needed exchange of ideas and methods with their counterparts in the West (*see* page 25).

Nuclear power opponents still wield influence

Despite the strong push for nuclear power development in China, some opposing voices persist in questioning specific aspects of the plan and even the assumptions underlying it. Two senior engineers of the Ministry of Nuclear Industry's Technical Information Institute confirmed in *China Daily* that some energy experts originally opposed the Daya Bay nuclear power project, favoring instead a hydroelectric station on the Hongshui River in Guangxi Province. This disagreement was resolved by a decision to fund both projects, and Hongshui's feasibility studies have just been approved.

A more comprehensive critique of China's nuclear power plan appeared in a September 1984 article by Yang Haiqun of the State Planning Commission's Economic Institute entitled "On the Decline of the World Nuclear Energy Industry." Yang argues that China is beginning its nuclear power program just as the industrial nations are realizing that nuclear power is not economical, and are cutting back on new plant construction. He concludes that China should abandon its nuclear development plans in the interest of both economics and safety. That this article was published at all suggests lingering, behind-the-scenes opposition to the government's current pro-nuclear policy.

Without question, China's nuclear advocates have oversimplified the issue of nuclear power's cost competi-

THE US-CHINA NUCLEAR COOPERATION AGREEMENT

As *The CBR* goes to press, hope is mounting that the impasse over a US-China Nuclear Cooperation Agreement will soon break. The absence of such an agreement has prevented US companies from holding commercial discussions with China on nuclear power plants and equipment sales.

In his June visit to China, State Department Special Advisor Richard Kennedy, the US government's de facto chief nuclear cooperation negotiator, reportedly settled all outstanding issues with the Chinese, including crucial ones relating to China's adherence to a policy of not helping other countries develop nuclear weapons. This has raised expectations that the agreement may finally be signed around the time of the visit by Chinese President Li Xiannian and Vice-Premier and nuclear czar Li Peng to the United States in July.

The original agreement was initialed by President Reagan during his April 1984 visit to China, after three years of hard negotiation. But it was never signed or submitted to Congress because of reaction on Capitol Hill to new allegations of Chinese cooperation in Pakistan's nuclear weapons program. While the text of the agreement has not changed since then, China has provided further assurances on the nonproliferation issue, and on the meaning of terms in the agreement.

Assuming that the agreement is signed during President Li's visit or soon after, the first consideration for US industry will be the date when it takes effect. US companies are alarmed about recent progress in China's negotiations to buy nuclear power plants from other countries, especially West Germany, whose government is vigorously promoting the export of nuclear power technology.

It now appears almost certain that a nuclear agreement with China will have to sit before Congress for at least 90 legislative days before taking effect. In practical terms this means that the agreement will not formally take effect until next year.

This waiting period, however, need not adversely affect US companies, since the US government, after interagency review, can grant so-called "810" authorizations (named for Section 810 of Volume 10 of the Code of Federal Regulations) that allow firms to transfer documents, make quotations, and negotiate in the meantime. The real key, therefore, is whether and when these authorizations begin to be approved. This is fundamentally a political decision in which the State Department will play a critical role. Failure to grant 810 authorizations soon, while not as harmful as failure to sign an agreement, will nonetheless create considerable difficulties for US firms already running behind their European competitors.

Should Executive Branch or Congressional hardliners prevent agreement during or soon after President Li's visit, the consequences will be grave indeed for US industry. The momentum to finish the agreement will likely dissipate on the US side, and the Chinese may conclude that the United States is not sincerely interested in participating in China's nuclear power development.

China's other nuclear agreements: In late July, China is expected to sign a pact with Japan, bringing to six the country's number of bilateral agreements for cooperation in the peaceful uses of nuclear energy. Prior agreements were signed with West Germany in May 1984; Brazil in October 1984; Argentina and Belgium in April 1985; and Britain in June 1985. China can also buy nuclear equipment and technology from France under a May 1983 understanding between the two countries, although they have not yet reached a bilateral agreement. —MW

tiveness with other energy sources. Articles in the popular press and technical journals supporting the nuclear program vary widely in their assumptions and conclusions. The most detailed and persuasive article to date appeared in *Nuclear Power Engineering* in 1983. The author, Luo Anren, based nuclear energy's cost competitiveness with coal on an assumed increase in the cost of coal and a reduction in the construction cost of nuclear plants through domestic sourcing of equipment and construction. Luo thus has implicitly acknowledged that electricity produced from imported nuclear power plants would not be price competitive with thermal plants.

In a recent speech, Li Peng attributed the high cost of nuclear power plants not only to the price of imported equipment, but also to the expense of China's domestically produced nuclear fuel. He said China would have to reduce the cost of fuel production and be able to produce equipment domestically in order for nuclear power to be cheaper than thermal. This is, in effect, an admission that the electric power to be produced by the Daya Bay, Sunan, and Liaoning nuclear plants will cost more than if thermal plants had been constructed. Li Peng views this as a necessary cost in order to attain an advanced nuclear power industry. But if technology transfer turns out to be more difficult than the Chinese anticipate, and construction costs increase, nuclear power opponents will not lack ammunition to attack the program.

In the meantime, China is keeping its options open by investing enormous sums of money in long-distance transmission of both hydro and thermal power from the interior to the coast, in coastal thermal power plants, and in new railroads and ports to move coal to these plants. At least two large coal-fired power plants are going up within 100 miles of the Daya Bay plant.

China has substantial foreign exchange reserves and a credit rating that would enable it to raise approximately $30 billion more. Thus, it is theoretically able to finance the import of several nuclear plants, should they be given sufficient priority. However, fiscal conservatism will probably make China reluctant to borrow these sums. Significantly, the Daya Bay project's viability hinges on selling electricity to Hong Kong—despite south China's acute power shortage. For the Sunan project, the Chinese are making stiff public demands that any foreign equipment purchases be offset by purchases of various Chinese goods, and by payments from equipment vendor countries for reprocessing nuclear fuel in China.

Furthermore, construction materials of all sorts are in extremely short supply. Planners are bound to question the wisdom of concentrating them on two or three projects. Should the go-ahead be given, nuclear power projects could well find their construction delayed by shortages for most materials sourced domestically.

All these factors, combined with China's concern for developing its own technology, probably add up to a China nuclear market in the $5–$10 billion range over the next 15 years, rather than the $10–$20 billion range. It could be even lower if the program is scaled back. China will probably be doing well if it succeeds in installing 5,000 mw by the year 2000, half of its announced target. Given the state of the industry, however, this still makes China's one of the world's largest nuclear power development programs and certainly one that no vendor can afford to ignore. 完

ORGANIZATION OF CHINA'S NUCLEAR INDUSTRY

STATE COUNCIL

■ NUCLEAR POWER LEADING GROUP
Director: Li Peng
(also State Council vice-premier)
- Charged with overall responsibility for nuclear power development in China

■ MINISTRY OF WATER RESOURCES AND ELECTRIC POWER
Minister: Qian Zhengying
- In charge of large power plant construction
- Will manage secondary cooling systems and generators for nuclear reactors
- Oversees several institutes and companies involved in nuclear power plant construction

■ MINISTRY OF URBAN AND RURAL CONSTRUCTION AND ENVIRONMENTAL PROTECTION
Minister: Rui Xingwen
- Oversees State Environmental Protection Bureau (Director: Qu Geping), which will give expert advice on protection from nuclear pollution

■ MINISTRY OF NUCLEAR INDUSTRY
Minister: Jiang Xinxiong
- Jurisdiction over nuclear power development
- Responsible for development of nuclear reactors and construction of nuclear islands
- Governs use of nuclear technology
- Distributes nuclear fuel
- Overall responsibility for construction of Qinshan plant
- Oversees Nuclear Energy Industry Corporation, which controls uranium mines and processing plants

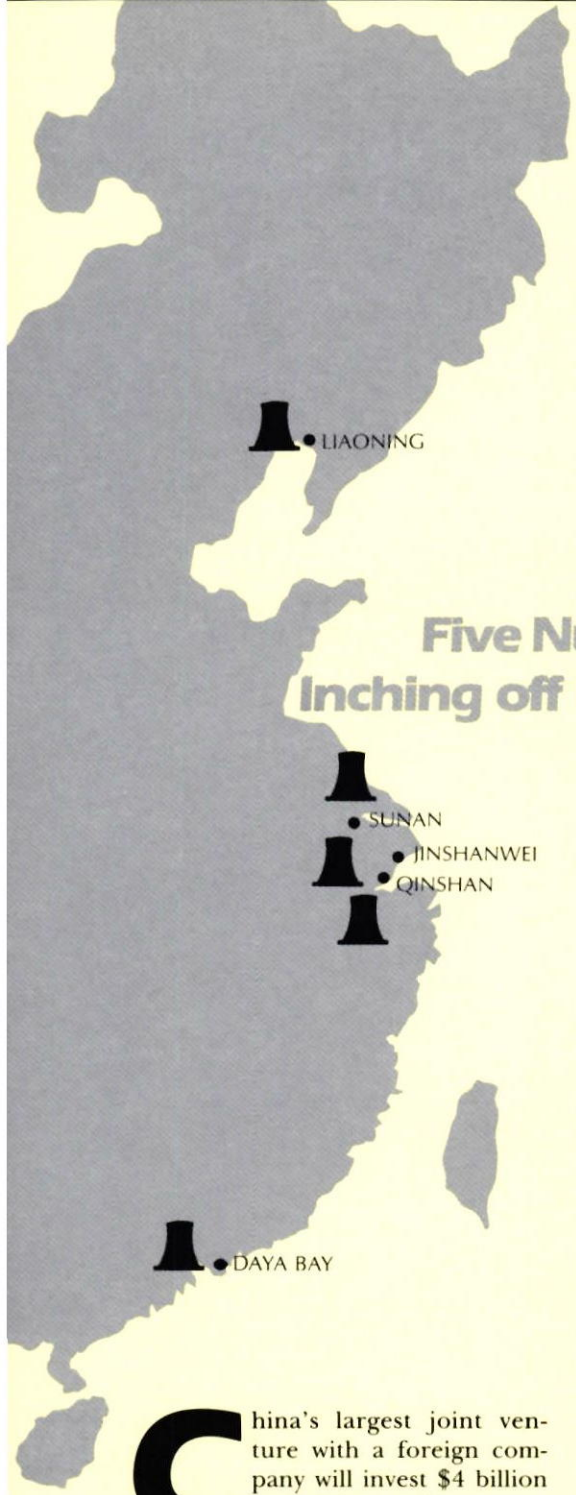
■ MINISTRY OF METALLURGICAL INDUSTRY
Minister: Li Dongye
- Controls specialized materials necessary for construction and operation of nuclear reactors

■ MINISTRY OF MACHINE-BUILDING INDUSTRY
Minister: Zhou Jiannan
- Operates several factories manufacturing equipment for the nuclear industry

■ MINISTRY OF GEOLOGY AND MINERAL RESOURCES
Minister: Sun Daguang
- Responsible for survey work at nuclear plant sites

■ STATE BUREAU OF NUCLEAR SAFETY
Director: Jiang Shengjie
- Drafts laws, regulations, guidelines, and standards for nuclear safety
- Will examine safety of civil nuclear facilities
- Conducts safety research
- Issues construction permits and operating licenses

Chart prepared by Matthew J. Matthews.



Five Nuclear Projects: Inching off the drawing board

China's largest joint venture with a foreign company will invest $4 billion to build a nuclear power plant at Daya Bay, 70 km east of Shenzhen. The long-awaited agreement between the Guangdong Nuclear Power Investment Company (GNPIC) and the Hong Kong Nuclear Investment Company (HKNIC) established the Guangdong Nuclear Power Joint Venture Company. It was signed in January by Zhao Qingfu, a vice-minister of Water Resources and Electric Power, and William Stones of the Hong Kong utility China Light and Power that owns HKNIC.

Deng Xiaoping underscored the political importance of the joint venture as he thanked Lord Kadoorie, chairman of China Light and Power Company, at a ceremony celebrating the agreement. "You have set an example by taking this risk," he said. "Hong Kong experienced some fluctuations when China and Britain were negotiating a settlement of the Hong Kong question. But you and your company adopted a friendly and positive attitude. We are thankful on this score." Both partners believe the project will have a stabilizing influence on Hong Kong, partly because it will augment Hong Kong's power supply, and partly because the contract extends beyond the expiration of British rule.

The $4 billion will be financed with 10 percent equity and 90 percent debt. HKNIC will put up 25 percent of the equity, or about $100 million. (China Light and Power failed in its attempt to attract Hong Kong Electric, the territory's other electric utility, as a co-investor). GNPIC will put up the remaining $300 million. The other 90 percent of the funds for Daya Bay's construction will come from international loans floated by the Bank of China and financed over the first 20 years of the plant's operation. Two-thirds of the debt is expected to be export credit loans, with the other third straight commercial loans. Receipts from Hong Kong for part of the plant's electricity will help repay the loans. Under the agreement, the sharing of output is based on equity holdings, with 25 percent of the power allocated to HKNIC and 75 percent going to GNPIC. However, GNPIC will actually use only 30 percent of the total output, and has arranged to sell the other 45 percent to HKNIC. For the first six years the unit price of electricity sold to HKNIC will not exceed the cost of producing an equivalent amount with a coal-fired plant in Hong Kong, although the exact mechanism for calculating this is still not known.

Electricité de France (EDF) will assume technical responsibility for the design, construction, and commissioning of the power station. Although this contract was signed in 1983 in an attempt to speed the project's development, EDF is reportedly still negotiating the terms of the project management portion. The GNPIC, now headed by Wang Quanguo, a veteran Guangdong politician, associate of Premier Zhao Ziyang, and Communist Party Central Committee member, has also established a watchdog management team of Swiss and American consultants.

Daya Bay's two nuclear reactors will almost certainly be supplied by Framatome (France) under a Westinghouse license. Framatome will supply a complete "nuclear island" to generate steam. Britain's General Electric Corporation (GEC) has been tapped to supply the turbine generators that actually make electricity. GEC has never made units of this size, and its involvement appears tracable to its long relationship with China Light and Power and to the political desire to have Britain involved in a project of such major impact on Hong Kong.

Long months of negotiating have yet to yield final contracts. The complexities of technology transfer have been partially responsible for the protracted negotiations, particularly with the French. Lack of international experience has been a factor in the British case. The complicated financing depends on the strength of guarantees offered by the Bank of China, the strength of Hong Kong's commitment to purchase electricity, and other factors.

The Chinese hope to sign the contracts before year-end, but such deadlines have often passed without action before. Although the Chinese still publicly say they expect construction to be completed by 1991, they are not likely to meet this goal. Nonetheless, preliminary sitework (coordinated by the Jilin Metallurgical Construction Company, the highly publicized winner of one of China's first major competitive construction bids) is proceeding apace with Chinese money.

Concern over safety issues has been expressed by Hong Kong residents and activist groups, and probably by Chinese living near the plant as well. China has pledged that safety standards will meet the requirements of the International Atomic Energy Agency, as well as those of the country supplying the plant. The new State Bureau of Nuclear Safety is formulating standards, with advice from the French Interministerial Committee for Nuclear Safety and other overseas groups. Bureau director

Jiang Shengjie recently took one of the few trips made by any Chinese nuclear official to the United States in this connection.

Qinshan/728

Qinshan, formally called Plant 728, has the longest history of any Chinese commercial nuclear power project; Zhou Enlai first approved research and development funds for the facility back in 1972. Qinshan is based on a Chinese pressurized water reactor design, and most of the equipment and materials are being produced domestically. Though cost estimates by the Ministry of Nuclear Industry show it to be too small to be price competitive with coal plants, Qinshan remains a priority item in the Sixth Five-Year Plan, a fact that underscores the importance leaders continue to attach to self-reliance. As Vice-Minister Zhou Ping has argued, Qinshan's construction will provide China's technical experts with a complete range of experience, from design engineering to equipment manufacture, project operation, and the training of technical staff.

In March 1984, crews began removing 800,000 cubic meters of earth and rock to prepare the site for the main plant buildings. This phase was completed by the end of 1984, and work on the main reactor began in January 1985.

Though most of the equipment for the plant is being produced in China, several important components will be purchased from foreign vendors. The German company KSB is supplying the main coolant pump for the reactor. The steam generator tubing will come from a Swedish company, and the reactor vessel will be provided by Mitsubishi Heavy Industries of Japan. The latter represents Japan's first export of nuclear technology to China since the two sides reached a preliminary understanding on nuclear cooperation in March 1984. The vessel is to be delivered by September 1986, and China hopes to have the plant operating by 1990.

Sunan

The plum dangling before the eyes of foreign vendors and the current focus of their competitive bidding is the 1,800 mw Sunan nuclear power plant. Leaders have designated this plant one of the key State construction projects for the Seventh Five-Year Plan. Feasibility studies of the site in Jiangyin County, Jiangsu Province, about 60 miles northwest of Shanghai, were completed and approved by the State Planning Commission in 1984. Experts say the site is ideal because of its geologic stability, adequate fresh water source (the Yangzi River), well developed transport facilities, and location in the center of the east China power grid.

Sunan will have two 900–1,000 mw reactors, similar to those planned for Daya Bay. The Ministry of Water Resources and Electric Power established the East China–Southern Jiangsu Nuclear Development Company in January 1985 to oversee construction. The company is currently holding talks with companies invited to bid on the reactors, including Framatome, Alsthom Atlantique (also of France), and the West German company Kraftwerk Union (KWU). US companies have been excluded from negotiations by the absence of a US–China bilateral nuclear cooperation agreement (*see* box).

KWU is currently the company to beat. The Chinese signed a memorandum of intent with the firm during Zhao Ziyang's visit to West Germany last June. The memorandum calls for China to purchase four 1,000 mw nuclear power plants, two of which would go to Sunan. The deal, reportedly worth as much as $1.6 billion, was reached in part through the Germans' willingness to set up barter trade arrangements in uranium and nonferrous metals as partial payment for equipment and technology.

The Germans have also agreed to consider China's controversial desire to store spent nuclear fuel from German reactors. The service fees thus earned by the Chinese could then be used to help pay for nuclear equipment imports. With this in mind, the Chinese and three West German companies signed a letter of intent in 1984 that calls for shipment of 400 tonnes of nuclear waste to China to be stored at a cost of more than $5 billion. The Ministry of Nuclear Industry is pressing hard on this issue because, if it can use these fees to help pay for the high cost of plant construction, it is more likely to win approval for the whole nuclear power program.

The memorandum between China and KWU is a major step forward, but it is not a contract. Negotiations on price and financing still lie ahead, and the Chinese are still free to back out of the deal and select another company. Optimistic American vendors feel that although they were not allowed to compete for contracts on Daya Bay, they still have a real chance to win contracts on Sunan. They say US firms are particularly attractive to the Chinese because of a superior ability to transfer technology. But as another US executive put it, "The horse race is already halfway over." Even if the United States and China do sign a nuclear cooperation agreement this year, US companies will have a lot of catching up to do.

Liaoning

Few details are available on the proposed 1,800 mw nuclear power plant in the northeast province of Liaoning. Li Peng reportedly announced the proposed site for the plant at a January meeting of the Ministry of Nuclear Industry, but it was not made public. The government is holding talks with Framatome on technology transfer strategies, as China plans to produce a substantial amount of the equipment for this plant domestically. More than 10 Chinese factories could potentially contribute components and plant materials. One US executive feels that the lack of more information on Liaoning indicates that the Chinese may be waiting to see how other plants progress before they take more concrete steps at the Liaoning site.

Jinshanwei

The nuclear power plant planned for Jinshanwei, in Shanghai, will generate power for the Shanghai General Petrochemical Plant. It will have two 450 mw units. Now that the feasibility study is complete, the technical design of the nuclear island is under study at the Southwest China Reactor Engineering Research and Design Institute. The Shanghai General Petrochemical Plant currently burns oil to make steam for the factory. Jinshanwei would therefore exemplify how nuclear power can replace oil in the production of heat and electricity, a goal consistent with the government's policy of reducing oil consumption.

The Chinese government does not seem to be moving very fast on this project. It may well be viewed as a follow-on to the Qinshan project that may or may not materialize, depending on the success of other nuclear plants. —MJM

China's Nuclear History

The country is no newcomer to the nuclear arena

Bradley Hahn

Despite Mao Zedong's opinion that the "atom bomb is a paper tiger," China's nuclear program has maintained high national priority throughout its existence, unaffected by political unrest and shifts in national policy. During the first three decades of development, the program helped assert China's military strength and superpower status. Now a more pragmatic Chinese leadership is also paying attention to the peaceful uses of nuclear energy. But even the relatively new emphasis on commercial nuclear power is backed by a long period of nuclear technology research and development.

Uranium resources

Uranium reserves had to be developed before China's nuclear program could advance. Deposits are found in the granite rocks of southern Anhui, Fujian, Guangdong, Guangxi, Hunan, southern Jiangsu, Jiangxi, and Zhejiang. They have also been reported in Xinjiang, Qinghai, Inner Mongolia, and northeast China, located in granite, alkaline rock, lead-zinc deposits, and phosphate. In 1980, a find was made in the northeastern part of Liaoning Province, large enough to support a medium-sized mine. Although China's total uranium reserves are not publicly reported, Western sources have estimated they may total close to 800,000 tonnes. Proven reserves are believed sufficient to keep pressurized water reactors with a total capacity of 15,000 megawatts running for at least 30 years.

Three uranium mines were developed in the Xinjiang Autonomous Region with help from the Soviet Union during the early 1950s. But China's largest uranium mining operations are located in Guangdong Province. Since 1964 more than 10 uranium deposits have been found there almost every year, although many have not yet been exploited and only about 15 mines are now operational. In 1979 the Wenyuan deposit, among the largest, was determined to consist of nearly 100 rich veins of almost 140,000 tonnes of pure uranium spread over an area of about 100 sq km. The composition of the ore permits relatively easy extraction and dressing. This discovery alone is considered of major importance for developing China's atomic energy industry, including the construction of the Daya Bay nuclear power station near Guangzhou.

Another center of mining activity since the 1960s is the Longnan–Zhushan and Quannan–Maoshan complexes of Jiangxi Province. Known reserves at these two locations amount to between 20,000 and 30,000 tonnes of pure uranium. The Maoshan lode, discovered in 1956, reportedly contains up to 0.4 percent uranium 235.

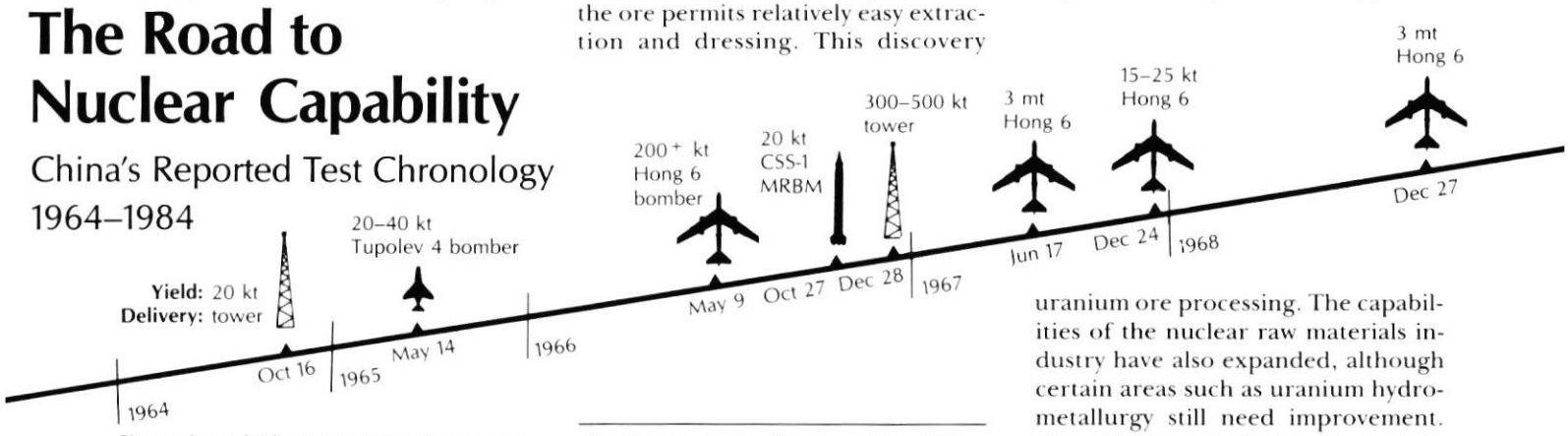
China's total current uranium production has been estimated at about 1,000 tonnes per year. But another recent report suggests that the country is producing about 1,000 tonnes per year for military purposes alone.

China's first uranium mining operations began in the 1950s, and subsequently the country has accumulated a considerable amount of technical experience adapted to all types of uranium ore processing. The capabilities of the nuclear raw materials industry have also expanded, although certain areas such as uranium hydrometallurgy still need improvement. The Ministry of Nuclear Industry's study of chemical methods for mining uranium has yet to move beyond the experimental stage.

Some of China's proven uranium reserves cannot yet be recovered economically because they are difficult to process or because of high con-

The Road to Nuclear Capability

China's Reported Test Chronology 1964–1984



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sumption of acids and alkalis. Another problem is that about 70 percent of the ore currently being mined comes from small, irregularly distributed deposits. The ore bodies in most mines are both thin and widely scattered.

Underground mining techniques account for about 80 percent of total production, and open-pit mining for the rest. Of those mines currently in production, 27 percent have open vertical shafts, 68 percent inclined shafts, and 5 percent horizontal shafts.

Developing a nuclear capability

During the 1950s, China's nuclear emphasis was on research. By May 1957, the Chinese Academy of Science was able to announce that "China can now extract pure uranium and thorium from Chinese ores on a laboratory scale. The techniques of radioactive isotopes have been applied in geologic, petroleum, power, metallurgical, and medical work and other scientific research."

More emphasis began to be placed on strategic weapons development at about the same time, as part of a joint Sino–Soviet effort to develop rocket and aviation technology. But this cooperative period was short-lived, and its results mixed. In September 1958 the PRC put its first experimental heavy-water reactor and cyclotron into commission, "built by Chinese workers, technicians, and scientists, with Soviet assistance." But by 1959, as Sino–Soviet relations began to sour, China found the USSR limiting transfer of nuclear weapons technology. By August 1960, all Soviet missile and nuclear technology experts were withdrawn from China. The joint program did not halt altogether, though. Some 47 Chinese scientists employed on nuclear-related projects at the Dubna Nuclear Research Institute remained in Russia until 1965, but returned to the PRC as the ideological rift between the two countries deepened.

Termination of Soviet technical support forced China to rely largely on its own initiative. In 1960, China outlined a "self-reliance" program to develop nuclear weaponry under the leadership of Nie Rongzhen, senior general and long-time politburo member who was then vice-premier of the State Council in charge of science and technology. The program relied heavily on such foreign-trained experts as nuclear physicist Qian Sanqiang, trained in France, and rocket specialist Qian Xuesen, trained in the United States.

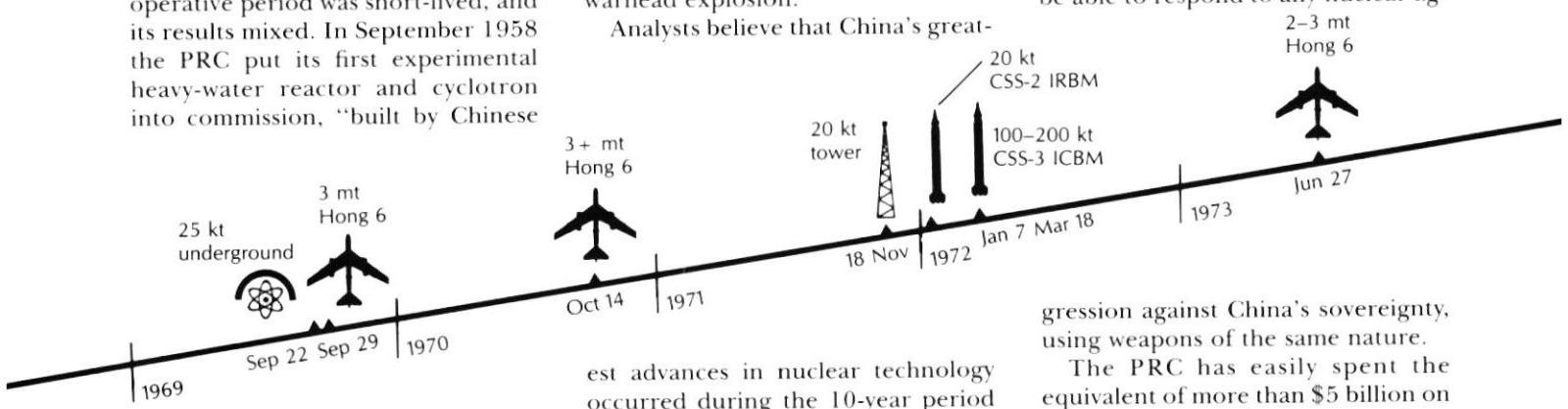
In October 1964, China became the fifth member of the international nuclear weapons club by exploding a fission device based upon enriched uranium (U235). All other nuclear powers reportedly began weapons test programs with plutonium (Pu239) devices. The Chinese test also used an advanced trigger technique called "implosion" instead of the less sophisticated "gun barrel" method. Zhang Aiping, the present defense minister, directed this test in the Gobi Desert. Just two years later, Nie Rongzhen supervised the PRC's first live medium-range nuclear missile launch and detonation test and, in June 1967, China's first hydrogen warhead explosion.

Analysts believe that China's greatest advances in nuclear technology occurred during the 10-year period from the mid-1960s to the mid-1970s. The country's accomplishments are perhaps best reflected by the interval of time between China's first fission test in October 1964 and the detonation of its first fusion device in June 1967. The PRC took only 32 months—compared to four years for the USSR (from 1949 to 1953) and over eight years for the French (from 1960 to 1968)—to accomplish this transition.

Throughout the 1970s, China's nuclear program developed in relative isolation. More than 40 sites were involved in research, development, and production of nuclear weapons. Principal facilities included about five weapons factories, two nuclear research institutes, six nuclear reactors, and the Lopnor test site in Xinjiang. During this period, reports of the dismantling and relocation of key nuclear installations from areas contiguous to the Sino–Soviet border circulated in the Western media, indicating that a number were being hardened against nuclear attack, with others being placed as far as 30 meters below ground level. By November 1976 China detonated a 4+ megatonne (mt) yield thermonuclear warhead during a ballistic missile training exercise, a fitting culmination to the accomplishments of the previous two five-year development programs.

The nuclear weapons industry

Foreign Minister Wu Xueqian has publicly stated that China advocates completely prohibiting and destroying nuclear weapons. The country's current arms control policy seeks a promise by nuclear nations not to be first to use nuclear arms. Nevertheless, in the absence of such international restraint, China has proceeded with its own nuclear weapons program. The goal of that program is to be able to respond to any nuclear aggression against China's sovereignty, using weapons of the same nature.



The PRC has easily spent the equivalent of more than $5 billion on nuclear weapons development alone since 1960. Production of nuclear materials probably accounts for more than half of that figure, with the rest going into research, development, fabrication, and testing. Even though this amounts to only a small fraction of government expenditure, the program absorbed a considerable portion of the country's raw materials, production capacity, and most proficient manpower at a time when other sectors of the national economy also had great need.

China has conducted at least 28 tests of nuclear devices and operational warheads, ranging from explo-

sions as small as 2 kilotonnes (kt) to larger than 4 mt. Materials identified in the early and intermediate test programs revealed that U235 was used for fission explosions, with U235, U238, tritium, and Li6 (lithium) used for fusion detonations. However, in later tests, use of Pu239 was reported in connection with warhead manufacture. This indicates a more efficient weapon design, since it requires approximately one-third as much plutonium to construct a bomb as uranium. Analysis of the fall-out of thermonuclear testing has also confirmed China's ability to utilize both lithium and tritium.

Production of weapons materials. The Lanzhou Complex, China's first nuclear weapons material production facility, began partial operation during the spring of 1962. This plant uses the older, gaseous diffusion isotope separation method to extract weapons grade enriched uranium (U235) from natural uranium (U238). Production averaged 375 kg/year around 1976.

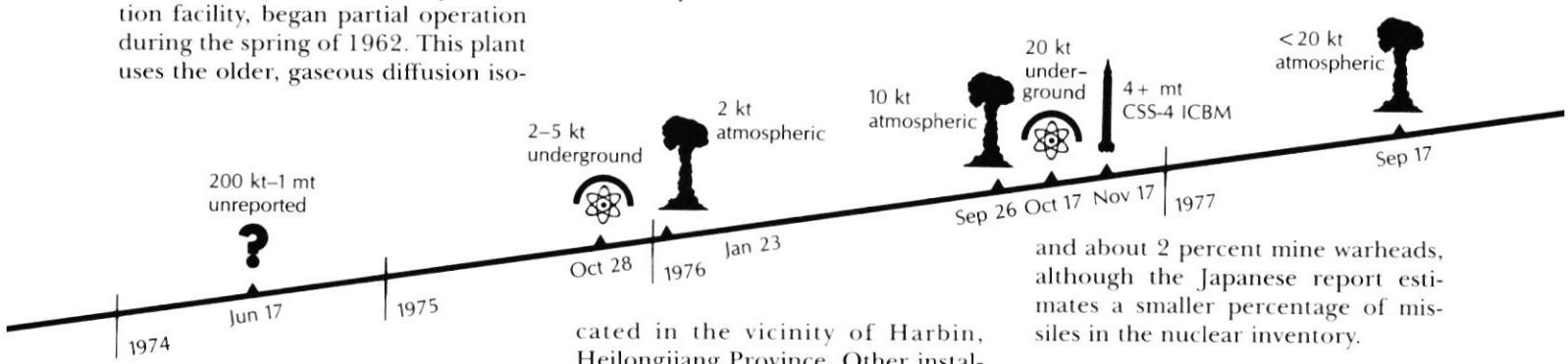
The Lanzhou Complex actually consists of three enrichment centers: Lanzhou, Helanshan No. 1, and Helashan No. 2. The Helanshan No. 1 Center produces 80–90 percent uranium (military grade) through the more advanced gas centrifuge method. This center, which went into operation in 1969, is estimated to be technically on a par with centers in the Netherlands, Britain, and West Germany. Helanshan No. 2 Center, reportedly another gaseous diffusion facility, probably became active in the mid-1970s.

Early Chinese inability to produce weapons grade plutonium by consumption of natural or enriched uranium in reactors forced dependence upon the Lanzhou Complex. But as nuclear technology improved in the mid-1960s, two other plants, one at Baotou, in Inner Mongolia, and the other at Yumen, in Gansu Province, began producing the necessary plutonium. The Baotou facility, equipped with two large reactors, initially produced about 10 kg of Pu239 a year, exclusively for research purposes, but the average annual output has risen to at least 40 kg at present. The Yumen plant reportedly produces about 400 kg of Pu239 per year.

Warhead production. The Huanyuan weapons production plant in Qinghai Province, another important center, is located 30 meters below ground. This reinforced nuclear blast-resistant factory, completed in 1962, began manufacturing thermonuclear warheads in 1965. A second site in Qinghai Province, the Haiyan installation located near Kokonor, is a hydrogen bomb development and fabrication facility. A third nuclear warhead production installation is located in the vicinity of Harbin, Heilongjiang Province. Other installations involved in nuclear component manufacture and assembly are found in Beijing, Chongqing, and Xi'an.

Testing procedures have utilized tower devices, aircraft drop, guided missiles, and underground facilities. The transition from ordinary nuclear bombs to more sophisticated missile warhead designs made miniaturization of the weapon warhead a necessity. Initial phases of this work program concentrated on improving the compactness of warhead configuration. China succeeded in reducing the weight-to-yield ratio of warheads (tonnes:kilotonnes) from 1:2 in the first test, to 1:10 in the second, to 1:20 by China's fourth detonation, in only two year's time (Oct. 1964 to Oct. 1966). China's first warhead device of 20 kt capacity weighed about 10 tonnes, compared to the fourth fission test of a warhead of the same order of magnitude fitted to a medium-range ballistic missile (MRBM), which weighed only one tonne. By contrast, it took the United States about six years—1945 to 1951—to reduce the weight-to-yield ratio from approximately 1:5 to 1:20.

China's total inventory of nuclear warheads reached 200 by 1970, reportedly passed 500 by the end of 1976, and was well over 700 units of all sizes in 1979. A 1984 Japanese report claimed the PRC had 940 weapons in its nuclear arsenal, but did not include submarine-launched ballistic missiles (SLBM) or atomic artillery warheads. Other estimates based on the amount of fissionable material available suggest that the number of warheads could be as high as 1,245. The truth probably lies somewhere in between. One estimated breakdown for the PRC nuclear arsenal today would be 44 percent bombs, 34 percent strategic missiles, 20 percent tactical missiles, and about 2 percent mine warheads, although the Japanese report estimates a smaller percentage of missiles in the nuclear inventory.



Peaceful uses of nuclear energy

The Chinese nuclear program has always been broader than the military industry alone. Peaceful uses of nuclear energy are receiving an increasing amount of attention now that China's international political posture has relaxed. The country's first exhibition devoted to the peaceful uses of nuclear energy was held in Beijing during the winter of 1983–84. Research and development involve the coordinated efforts of the People's Liberation Army (PLA), the Chinese Academy of Sciences (CAS), and a number of ministries, including Nuclear Industry, Astronautics, Aviation, Chemicals, Electronics, Ordnance, Geology and Mineral Resources, and Water Resources and Electric Power.

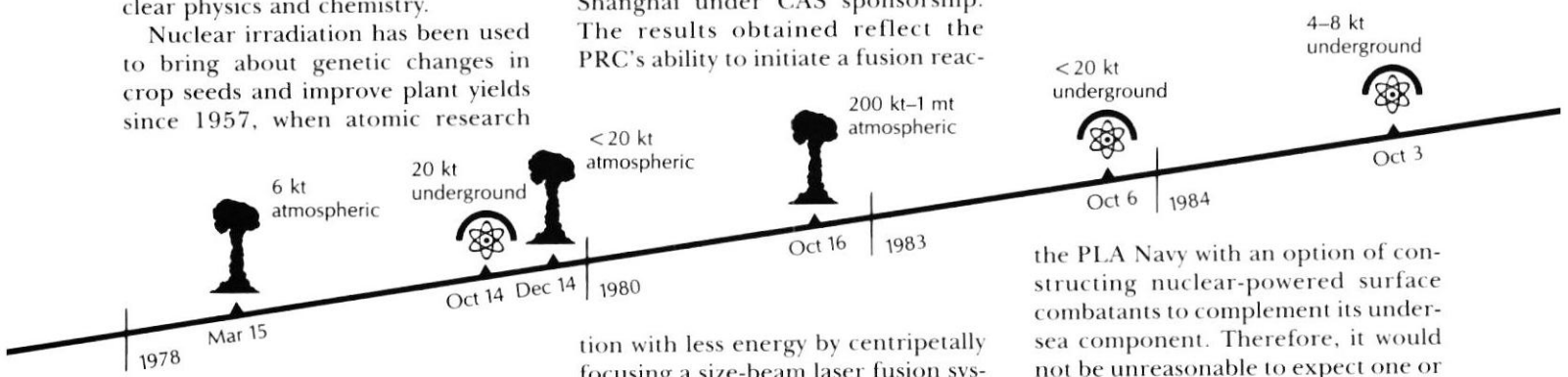
Most of China's key nuclear scientists, production technicians, and researchers have a professional status comparable to those of the most advanced nuclear powers. The country has some 5,000 nuclear technocrats, engineers, designers, and researchers, about 80 percent of them with academic backgrounds in prestigious Western institutions. Nuclear chemistry research centers that support

the PRC's nuclear materials industry include the institutes of Nuclear Research, Atomic Energy, and High Energy Physics (all under CAS), the Ministry of Machine-Building in Beijing, the University of Science and Technology in Hefei, Anhui, and Fudan University's Physics Department in Shanghai. These facilities conduct research on a wide range of practical and theoretical topics in nuclear physics and chemistry.

Nuclear irradiation has been used to bring about genetic changes in crop seeds and improve plant yields since 1957, when atomic research was first applied to agriculture. Today most autonomous regions, provinces, and municipalities have their own laboratories with irradiation equipment and facilities for the study of isotopes. At least 2,000 nuclear technicians are working on biological fixation of nitrogen fertilizers and other agriculture application methods.

Chinese research in high energy physics commenced in 1956 when China's Communist Party Central Committee established a 12-year science and technology development program. A 40 billion electron-volt (40 GeV) project was scrapped in 1975, but China's first high energy accelerator "prefabrication research project" is currently underway. Construction of a 50 GeV proton synchrotron (a subatomic particle accelerator) began near Beijing in mid-1978, but completion has been extended from 1982 to 1985 in order to take advantage of the latest technology. This 50 GeV proton synchrotron and associated experimental detection and data processing systems, when completed, will provide the PRC with an advanced capability in nuclear physics and other sciences for civilian and defense needs. There are only eight accelerators operating in the world that have a capacity above 10 GeV, and two larger than 400 GeV.

Laser research, used in the separation of uranium isotopes and nuclear fusion, is another important area of experimentation. The Shanghai Precision Optical Instruments Institute and the Anhui Optical Instrument Plant, another research center, have discovered new spectral lines in flourine chemical lasers, while Anhui has also discovered new special lines in the eximer laser. Over the past several years laser plasma experiments utilizing multiple beam laser fusion systems have been underway in Shanghai under CAS sponsorship. The results obtained reflect the PRC's ability to initiate a fusion reaction with less energy by centripetally focusing a size-beam laser fusion system on a fuel pellet. The laser fusion system, detectors, measuring instruments, components, and ancillary equipment used in the experiments were all manufactured in China. The ability to initiate and control energy-releasing fusion reactions promises to open up many applications in civilian, military, and aerospace disciplines.



Waterborne nuclear propulsion

Use of nuclear material in waterborne propulsion designs dates from 1964, when China decided to produce nuclear-powered propulsion units for submarines. The first waterborne nuclear propulsion system, a single pressurized water-cooled reactor, was installed in a HAN Class submarine at the Red Flag Shipyard of Dalian. About five years later, China's first nuclear-propelled submarine began trials in North Yellow Sea waters. By the late 1970s, the second HAN class unit was outfitted, probably with a ballistic missile bay.

Construction subsequently began on a new class of nuclear-propelled submarine, the XIA. This design was the PRC's first nuclear-powered ballistic missile submarine. The XIA program probably began about 1975, with the first submarine launched in 1981. The editor of *Jane's Fighting Ships* stated in July 1983 that Chinese authorities had confirmed that they had already commissioned one nuclear-powered ballistic missile submarine, were building another, and planned to build six more. More recently, Chinese officials have suggested that up to four XIA Class hulls are now in existence.

In late 1980 a Chinese official noted that the country was developing a nuclear-powered merchant ship. Such a ship, the first of a series, could be in trial status before the end of 1986. The nuclear-powered merchant ship program should provide the PLA Navy with an option of constructing nuclear-powered surface combatants to complement its undersea component. Therefore, it would not be unreasonable to expect one or more nuclear-powered surface ships to become operational by the end of the 1980s.

International cooperation

Internationally, China signaled its intent to become a full-fledged, responsible member of the nuclear community when it joined the International Atomic Energy Agency (IAEA) in late 1983. Signatories to the IAEA, which tries to enforce a nonproliferation treaty drawn up in the late 1950s, include most United Nation member states. This action indicates China's willingness to place imported equipment and materials and potential waste storage sites under international safeguards.

Meanwhile, China has been busy strengthening commercial ties with other nuclear nations (*see* page 25). By the turn of the century, China believes its nuclear industry will be able to compete successfully in the international export market for nuclear power generating systems, propulsion equipment, and raw materials processing techniques.

Vice-Premier Li Peng summarized the PRC's current national and international nuclear policy this February, stating, "China has no intention, now or in the future, of helping non-nuclear countries develop nuclear weapons . . . China will abide by the stipulations of the International Atomic Energy Agency, and restrict nuclear cooperation with other countries to peaceful purposes only." 完

SOURCE: Hahn Associates International

China's Renewable Energies

Traditional sources retain a place in China's energy future

David Nianguo Li

While renewable energy sources such as sunlight, biomass, and wind have only recently come into vogue among Western development experts, they have been an important part of life in China for generations. The Chinese today continue to cook with firewood, irrigate their fields with power from windmills, dry crops in sunlight, and seek cures to a variety of ailments by bathing in geothermal hot springs. To be sure, the nation's current energy plans stress large-scale coal, petroleum, natural gas, and hydropower projects. But far from forsaking renewable energy sources that have served well in the past, China is intent on expanding them as part of a comprehensive energy development strategy.

The potential of these renewable energies needs to be kept in perspective. Even if the government's very ambitious expansion plans are fully implemented, solar, biomass, geothermal, wind, and ocean energies will provide just 4 percent of China's total energy consumption by the year 2000. Currently, these sources supply only 0.2 percent of the country's annual commercial energy consumption of some 600 million tonnes of standard coal equivalent. Their effective contribution, however, outweighs the paltry impact this aggregate view conveys. The Mongolian herdsman who replaces yak butter lamps with windmill-powered electric light bulbs experiences an unquantifiable, but certainly substantial, improvement in his standard of living.

Electricity is not available in 40 percent of China's villages—some 300 million peasants do without a commodity taken for granted in the developed world. Moreover, most of these villages are in remote areas that will not be connected to national power grids any time soon. The government's only medium-term hope of tackling China's severe rural energy shortage is to encourage utilization of the renewable energies discussed here, and to promote more efficient use of those already being exploited.

The Chinese government thus regards traditional renewable energies as a supplement to conventional sources, not an alternative. It correctly stresses their development in the remote rural areas hardest to serve with conventional sources, where their immediate impact will also be most profound. In less remote areas renewable energies can supplement conventional sources, and thus contribute to their conservation.

BIOMASS

1984–600

1990–6,300

2000–31,000

Figures in all charts expressed in 1000 tonnes standard coal equivalent. 1990 and 2000 figures are targets.

Perhaps as much as half of the energy supplied by all renewable sources except hydropower comes from biomass resources such as firewood, crop residues, and manure. Firewood and plant stalks, burned for cooking for centuries, still play an important role in practical rural energy supply. According to one estimate, the Chinese annually burn 230 million tonnes of plant stalks and 180 million tonnes of firewood for cooking and heating.

Inefficient traditional stoves permit utilization of only 10–15 percent of the potential heat held by these biomass resources. This percentage could be doubled by expanded use of more efficient stoves that the government is trying to popularize. Even better, biomass resources can be used as a raw material in chemical digesters that produce biogas in methane pits.

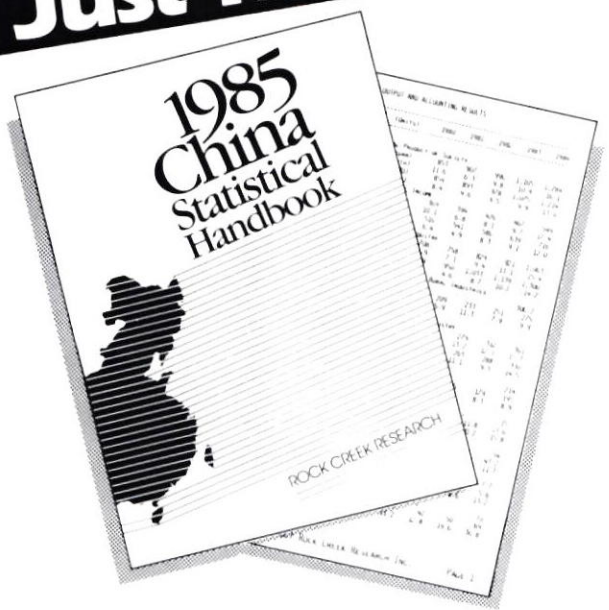
Thermal efficiency would increase by 80 percent if half of the straw and stalks now burned each year were instead fed into these digesters to be turned into biogas. This would generate 32.8 billion cubic meters (cu m) of biogas, enough for 60 million farm families to cook with for a year.

Night soil and animal manure are other widely but inefficiently used biomass resources. More than 260 million tonnes of dry matter comes from manure every year, 213 million tonnes of which may be used to generate biogas. At present the manure is applied directly as fertilizer. If it were all put into biogas production, more than 40 million cu m of methane would be produced, while still leaving the effluent as a high-quality fertilizer.

Expanding biogas generation is thus a principal feature of China's renewable energies strategy. About two-thirds of the country's 6–7 million family-size digesters are currently in operation. About half of these operating methane pits have been dug since 1980, and government policy calls for another 3.5 million digesters to be built by 1990. There are also about 600 power plants with a total capacity exceeding 8000 hp that burn biogas for direct

David Nianguo Li is senior consultant in the Guangzhou office of Energy Projects (China) Ltd., a Hong Kong-based firm serving energy-related companies in China. He formerly headed the Guangzhou Research Institute of Energy Conversion under the Chinese Academy of Sciences.

New Just Released



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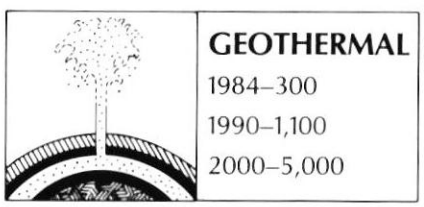
mechanical uses, and some 1,200 biogas electricity generating stations with a total installed capacity of more than 16 megawatts (mw). China is also developing solid biomass gasifiers that supply gaseous fuel from materials such as wood chips, sawdust, rice husks, fruit, and nut shells.

Biogas is used in urban areas too. Tianjin recently installed an electricity generator fueled by biogas produced by treating the city's sewage water. Made by a machinery factory in Chongqing, the generator lights the sewage plant. Liaoning Province's largest methane generating pit is in the city of Benxi. Installed in 1983, the unit uses 80 tonnes of night soil per day. Annual output is 1,300 cu m, enough to fuel 600 households (or to replace 20 tonnes of gasoline if used in transport), and 30,000 tonnes of fertilizer, enough to fertilize 1,340 hectares of gardens. (One hectare is equal to 2.47 acres).

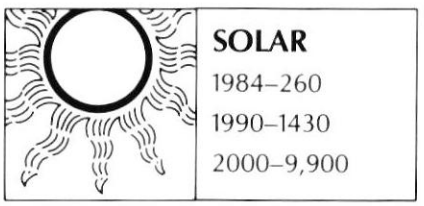


Geothermal resources provide about a fourth of the total energy from the five renewable sources discussed here. China's geothermal resources are spread throughout the country. More than 2,500 hot springs exist, concentrated along China's eastern coast and the southwestern plateau. Also buried in northern China are relatively rich underground hot water reserves.

Nine geothermal pilot power plants have been set up throughout China, the largest of which is a 7,000 kilowatt (kw) experimental power station near Lhasa, Tibet. The station is one of the city's major electricity suppliers. A new generator being built will increase output to 10,000 kw.

In most cases, however, the wellhead temperature at China's hot springs is too low for economically feasible commercial power generation. So the country utilizes its geothermal energy mainly for such applications as greenhouse heating, grain drying, and crop and fish raising. At present China has geothermal greenhouses with a total area of nearly 60,000 square meters and warm water fish ponds with total surface area of 80,000 square meters.

One technique with a promising future calls for a staged application of geothermal energy. First, brine acquired at a temperature of about 84° Celsius generates electricity. The water discharged is 57° and can be used for space-heating. When it drops to 55°, the hot water is transferred to a greenhouse. When it cools to 40°, the effluent flows into fish ponds. Water leaving the ponds at 20° is used to irrigate crops.



Artwork by John Yanson

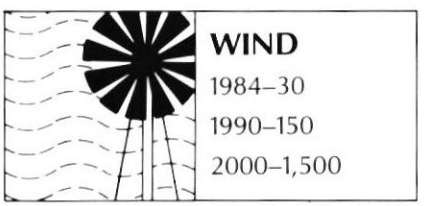
China has abundant solar energy resources. Most of its territory enjoys more than 2,000 hours of sunshine per year, while the sunniest southwestern regions receive 2,800–3,300 hours. Tibet is said to rank second only to the Sahara Desert in solar energy potential.

The country's efforts in exploiting this energy are mainly at the pilot project or experimental stage. But projects are being carried out in a number of areas including photothermal conversion, photovoltaic conversion, photo-chemical conversion, solar energy storage, solar energy materials, and measurement technology. To compensate for the intermittent nature of solar energy, Chinese researchers are studying various ways of pairing it with other renewable energy sources, e.g., combining solar energy with wind, hydropower, and geothermal energy.

Applications receiving the most interest include using solar energy to heat water, power stoves, heat or cool buildings, dry farm produce, and desalinate water. China plans to build 500,000 solar stoves by 1990—an ambitious target given that the country had just 40,000 at the end of last year. Many are used by herdsmen in China's northwest. More than 200 buildings with experimental solar heating systems have been built nationwide, half of them last year alone.

As it pursues solar energy development, China has been shopping with US firms for photovoltaic technology. The Spire Corporation of Massachusetts has a 20-year agreement to set up a new photovoltaics manufacturing facility in Nantong, Jiangsu. Spire is providing equipment worth about $4 million, materials, and training. Another Massachusetts firm, Solenergy, and Sovonics Solar Technology of Michigan, both have letters of intent to establish joint ventures in China.

Other countries are also involved. Japan's Kyoto Ceramic Company and Mitsubishi Corporation are providing financing for China's first solar energy power plant, a 10-kw facility to be built in Yuzhong County, Gansu Province. And Australia's Southern Cross Company will help build a solar energy research and demonstration center in Gonghe, Qinghai.



At a conference last year in Beijing, energy planners resolved to speed development of wind power to help solve the energy problem in remote mainland areas and islands not served by power networks. Several regions of China enjoy wind strengths forceful enough to generate power, especially the southeastern coast, the Qinghai–Tibetan plateau, northern Inner Mongolia, Gansu, Xinjiang, and eastern Heilongjiang and Jilin.

As of late last year, some 2,000 wind power generators and 8,000 wind-powered water pumps were in use. Traditional wind mills form a part of the scenery along the banks by the lower reaches of the Yangzi River.

The country plans to emphasize small (up to 100 w) wind generators. Smaller North American companies that specialize in this technology have sold some equipment to China, and may sell more if plans continue to develop. Flow Industries of Washington State has a letter of intent to construct a $12 million 'wind farm' with 40 turbines near Beijing. It would produce enough electricity for 160,000 homes. The Vermont subsidiary of Canada's Thermax Corporation has sold 20 wind generators and is investigating a joint venture to build 12-volt generators. And Bergey Windpower of Oklahoma is negotiating with the Ministry of Agriculture to provide technology for 1–10 kw wind-powered generators.

OCEAN
1984–10
1990–20
2000–60

China's coastal areas produce more than a third of the country's agricultural and industrial output, but have only about 6 percent of its known coal reserves and less than 5 percent of total hydropower resources. One way to satisfy the region's energy hunger would be to harness the tides.

There are about 10 tidal power stations in coastal Zhejiang, Jiangsu, Shandong, and Shanghai. Total installed capacity of 9 mw is less than a third of what some experts believe could be produced if more areas built stations. The theoretical tidal reserve in China approaches 3 million mw, but many places lack the required funnel-shaped terrain to permit large-scale application. The country's largest tidal power station is at Jiangxia in Wenling County, Zhejiang, with six generators and a total capacity of 3,900 kw. The world's second biggest tidal power station after one in France, Jiangxia is entirely of Chinese design, manufacture, and installation.

China has only recently given serious consideration to exploiting wave energy. So far only navigation buoy-lights generating under 100 watts have been used, though larger systems are planned. An experimental wave energy station designed by the Guangzhou Research Institute of Energy Conversion will be built on Dawanshan Island in the Pearl River.

Renewable energies still cannot compete with coal, petroleum, and hydropower because of limited economies of scale and, in some cases, immature technology. Thus, the big capital investments China must make in the energy sector will be for more conventional energy mainstays. As one expert in China put it, "The [renewable energy] goals to fight for should not be set too high, to avoid disassociation from reality." However, improvements in technology and gradually higher output will enhance the economic competitiveness of renewable energies and increase their small but significant contribution. Renewable energies will be an enduring feature of Chinese life. 完

Finding Space to Live and Work in Beijing

New options will soon be available for foreign firms

Andrew Ness

As any foreign resident in Beijing knows, accommodations have not kept pace with the influx of foreigners to the city in recent years. The lack of space and skyrocketing rents have earned Beijing the dubious distinction of being one of the world's most expensive cities in terms of value obtained per dollar of rent. Foreign companies have few choices as to where to establish offices and house employees. Moreover, many find that the less-than-desirable accommodations they end up with eat up a major chunk of their China operations budget.

Faced with this acute shortage, Beijing city officials have responded with a plan to more than double the office and residential space available to foreigners by 1990. Supply of deluxe hotels may even begin to exceed demand by the late 1980s. The building boom is already changing Beijing's skyline and will shortly present new options for companies planning to establish a presence in the capital. The lucky ones may soon move out of hotels altogether and into new apartments and offices. Rents, however, won't drop significantly in the short run, so executives should carefully weigh their options and keep the long-term needs of their particular company in mind. Judicious planning now could save thousands of dollars and headaches later.

THE PROBLEM

Just five years ago the Beijing foreign community was a small enclave of diplomats and business people whose activities centered on the Beijing Hotel and foreign embassies. But according to an ongoing study by the Capital Construction Department of the Beijing Planning Commission, the city's foreign population has now swelled to well over 10,000. This includes some 1,500 business people, 6,000 diplomatic personnel and their families (including UN personnel), 1,000 experts and teachers, 2,000 students, and 300 journalists. If the family members of all groups were included, the number of expatriates would reach at least 12,000.

One hundred firms signed up when China's General Administration for Industry and Commerce began to register foreign offices in Beijing in 1980. That number now stands at close to 650, an increase of more than 100 offices each year. In addition, there are scores of unregistered representatives on temporary duty and a long list of companies waiting to be registered. And the pace of growth may soon speed up considerably: the Beijing Planning Commission estimates that the city will have between 1,200 and 2,000 registered foreign representative offices by 1990.

Trying to keep up with demand

Foreign residents arriving in the early 1980s quickly occupied most of the available rooms along Chang'an Avenue—the city's major east–west artery and site of many government ministries. Later arrivals settled in other strategic spots such as the Xiyuan Hotel in northwest Beijing near the Erligou Center, where the Ministry of Foreign Economic Relations and Trade (MOFERT) holds business negotiations.

Andrew Ness joined the National Council's Beijing Office on May 1, 1985, as deputy representative in charge of research. He has spent more than four years in China doing research, editing, and translation work. Tracy Elstein contributed to this article with research in Beijing.

By late 1983, the municipal government was forced to improvise, opening new space for foreign firms in formerly Chinese office buildings, such as those above the Hepingmen Beijing Duck Restaurant (offices only) and the Cultural Palace of the Nationalities. They also let foreigners use hotels such as the Xuanwumen, Guanghua, Retan, and Dadu that had previously been reserved for use by Chinese cadres or Hong Kong travelers. These facilities are all generally at the lower end of the market.

More up-market accommodations became available with the opening of the Jianguo Hotel in 1982, the Great Wall Hotel in 1983, the Lido Hotel in 1984, and the Jinglun Hotel in 1985. But not all companies can afford the rates charged at these hotels: the new Lido Apartments, in the uppermost scale of the deluxe range, now rent for $6,000 a month for a three-bedroom apartment, while a deluxe three-room suite at the Sheraton Great Wall Hotel costs a hefty $125,000 per year.

The greatest demand is for accommodations in the middle of the price/quality spectrum, rather than these rooms at the upper and lower ends. According to the Beijing Planning Commission, 40 percent of the city's accommodations are currently considered up-market, and attention is now shifting to the need for more middle-market facilities. To avoid flooding the city with too much expensive hotel space, the commission is taking measures to achieve a future breakdown of 20 percent up-market, 20 percent down-market, and 60 percent medium-priced establishments. But for now, most of Beijing's medium-priced facilities are fully rented and thus unavailable, with the exception of those in inconvenient locations.

Runaway rental costs

Once suitable accommodations are found, runaway rental costs present the next major problem. Not all hotels provide long-term leases, and companies often have no choice but to pay the daily rates. They must also put up with frequent, unpredictable rent hikes. The Beijing Hotel has raised rents three times in each of the past four years, making all rooms at least 130 percent more expensive than in 1981. Rents there have already risen twice so far this year. Overall, rents in Chinese-managed hotels, relatively cheap four years ago by international standards, have steadily inched upward to parallel prices in Tokyo and Hong Kong, although the service and facilities are generally far inferior.

Even if a Chinese hotel does provide a lease, it does not necessarily guarantee full protection against arbitrary rent hikes. Many Chinese contracts note that management reserves the right to raise the rent "on orders" from the Beijing Municipal Pricing Bureau, which is responsible for regulating hotel rates. Even if the contract makes no mention of this, prospective tenants should discuss the issue with hotel management, because the question of whether price adjustment orders from the municipal government can legally contravene the terms of a contract has not yet been resolved. A dispute over this ambiguity reportedly led to a recent rent strike by foreign tenants at the Beijing Exhibition Center.

The unpredictability of these price hikes makes it difficult to plan annual business costs and stay within a company's Beijing office budget. The widespread vulnerability of foreign tenants to rent increases makes the new three-year leases at fixed rates offered by some of Beijing's newest buildings particularly attractive.

THE PROSPECTS

The future looks more hopeful. Three international joint venture hotels and one large Chinese hotel are nearing completion. A new office tower owned by the China International Trust and Investment Corporation (CITIC) is fully rented and ready for occupancy, and another should be ready by 1986. Two apartment projects were just finished, a third is nearing completion, and a fourth should begin renting units by the end of this year. Twenty-seven other major hotel, office, and apartment projects have been approved, as have 60 smaller-scale projects, but they are at widely divergent stages of completion.

By late 1988, there will be almost 29,500 hotel rooms in the city, compared to the current 16,000. And by 1990, a total of 6,000 apartments and 3,000 office rooms should also be available for expatriates in Beijing, according to the Beijing Planning Commission. It estimates that the number of apartments will still fall approximately 3,000 units short of the desired number. Nevertheless, the new rooms will still be a welcome addition.

Foreign businesses in Beijing currently face a severe shortage of working space and exorbitant rents. But the city will soon provide a greater choice of residential and office locations, more middle-market facilities, and a range of services now available only at deluxe hotels.

The role of Chinese and foreign developers

Foreign investors and developers are playing a major role in Beijing's building boom. Ninety percent of the new projects will involve joint ventures with foreign firms or at least be partially financed with foreign capital. At least one-third of the 27 largest projects under consideration will be coordinated by the Beijing Hotel Service Company (BHSC), the city's traditional leader in the hotel industry. Formerly called the Number 1 Service Bureau, BHSC administers 12 of the city's older and larger hotels. Along with the Beijing Municipal Travel Bureau, BHSC has traditionally been responsible for joint Sino–foreign hotel projects. BHSC General Manager Tian Qiong admits that a massive infusion of foreign capital will be needed to meet Beijing's ambitious building targets on time.

While most of the real estate joint ventures will break ground to erect brand new buildings, BHSC will focus its efforts on adding new wings onto the hotels it already owns and manages. The goal of BHSC's nine projects, according to Tian Qiong, is to upgrade establishments that formerly catered to Chinese travelers.

For several of its nine projects, such as the renovation and expansion of the Qianmen Hotel, BHSC has hired a foreign company to construct new buildings or wings, while BHSC will renovate the existing facilities. This may prove to be a wise division of work. Contrasting the masterful renovation work at the Minzu Hotel with the sloppy workmanship at the new Shanghai Hotel, one long-time American resident noted, "The Chinese are masters at renovation, but still novices at construction."

In fact, the task of expanding Beijing's hotel and office facilities has become far too massive to be handled by BHSC and the travel bureau alone, even with their foreign partners. As a result, many other Chinese organizations sense a golden opportunity to earn foreign exchange and are rushing into the real estate business. These organizations are as diverse as the Mineral and Metals Import and Export Co. under MOFERT (backing the International Trade Center), CITIC (backing its own building), the Capital Iron and Steel Hotel Development Company (backing an as yet unnamed office–residential–entertainment complex), the China Council for the Promotion of International Trade (backing the Foreign Trade Exhibition Service Building), and the Bank of China (backing the Zhongyuan Hotel). Most of the new entrants to the field are undertaking just one large project.

Typically, a Chinese organization initiates a hotel, apartment, or office building joint venture by applying to the Capital Construction Department (CCD), under the Beijing Planning Commission. Approval can be expected if the location seems appropriate and the costs reasonable. CCD has expressed concern that developers would rather build deluxe hotels, to recoup their investment quickly, than the middle-market facilities in

Beijing's Existing and Planned Hotels, Apartments, and Office Space

(For details on facilities, see accompanying table.)

greatest demand. Therefore, CCD actively discourages new projects with construction costs in excess of $1,000 per square meter and instead urges developers to build hotels in the $700–$800 price range. Once approved, the Chinese party—sometimes in conjunction with a foreign partner, if one has already been chosen—carries out a feasibility study. But CCD must approve the feasibility study before the Chinese party can sign a formal contract with its foreign partner.

One of the most ambitious and elaborate projects on the drawing board is a joint venture between the M. W. Kellogg Company and the China National Technical Import Corporation to be known as International Village. It calls for development of a self-contained residential community for expatriates in Beijing, complete with an international school, supermarket, medical center, recreation facilities, and its own power generator. Kellogg is nearly done with a feasibility study of the complex and will also help its Chinese partner with financing, architectural design, and actual construction. Residents will take occupancy in September 1986, and may find themselves living in one of modern China's first planned foreign communities.

New business hubs

The building boom will increase the number of hubs of foreign activity in Beijing. The major hub of business activity will shift eastward along Chang'an Avenue from the Beijing Hotel—which once housed more then half the foreign companies in the city—to a group of office buildings and residential complexes now under construction or soon to be built in Jianguomenwai, near the Friendship Store. This group of buildings already includes the Jiangguo and Jinglun hotels and the CITIC building. It will eventually expand to include the Noble Tower, a Canadian–Chinese joint venture consisting of a deluxe office building and adjoining hotel; the Changfugong, a Japanese–Chinese joint venture providing deluxe office space for large Japanese companies; and the International Trade Center, a sprawling complex to be completed in two phases by 1990.

The Chaoyang District is likely to emerge as the primary residential center for Beijing's expatriate community. It already houses the city's

ACCOMMODATIONS IN BEIJING

Facility	Investment	Total Rooms	Description	size (sq. m)	price (RMB)	Foreign Companies based in facility	• Rental Terms for Office Space ★ Construction Schedule/Expansion/Renovation Plans
1. Bamboo Garden Hotel	CFB Xinhua Enterprise	39	Singles: Doubles: Suites:	12-13 17-18 30	60 120 250	5 residential	• Lease available; length negotiable; no rooms rented as office space; discounts negotiable.
2. Beijing Hotel	CFB BHSC	900	Singles: Doubles: Suites:	35 80 116	154 252 363	90+	• Leases not available; rent paid monthly. ★ "Honored Guest" 300-room deluxe addition under construction, to open by late 1986. Joint venture between BHSC and Fok Yingdong (individual from HK).
3. Beiwei Hotel	CFB BHSC	200	Singles: Doubles: Suites:	16 16 34	59 59 94	7-8	• Must sign lease, one year; no rent hikes during duration of lease; no discounts; double rooms identical to single rooms, except contain extra bed. ★ Plan to construct 20-story hotel next to present hotel through joint venture, potential partners are Swiss Service Corp. Ltd. and Maruichi Co. (Japan).
4. Capital Airport Hotel	CFB CAAC	210	Singles: Doubles: Suites:	12 14 28	48 60 120	3	• Must sign lease; generally one year; no rent hikes during duration of lease; discount negotiable at time of signing. ★ Currently negotiating with various potential foreign partners about possible expansion of facilities.
5. Capital Iron and Steel Development Co. Residential/Office Complex**	JV between Capital Iron and Steel Development Co. and Bank of China Group (HK)	650 apts.					★ Complex includes office building, hotel entertainment, cultural center, to cover 410,000 sq. meters.
6. Changfugong Building**	JV between Beijing Travel Bureau and CCI Co. (consortium of Japanese companies)	100 apts. 100 offices 500 hotel rooms					★ To be open for occupancy by 1987.
7. Chaoyang Apartments	JV between Beijing Agricultural Administration and Asahi Trading Co. Ltd. (Japan)	33 apts.	Suites:		113		• Suite facilities consist of one-bedroom apartments, each with kitchen and sitting room.
8. CITIC Building	CFB	105 apts. 105 offices		82 (office) 109 (office) 164 (office)	273 363 547	83	• Must sign lease, three years; no rent hikes during duration of lease; six month's deposit due at time contract is signed; one year's rent due month before move-in date; must lease office to be eligible to lease apartment; utilities charge, 1¢ per square meter per day.
9. Chongwenmen Hotel	CFB Beijing Food and Drink Service Company	45	Singles: Doubles: Suites:	14 14 20+	43 43 84	2	• Must sign lease; generally one year; management may raise rent during duration of lease; no discounts.
10. Cultural Palace of Nationalities Office Building	CFB National Minorities Commission	45	Singles: Doubles: Suites:	25 25 52	65-75 65-75 180	55	• Must sign lease, one year maximum; management may raise rent on orders from Beijing Pricing Bureau; no deposit; no discount.
11. Dadu Hotel	CFB Beijing government	229	Singles: Doubles: Suites:	15 15 35	70 70 210	12	• Must sign lease, one year maximum; no rent hikes during duration of lease; one month's rent required as deposit; no discounts. ★ Have signed contract with foreign company to establish joint venture to construct additional hotel building; expected completion late 1987.
12. Diaoyutai State Guesthouse	CFB Ministry of Foreign Affairs						• Lease not available; rent only entire buildings with 5-25 apartments for 1-2 month periods. ★ Have entered into joint venture with United Industry Co. (Singapore) to build new 200-room hotel on present site by end of 1987.
13. Dongzhimen Complex*	JV between Capital Iron and Steel Development Co. and Jardine Matheson (UK)	40 houses 110 apts.	Singles: Doubles: Suites:	61 86 209/263			• 2-3 year leases available. One year's rent required in advance. ★ Consists of 38 office space sufficient for 80 companies. Completion expected 1987.
14. Exhibition Center Hotel	CFB BHSC	30 apts. (90 rooms)	Suites:	40	140		• Lease not available. ★ Addition of 250-room hotel underway through joint venture with HK-based Hoi Bun Co.; completion expected late 1986.
15. Foreign Experts Apartments*	CFB	200 apts.					
16. Friendship Hotel	CFB BHSC	1000	Singles: Doubles: Suites:	20.89 31 51.5	47 94 125		• Must sign lease; three years maximum; management may raise rent on orders from Beijing Pricing Bureau; no deposit or advance; 5% discount for longer leases.
17. Guanghua Hotel	CFB Beijing Foreign Affairs Office	80	Singles: Doubles: Suites:	24 24 40	50 50 60	none	• Leases not available.
18. Guangming Apartments*	JV between Beijing Agriculture Administration and Toko Shoji (Japan)	136 units					★ Units are mainly apartments, but some offices available.

Key

*Under construction

**Approved but construction not yet begun

✓ Indicates better rooms

CFB Chinese financed and built

JV joint venture

BHSC Beijing Hotel Service Company

Listings are for existing facilities, approved projects, or those whose approvals are imminent. All rates in RMB (foreign exchange certificates). Prices accurate as of 6/25/85, based on daily rate. Hotels not offering leases usually charge daily rate and bill by the month. Actual size of rooms within single, double, and suite categories may differ. In such cases, prices are representative and reflect cost of average-sized facility within the category.

Facility	Investment	Total Rooms	Description	size (sq. m)	price (RMB)	Foreign Companies based in facility	• Rental Terms for Office Space ★ Construction Schedule/Expansion/Renovation Plans
19. Heilongguan Hotel	CFB Beijing Farm Administration	175				none	
20. Hepingmen (Beijing Duck Restaurant Office Building)	CFB	28	Doubles: Suites:	30 100	75/90- 250/300-	10	• Must sign lease, two year maximum; no rent hikes during duration of lease; variable discount offered depending on size and quality of office space; must pay FESCO 1% commission.
21. Huadu Hotel	CFB Beijing Travel Bureau	522	Singles: Doubles: Suites:	17 17 37	85 85 180	5	• Must sign lease; six months minimum, two years maximum.
22. Huatai Apartments**	JV between Nanmofang Agriculture Commerce Corp. and HuaTai Corp. (Thailand)	126	Doubles: Suites:	85 95	242 270		★ Construction to begin within six months, expected completion early 1987; "double room" consists of 1-bedroom apartment with sitting room and kitchen; "suite" is 2-bedroom apartment with sitting room and kitchen.
23. IBM Apartment Complex	JV between Beijing Farm Administration (providing land only) and IBM Corp. (US)	100 single family villas					★ Construction of 100 prefabricated, landscaped single family villas with sportsgrounds and entertainment facilities is expected to begin before the end of 1985, and be completed by the end of 1986.
24. International Club	CFB	10+	Singles: Suites:	21.2 104	106 532	12	• Must sign lease, one year maximum; rent subject to review every six months.
25. International Cultural Exchange Center**	JV between Ministry of Culture and Far East Hotel Devel. Corp. (HK) and King Tai Corp. Ltd. (HK)						
26. International Overseas Chinese Service Center**	JV between Beijing Overseas Chinese Affairs Office and foreign partner.						★ Feasibility study now in progress, considering various foreign partners.
27. International Trade Center**	JV between MOFERT and Singapore partner						★ To be completed in two phases by 1990.
28. International Hotel*	CFB						★ Construction more than half complete.
29. International Village	JV between M.W. Kellogg Co. and the China National Technical Import Corp.						★ Will consist of 150 single-family houses, 80 townhouses, and 250 apartments. To be completed by Sept. 1986.
30. Jianguo Hotel	JV between Beijing Travel Bureau and Zhengmei Development Co. (HK)	453	Doubles: Suites:	35 70	180 460	33	• Must sign lease, one year maximum; rent subject to review every six months.
31. Jinglun Hotel	JV between Beijing Municipal Travel Bureau and foreign partner. Managed by Japan Airlines	608	Singles: Doubles: Suites:	35 35 70	166 178 356	41	• Must sign lease, two years maximum; management may raise rent on orders from Beijing Pricing Bureau; rent includes 10% service charge and 5% municipal tax; negotiable discount for long-term tenants.
32. Kunlun Hotel*	JV between China International Travel Service and San Lek Shipping Co. (HK)	1005					
33. Liangmahe Tourist Center**	JV between Beijing Travel Bureau and Yan Kong Enterprises (HK)	400 apts.					
34. Lido Hotel	JV between CITS and Yick Wok Ltd. Co. (HK)	500	Singles: Doubles: Suites:	26 26 54	140 150 360	4	• Must sign lease, long leases available; rent subject to review every six months; add 10-15% service charge starting September 1985; total rent for half duration of lease required as deposit; 10% discount for leases over six months. ★ 48 deluxe 3-bedroom apartments recently added to existing 24-room complex; 1, 2 bedroom studio apartments will be added by mid-August; 2 and 3 bedroom apartments will be added by late 1986.
35. Maizhongqiao Apartments*	CFB	200 apts.					
36. Minzu Hotel	CFB BHSC	615	Singles: Doubles: Suites:	24 50 90	120 265 430	80+	• Leases not available.
37. New World Apartments*	JV between FESCO (Beijing) Far East Hotel Development Co. (HK) and King Tai Corp. Ltd. (HK)	135 apts.		One-bedroom, two-room apartment Three-room apartment Two bedroom apartment with four rooms	257 342 399		
38. Noble Tower**	JV between Science and Technology Exchange Center and Noble Chong (Canada)		Singles: Doubles: Suites:	63.6 79.4 85.6	211 264 285		★ All offices; singles, doubles, suites represent small, medium, and large offices. Small units can be combined for more space. To be completed by December 1986.
39. Overseas Chinese Mansion	CFB Overseas Chinese Affairs Office	186	Singles: Doubles: Suites:	15 15 30	66 66 115	none	• Leases not available.

Table prepared by Andrew Ness with Tracy Elstein in Beijing and Molly E. Wyman in Washington, D.C.

Facility•	Investment	Total Rooms	Description	size (sq. m)	price (RMB)	Foreign Companies based in facility	• Rental Terms for Office Space ★ Construction Schedule/Expansion/Renovation Plans
40. Overseas Chinese Hotel	CFB State Council's Overseas Chinese Affairs Office	167	Singles: Doubles: Suites:	12 14 24	55 65 100	none	• Leases not available.
41. Peace Hotel	CFB BHSC and Everbright Corp. (HK)	114	Singles: Doubles: Suites:	30 30 33.8	88 88 132	10+	• Leases available; length negotiable; management may raise rent during duration of lease. ★ Will add 300-room hotel on present site; completion expected late 1987.
42. Qianmen Hotel	CFB BHSC and Sun Hung Kai Ltd. (HK)	450	Singles: Doubles: Suites:	30 30 65	66 66 132	30+	• Must sign lease, one year maximum; no rent hikes during duration of lease; no discounts; no deposit required. ★ Have signed contract with Pakistan company to form joint venture to add new wing; most of old building under renovation; expected completion October 1985.
43. Qiaoyuan Hotel	CFB	200	Singles: Doubles:	15-17 15-17	32 32	none	• No lease available.
44. Retan	CFB National Labor Federation	100	Singles: Doubles: Suites:	13 13 40-50	80 80 250	5	• Must sign lease, one year maximum; no rent hikes during duration of lease; no discounts.
45. Shangri-La Hotel*	JV between Evergreen Commune and Shangri-La Hotel Group Ltd. (HK)						
46. Sheraton Great Wall Hotel	JV between CITS and Sheraton (US)	1007	Singles: Doubles: Suites:	15 30 50	220 280 400	10	• Must sign lease, one year maximum; no rent hikes during duration of lease; no deposit required; 10% service charge added to monthly bill; discount negotiable.
47. Taoranting Park Hotel	CFB Beijing Forestry Bureau	27				none	
48. Tiantan Sportsmen Inn	CFB National Athletic Commission	108	Singles: Doubles: Suites:	10 10+ 30	36 55 82	none	• Leases not available; no long-term residents accepted. ★ Construction of a second facility, the "Sportsmen's Guest House," planned for another site by National Athletic Commission. Already approved, but construction timetable not set.
49. Tianshoushan Hotel	CFB Beijing Farm Administration	300	Singles: Doubles: Suites:	16-18 16-18 30	65-75 65-75 130-140	2	
50. Wanshou Hotel	CFB CCP Central Committee Liaison Office	300	Singles: Doubles: Suites:	16-18 16-18 30	65-75 65-75 130-140	2	• Must sign lease, one year maximum; management may raise rent during duration of lease; some discounts given.
51. Wanquanhe Apartments	JV between Haidian Commune (providing land), Sanwa Bank (Japan) and Nissho Iwai Corp. (Japan)	200					
52. Wofosi Hotel	CFB Beijing Forestry Bureau						
53. Xinqiao Hotel	CFB BHSC and Luen Hop Construction Co. (HK)	300	Singles: Doubles: Suites:	24 42 120	72 140 250	90	• Leases not available.
54. Xiangshan Hotel	CFB BHSC	290	Singles: Doubles: Suites:	36 72 237	170 290 880	10+	• Must sign lease, two years maximum; management may raise rent during duration of lease on orders from Beijing Pricing Bureau; 5% of one year's rent required as deposit; discount offered depending on length of lease.
55. Xiyuan Hotel (new wing)	CFB BHSC	709	Singles: Doubles: Suites:	28 28 39	165 165 275	50+	• Must sign lease, one year maximum; no rent hikes during duration of lease; variable discounts offered on all leases, amount depends on size and quality of rooms; deposit required only if reserving far in advance. ★ Contract signed with Singapore-based company to form joint venture to add new complex to present site; will include 420-room office buildings hotel rooms and apartments; expected completion late 1988.
56. Xiyuan Hotel (old wing)	CFB BHSC	343	Singles: Doubles: Suites:	15.7 24 56.83	53 77 330	80+	• Must sign lease, two years maximum; rent subject to review every six months; no deposit or advance required; discount available; amount negotiable.
57. Xuanwumen Hotel	CFB Beijing Food and Drink Service Company	224	Singles: Doubles: Suites:	18 18 36	29 47 99	7	• Must sign lease, one year maximum; no rent hikes during duration of lease; no deposit or advance required; no discounts. ★ Currently seeking foreign partner to form joint venture to add 350-room, "middle-market" hotel on present site.
58. Yanshan Hotel	CFB Fuerli Company (Beijing)	20+	Singles: Doubles: Suites:	15 15 36	65 65 130	2	★ Have entered into joint venture with HK company to add 40-apartment complex (300 rooms total). Construction not yet begun.
59. Yanjing	CFB BHSC	507	Singles: Doubles: Suites:	14 14 28	80 80 154	19	
60. Yanxiang Hotel	CFB Beijing Municipal Travel Bureau	360	Singles: Doubles: Suites:	20 20 50	150 150 280	30-40	
61. Yuandong Hotel	CFB Beijing Municipal Government					none	• Currently occupied by Xiaoxiao Qiche Company ★ Existing hotel building to be razed and new hotel erected on site.
62. Ziyu Hotel*	CFB Yu Yuan Tan Commune						
63. Zhaolong Hotel*	JV between CITS and Worldwide Shipping Co. (HK)	267					

diplomatic quarter and most offices and residences of Beijing's foreign journalists. The Chaoyang District is also home to more than half of the purely residential complexes for foreigners going up in the city, many in a loosely knit circle of development projects surrounding the Sheraton Great Wall Hotel. The partially constructed Kunlun and Zhaolong hotels, to the north and south, and the older, Chinese-managed Huadu Hotel will round out this residential hub, which is less than 10 minutes by car from Jianguomenwai—where many of its residents will work.

A third hub, in the city's Western District, may emerge to challenge the preeminence of the Chaoyang District by the late 1980s. Relatively far from the other two, its current base is the Xiyuan Hotel, which will be expanded by the end of 1988. Eventually, its focus of activity will probably shift eastward to the Capital Iron and Steel Development Company's mammoth planned office/residential/hotel/entertainment complex.

A growing range of alternatives for companies of all sizes

In short, Beijing will soon provide a greater choice of residential and office locations, more middle-market facilities, and a range of services now available only at deluxe hotels. A common feature of the large new complexes rising in Beijing is their aim to create comfortable living space for long-term foreign residents in Beijing, roomy enough for family members, equipped with cooking facilities, and convenient to places of work. Many will also be close to sports, entertainment, shopping, and Western dining facilities, which are still sorely lacking in Beijing.

A greater understanding of the needs of the business community is already leading to a wider range of business services in newer facilities. These include better telecommunications facilities, direct telephone and telex lines in each office, and sometimes even computer terminals and telefax facilities.

Companies with an established, long-term commitment to their China operations are likely to be attracted by the greater space, longer leases, and fixed rents offered at the new office towers and residential complexes. Many companies will gladly trade the offices they have jealously clung to in the Beijing, Xinqiao, and Jianguo hotels for these newer office and apartment buildings.

Yet renting space in newer buildings will not suit every US company setting up shop in Beijing. Some will just be groping for a foothold in the China market and will not be ready to commit to a long-term lease. Others will not yet have registered their Beijing offices—a prerequisite to renting office space—or not need the 60 or more square meters generally provided in the newer buildings. Many companies in this category may find they have more options as larger companies begin to move out of hotels into regular offices, creating vacancies for smaller companies or those that prefer short-term arrangements.

For companies staying in hotels, the major choice will still be between Chinese-managed hotels and the more international Sino–foreign joint venture hotels. The joint venture hotels offer many benefits, but at rates usually 20 to 100 percent higher than their Chinese-managed counterparts. Their advantages include more efficient and less intrusive service, English-speaking switchboard operators, rooms that can be reserved from overseas (a service that none of the Chinese hotels currently offers), bars and restaurants more suitable for entertaining clients, and more tastefully decorated premises. Perhaps most important, their leases generally guarantee a fixed rent or limit the management to one price adjustment per year.

Many foreign business representatives, frustrated by indifferent service and arbitrary rent hikes at Chinese hotels, will gladly vacate them as space becomes available in the joint venture facilities. Chinese hotel managers, for their part, may be just as happy to fill these rooms with affluent foreign tour groups that spend more freely in the gift shop. "The Beijing Hotel was never intended to serve as an office building," comments Tian Qiong.

Some companies are mixing and matching their needs. One option is to house the company manager in an international hotel while putting the rest of the staff in less expensive hotels and subsidizing the cost of their transportation to and from work.

Other companies with large and growing expatriate staffs are exploring the possibility of erecting their own condominium-style apartment complexes to lodge all their foreign personnel. IBM Corporation, whose experience aptly illustrates the need for such a solution, is among the first to try this. Currently IBM rents more than 60 rooms for offices in the Sheraton Great Wall Hotel at the highest prices in the city, and houses staff at eight other hotels throughout the

Photo courtesy of Lisa Mary Chan

The lobby of the Jianguo Hotel, a building based on the design of the Palo Alto, California, Holiday Inn.

city. Thus their decision to build 100 single-family villas on the outskirts of Beijing, which should be ready for occupancy by the end of 1986, is an essential move for the company and may represent the wave of the future for all US companies maintaining a sizable presence in Beijing.

Issues to consider

Companies considering establishing a presence in Beijing should not rush into anything. It is best to house a potential representative in a hotel for a few weeks to investigate all the alternatives before making a decision that will influence the company's China operations budget for years.

In deciding which of the new housing and office options is best for your company, keep in mind the following basic considerations:

Atmosphere will vary widely from joint venture hotels to Chinese hotels to new office and apartment complexes, influencing the image your company will project to clients and contacts. One consideration for service organizations, such as foreign banks, will be the fact that their offices should not compare unfavorably with the accommodations that their foreign clients will be staying in.

Attractive leases are an important consideration. Only Sino-foreign joint venture office buildings, and perhaps future apartment complexes, are sure to offer long-term leases. The situation will continue to vary widely among the city's hotels. The lessee should investigate carefully—not all long-term leases offer iron-clad protection against price hikes ordered by the Beijing Price Bureau.

Location and transportation are crucial for companies, especially those that do not have a car and full-time driver. Is the office close to the company's major locus of activity? How far away are important organizations or customers? Are taxis available? Not all hotels and office buildings in Beijing have taxi stands, and taxi service at the lower-priced Chinese hotels can be sporadic and undependable.

Communications facilities are often a major problem in older facilities. At least one direct office phone is advisable in China, because it may be difficult to get through to hotel switchboards. If phones are not hooked up, how long will it take to get them? Telephones can only be obtained by applying to the Ministry of Posts and Telecommunications. Even after obtaining approval, there may be a wait of up to a year for a phone number to become available. Thus, the availability of telephone lines should be determined before signing a lease.

Office renovation, and the hotel management's attitude toward it, may be important to some companies. Generally tenants will be allowed to customize their office space, but it is wise to signal your intentions to do so before making a final decision, in case it proves to be a problem. Had all foreign companies adopted this approach, many heated disputes could have been avoided.

Although there will be more apartments, offices, and hotel rooms available to foreign companies in each of the next few years, the selection process will remain fraught with pitfalls, and prices will remain high. Careful evaluation of all the alternatives and a clear understanding of company goals in establishing a presence in Beijing are important before making a final decision in this rapidly changing market. 完

Real Estate Frontiers

One company's attempt to break new ground

A. J. Robinson

Little is known in the United States about developing real estate in China, primarily because not much has been done there by foreign concerns. Until recently, the climate for real estate development was less than attractive for foreign investors. Many problems must still be resolved before companies feel comfortable entering the market. But recent changes have improved developers' prospects considerably, as any head count of the number of foreign real estate companies active in China will reveal. The opening of many new cities to foreign investment, greater authority for local officials in investment decisions, and new legislation all help to make the real estate market in China more attractive.

Part of the difficulty of real estate development in China is the extreme difference in the Western and Chinese approaches to the industry. In the United States real estate has become a separate, specialized industry with its own institutions and legal structure. Many American attorneys devote themselves entirely to real estate law. In China, however, there is no separate industry, and consequently no separate legal structure.

If real estate developers find China hard to understand, their Chinese counterparts find them equally mysterious. The Chinese have little experience with Western real estate principles such as asset appreciation, tax benefits, leveraging, mortgaging of assets, and most important, the idea of risk taking. Western developers are usually free-wheeling entrepreneurs who will take big risks in order to enjoy substantial returns. But this concept represents uncharted water in modern China.

This mutual lack of understanding requires a great deal of education on both sides. Fortunately, China's new investment climate provides numerous opportunities for foreign firms to introduce Western concepts in real estate development, and learn more about the operating environment in China.

Another problem is that the usual financial incentives for real estate development are largely absent in China. At home, Western developers can construct buildings and complexes with the idea of maintaining ownership and taking advantage of the eventual capital appreciation. At the same time they may enjoy substantial tax benefits. But such incentives are lacking in China. As a result, real estate development there is based on the ability to invest money and receive a fair return over a relatively short period of time. In order to justify the investment of private or public foreign capital (debt or equity) in Chinese real estate, the investor has to believe that 10 to 30 years from now the country will still be committed to its modernization program.

Finally, even the developer with faith in the future and an understanding of the operating conditions in China may face a purely practical obstacle—namely, difficulty in finding an appropriate building site. This is particularly true in big cities where space is at a premium and the shortage of housing most severe. In the United States, developers can make arrangements for people to relocate. But in China there is no free trade in land, and few areas available for relocation.

Despite these problems, foreign developers willing to take the risks inherent in exploring new territory will find opportunities in China. The country's urban needs are substantial. Hotels, offices, and housing for both foreigners and local residents are in great demand, and the necessary capital and infrastructure to complete urban projects are often lacking. Some markets that Western developers are accustomed to, such as single-family homes, will be less attractive. But others, such as offices, hotels, apartments, retail centers, and shopping complexes, offer tremendous opportunity, especially since China is looking to the West to provide the capital for such projects. But the key issue for a foreign developer will be negotiating a fair return on investment.

Shanghai Centre: real estate milestone

John Portman Associates, Inc. of Atlanta, Georgia, has been working on real estate development in China since 1979. With a background in building multi-use urban projects, the company's strengths are readily transferable to China. Currently, Portman is undertaking a large-scale multipurpose complex in Shanghai called Shanghai Centre. The company began by doing architectural work on this project, but now acts as owner, developer, and operator for the Shanghai Centre.

Financing will come from Hong Kong-based CCIC, a joint venture merchant bank linking the Bank of China, the First National Bank of Chicago, the Industrial Bank of Japan, and China Resources Ltd. The Shanghai Exhibition Center Group has been Portman's Shanghai counterpart in the negotiating process. The Shanghai Investment and Trust Corporation has also been a strong backer of the project since its

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inception.

Choosing a site in Shanghai is no different than in any other city—there are three things to keep in mind: location, location, and location. Shanghai Centre will be located in the heart of the city, directly across from the Shanghai Exhibition Center. This site allows convenient access to the city's major traffic arteries, airport, main business and government offices, and shopping and residential areas on Nanjing Road. In addition, the site is close to a station on the proposed rapid transit system, and to the city's railroad station. The choice of Shanghai itself was part of the overall strategy. Portman sees Shanghai as China's most vital city—a bustling metropolis that could eventually become China's gateway to the West, much as it was prior to 1949.

Shanghai Centre is designed to complement the Shanghai Exhibition Center, and to respond to market demands for exhibition, office, apartment, and hotel facilities. It should also stimulate new international activities in Shanghai. When it opens in the spring of 1988, the complex will contain a 700-room hotel complete with ballroom, meeting rooms, restaurants, a business center, and recreational facilities; over 250,000 square feet of office space (designed for small- and medium-sized business offices and/or showrooms); 50,000 square feet of retail space; a modern 1,000-seat theater; 70,000 square feet of exhibition facilities; and parking for 350 cars. The complex will also feature two towers containing furnished apartments, each with kitchen facilities. Multiyear leases will be available.

With a foreign investment of more than $100 million, Shanghai Centre represents a number of milestones for real estate development in Shanghai. For example, it is the city's first multipurpose real estate project, the first exhibition facility to be built in Shanghai since the Shanghai Exhibition Center in the early 1950s, and one of the first projects announced under the new provisions for the 14 coastal cities.

Shanghai Centre will also be among the first 100 percent foreign-owned ventures in Shanghai. This approach to real estate development, made possible by new coastal cities regulations, was chosen by Portman for the relative freedom of operations it would allow.

Portman is the prime developer, but they have taken on a Japanese partner, Kajima Corporation, one of the largest construction companies in the world. Kajima will be responsible for the overall construction of the project, although much of the work will be done by Chinese contractors.

The architectural work will also involve three parties. Portman Associates will be the prime contractor, but architects from Kajima Corporation and the Shanghai Industrial Building and Design Institute will also play a critical role in most phases of the architectural and engineering work. It is hoped that participation by all three parties will not only create a more cohesive working unit, but also help ensure that the work is completed on time, and quality standards maintained. When the project is completed, Portman and Kajima will share ownership of the center.

Success in any major project in China depends on building relationships of trust and confidence, and maintaining credibility with the Chinese partners. To foster good relations with Shanghai, Portman hosted a series of city officials and industry experts in the United States. This enabled Shanghai officials to witness the company's operations and facilities firsthand, and to see how Portman's architecture and development concepts could be transferred to Shanghai. This also gave Portman the opportunity to work on a day-to-day basis with Shanghai counterparts in order to understand the city's needs and customs, as well as the manner in which the Chinese conduct business.

Real estate development in China can be frustrating. Easy solutions to the remaining problems will not appear until the base of mutual knowledge and experience expands in the coming years. Nevertheless, while many foreigners are quick to criticize the length of negotiations and the time it takes to conduct business, it is also important to realize just how far China has come in the last decade. Four years ago, for example, my work with the Beijing No. 1 Construction Company made it clear that China had almost no concept of Western real estate development. Yet now Portman has been able to negotiate the ambitious Shanghai Centre project, and will begin construction soon. In the process, Portman will break much new ground in China's real estate market. 完

Photo courtesy of Portman Properties

The Shanghai Centre will have a 700-room hotel, 250,000 sq ft of office space, and other facilities when it opens in 1988.

China Heads Toward 2000

The World Bank looks at long-range options for the Chinese economy

Madelyn C. Ross

China and the World Bank have come a long way together in the past five years. World Bank lending to China commenced in fiscal year 1981, reaching $200 million that year. China now borrows more than a billion dollars a year, and has become the third largest recipient of World Bank financing, after India and Brazil. The bank also carries out wide-ranging economic work and a large technical assistance and training program. In October the World Bank will open a resident office in Beijing to help implement these expanding programs.

Another measure of progress in the relationship is the recent completion of a second major World Bank report on China's economy. Titled China: Long Term Issues and Options, *this seven-volume study provides a broad context for bank activities. Unlike the bank's first comprehensive study of China in 1981, which dealt with immediate economic issues, the new report asks: What are China's major policy options between now and the year 2000, and how can the country deal with the problems it will face along the way?*

Sent to the governments of member countries in June, the report is expected to be released for public distribution this fall. Caio Koch-Weser, chief of the China Division, and Edwin R. Lim, chief of the Resident Mission in China, talked with The China Business Review *about the new report and its implications for World Bank programs. A summary of their views follows.*

Setting economic targets

China's leadership has frequently proclaimed its goal of quadrupling the gross value of agricultural and industrial output (GVAIO) between 1980 and 2000. But is GVAIO necessarily the best indicator for China to use in measuring its economic progress? The World Bank thinks not, and alternative ways of measuring growth form a central theme of the new bank report. Strict quantitative goals reflect a traditional Soviet-style strategy that concentrates resources on industrial production. The bank suggests that China instead place more emphasis on consumption-oriented goals, such as the one articulated by Deng Xiaoping when he set a per capita income level of $800 as a national target for the year 2000.

One option China may want to pursue would be an increased emphasis on developing the service sector, broadly defined to include transportation and infrastructure as well as personal and financial services. Chinese planners have already begun to move in this direction. In some large cities, notably Shanghai and Wuhan, expansion of the service sector is already a high priority. By comparing China to other nations that have passed through similar stages of development, the bank concludes that excellent prospects exist for increasing the share of services in China's economy. The bank recommends that China drop GVAIO as an economic indicator and switch to a national accounting system that measures net, rather than gross output and includes the value of both goods and services produced in the economy.

New institutions to guide reform

Any in-depth look at China's economy cannot ignore the fact that it is undergoing extensive reform and experimentation. In addition to suggesting structural changes, the new World Bank report makes some general recommendations for future reform of China's economic system.

First, the bank urges China to tackle a problem familiar to those doing business there—the lack of coordination among economic institutions. Such coordination is essential to achieve greater mobility of economic resources such as labor and capital, and to ensure that closely related reforms—such as reform of the wage system and the pricing system—reinforce each other.

China may also need new institutions and instruments of management to exercise indirect control over the economy, in contrast to the direct administrative measures being used now. For instance, the government can rely more on credit, and monetary and fiscal policies, to guide the changing composition of demand and to help enterprise reforms progress smoothly. As enterprises gain more control over short-term production goals and resource allocation, the government will be able to focus more on all-important medium-term plans and policies.

Finally, China may want to create new institutions to safeguard the social achievements of the past. As issues such as poverty alleviation and public health and education are increasingly left to local control, they may not receive the priority they once had at the national level. Thus, innovative social policies and institutions may become necessary.

Although these recommendations seem to advocate greater central management at a time when China is heading in the opposite direction, the bank believes they go hand-in-hand with decentralization. Economic reform can and should encompass both concepts. By strengthening indirect control over key aspects of the economy—prices, wages, monetary and fiscal policy—the devolution of other powers to individual enterprises can take place more effectively. An example of what can happen without this coordination oc-

curred late last year, when banks gained more decision-making authority before a clear set of monetary regulations was in place. The result: banks undertook an uncontrolled, rapid expansion of credit that had to be contained with new administrative guidelines for bank lending in 1985.

Sectoral lending priorities

The bank report also discusses sectoral problems. World Bank officials and China's economic planners have both focused on energy and transportation as critical bottlenecks facing the economy in the coming years. The new World Bank report reiterates a central theme of the 1981 China report: energy will continue to be a major constraint on economic growth for some time. The energy gains China recorded in the early 1980s can in part be attributed to strict conservation measures. Although these measures provided short-term relief, future gains will be more difficult to achieve.

The World Bank's lending priorities reflect this concern. Energy has been, and may well continue to be, the bank's largest single area of lending to China. To date the bank has lent mainly for large hydropower and thermal power projects. Its future loans are likely to target broader sectoral issues including regional grid planning and tariffs. Petroleum, natural gas, and coal are also expected to receive more funding.

Transportation is another high priority. The bank expects to lend more for road and highway construction. At present China lacks both funding for road development and coordination among regional highway authorities. The bank also hopes to be involved in port development, inland waterways, and improving the links between different modes of transport.

The concern expressed in the bank report over safeguarding social achievements means loans for education will remain a high priority. The bank would like to lend money for projects that maintain the quality of primary education, expand and improve vocational training, and continue the bank's present involvement in higher technical education.

Agriculture and industry will continue to receive World Bank funds, but China's own credit institutions will gradually become more directly involved in lending. The bank ex-

WORLD BANK AND IFC LOANS TO CHINA

Fiscal Year 1985

Approximately $1.1 billion in loans were approved for China in fiscal year 1985 (July 1, 1984 through June 30, 1985), consisting of the following mix:

International Development Association (IDA): $449 million (interest-free);
International Bank for Reconstruction and Development (IBRD): $660 million (with interest);
International Finance Corporation (IFC): $17.02 million (The IFC is an affiliate of the World Bank that assists the development of private and joint private/government-owned companies in IFC member countries).

Note: for list of earlier World Bank loans to China, see *The China Business Review* Jan–Feb 1984.

Project/Total Cost ($ mil)	Loan Amount ($ mil)	Project Description
Agricultural Research II/69	25 IDA	Construction and renovation of 15 research centers and 10 agrotechnical extension stations for agriculture, animal husbandry, forestry, water conservancy, meteorology, and water products.
University Development Program II/1,162	148 IDA	First phase of 10-year program to increase technical and managerial manpower at 35 universities and colleges in economics/finance and postgraduate education.
Power Project II/282.8	117 IBRD	Construction of 500-kv transmission line from Xuzhou to Shanghai; installation of five substations.
Coal I (Changcun)/357	126 IBRD	Construction of an underground, long-wall mine that will increase coal production by 4.5 mil. tpy by early 1990s; technology transfer and improved management techniques. Co-financing from West Germany ($1.9 mil.), UNDP ($.04 mil.)
Rural Water Supply/210.2	82 IDA	Construction of water supply facilities in Liaoning, Shaanxi, Sichuan, Zhejiang, and Beijing. Co-financing from West Germany ($1.5 mil.) and World Food Program ($10.5 mil.).
Seeds Project/86.8	42 IDA	Modernize facilities and increase production of high quality seeds at 18 seed production, processing, and distribution centers; strengthen operations of Nat'l Seed Corporation.
Highways I/176.6	4.3 IBRD 30 IDA	Construction and improvement of national roads totaling 230 km. Construction and improvement of 59 rural road sections in six provinces totaling 1,400 km.
Railways II/569.1	235 IBRD	Upgrading and electrification of Zhengzhou–Wuhan line (547 km) and 72 km feeder line to Pingshan mines; increase production at Changchun passenger coach factory to 1,500 coaches/year.
Chemical Fertilizer/173.8	97 IBRD	Increase fertilizer production and modernize five chemical fertilizer companies to increase energy efficiency.
Forestry Development/135.8	47.3 IDA	Development of forest resources, acceleration of afforestation, improved management and exploitation of existing forests in Guangdong, Heilongjiang, and Sichuan.
Anhui Rural Development/264	75 IDA 15 IBRD	Increase agricultural output by developing water resources, and improving flood control, rural infrastructure, and support services in Pishihang and Chaohu.
Weiyuan Natural Gas/30	25 IBRD	Technical assistance for diagnostic study and rehabilitation program to maximize gas recovery.
Guangzhou Peugeot Automobile Company/79.5	15 loan 2.02 equity	Finance to assist French–Chinese joint venture that will manufacture 15,000 one metric tonne pick-up trucks/year and after three years, will manufacture 50,000 vehicles/yr. This is the first IFC-funded project in China.
Proposed Projects for Fiscal Year 1986		
Provincial University Devel.		Upgrade teaching at provincial universities.
Highways II		Construction of Beijing–Tanggu expressway.
Ports III		Expansion and modernization of Tianjin Port, including two new piers, sea wall, and railway spur.
Railways III		Electrification of railway lines: Chongqing–Guiyang and Yichang–Xiamen.
Rural Credit II		Grant to Agricultural Bank of China for projects in Fujian and Guangxi.
Aquaculture		Modernization of aquaculture near eight cities.
Cement		Modernization of existing cement making facilities.
Shanghai Machine Tools		Modernization of Shanghai machine tool sector.
Coal II		Construction of long-wall mine in Shanxi Province.
Power III		Construction of coal-fired thermal power station rated at 1,200 mw at Beilungang.
China Investment Bank		Third industrial credit.
Shanghai Environmental Project		Construction of sewers to remove wastewater from central district and pipe to sea.

Prepared by A. Kelly Ho.

pects to expand its work with financial intermediaries such as the China Investment Bank (set up in cooperation with the World Bank to fund industrial projects), the Agricultural Bank of China (ABC), and the large Industrial and Commercial Bank of China. The World Bank can help these institutions improve project appraisal and selection—tasks that will gain importance as ongoing reforms expand the role of banks in the economy. For instance, the World Bank expects that, in line with ongoing rural reforms, agricultural development projects will be increasingly funded through the ABC rather than through government budget allocations.

Other long-term issues

The World Bank has several long-term goals that apply to all types of lending. First, projects should address broader issues than they have in the past, such as integrating regional power grids and strengthening intersectoral links, i.e., between energy and transport. Second, the bank will look at potential problems on a regional basis. It has already begun to work with authorities in Gansu Province and Shanghai municipality to gain a better understanding of these two very different regions. Finally, as China's need for international financing expands, the bank expects to encourage more co-financing of projects with foreign private banks, as well as other multilateral and bilateral aid institutions.

In all areas of cooperation, the World Bank and China will build on the experience gained over the past five years. From 1981 to the end of fiscal 1985, bank loans to China totaled some $3 billion for about 30 projects. Bank officials estimate that the number of projects waiting in the pipeline will allow further rapid expansion of the lending program in the coming years.

China's excellent credit-worthiness makes it a continually attractive borrower of funds. And as China enters the critical economic period of the Seventh Five-Year Plan (1986–1990), the World Bank's advice and experience will remain useful. In short, both sides have much to gain from working together. The new World Bank report provides a framework for this partnership to develop further over the next 15 years. 完

The Upcoming Industrial Census

Good news for economic planners and foreign investors

Jeffrey R. Taylor

Complete and accurate statistics are essential to measure a nation's economic progress. China has improved its economic reporting immeasurably since 1978 and is about to make another giant stride by conducting an industrial census next year. This will be the first comprehensive survey of the nation's enterprises since an unpublished census was taken the year after the 1949 revolution. China has indicated that it will publish the results of the census this time, and make the detailed tabulations available to outside parties. The new industrial census should provide valuable data both to China's planners and to foreign business people evaluating opportunities in China.

The census will focus on the nation's manufacturing, mining, and utility (electric, gas, and water) enterprises, from the largest facilities down to county-level operations. The government is asking these enterprises to provide information on their balance sheets, work forces, and capital equipment holdings in 1985, grouped around seven sets of basic economic indicators (*see* page 50). Although even preliminary results will not be available before the end of 1986, economists and business people are already thinking about the many applications of this anticipated windfall of information.

What will be gained from an industrial census?

According to Xu Gang, deputy director of the State Statistical Bureau and director of the National Industrial Census Office, China's industrial census will accomplish four objectives: 1) improve the quality of industrial statistics for long-term planning; 2) provide an accurate inventory of industrial capital equipment, which will be used to identify sectors in urgent need of upgrading; 3) provide the basic data for undertaking and evaluating economic system reform; and 4) further China's opening to the outside world. A look at the current situation suggests that all of these are worthy goals.

The importance of the first goal was underlined by Yuan Baohua, deputy director of the State Economic Commission and vice-chairman of the Industrial Census Leading Group at a census work conference last year. He noted that the records of some industrial enterprises are inaccurate because they are based on estimates rather than actual figures. Other enterprises miscalculate technical indicators in their monthly, quarterly, and annual reports. This suggests that there are errors of indeterminate magnitude in some of China's existing industrial statistics—errors that authorities are anxious to eliminate. Census pretests are now being used to familiarize enterprises with reporting procedures, and to put their records in order so that they can respond faithfully to census questionnaires. The industrial census will also provide useful new information not routinely covered in existing enterprise reports, such as the age of fixed assets by equipment type, data linking employee productivity with compensation, and detailed cost breakdowns for smaller manufacturing units.

The second objective of the industrial census will be to identify industrial sectors in need of technical upgrading. Enterprises do not currently gather statistics on their capital equipment holdings by age or type. This lack of information worries economic planners in China, who fear that ancient plant and equipment may cripple ongoing efforts to make Chinese enterprises more efficient. Their concern is justifiable, given a 1980 depreciation rate for Chinese industry overall of only 4.2 percent. Considerably lower than the industrial average for Western countries, this implies that the average piece of industrial equipment in China is worked for a remarkable 24 years before it is scrapped. By requiring enterprises to report the actual age of equipment now in use, the census will help pinpoint the sectors that most urgently need to update their stock of industrial capital equipment.

Third, an industrial census will provide necessary information to carry out economic system reform throughout China, particularly the urban industrial reforms approved last October. The reforms aim to reduce the role of central planning in manufacturing and distribution, restructure wholesale and retail prices, and generally improve the efficiency of the urban marketplace. The reforms require better financial statistics to guide managers in profitable plant management, better production cost data to revamp prices, and detailed efficiency indicators to keep State economic authorities apprised of the impact of the reforms.

Finally, the census can advance China's opening to the outside world in several ways. It should stimulate commercial ties by giving foreign business people more information on

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trade and investment opportunities they may have overlooked. Because the census will profile the nation's manufacturing activities, both foreign and domestic investors will be able to determine where operating costs are lowest, and where the closest suppliers and possible competitors are located. It could also stimulate a more efficient economy, as profit-seeking enterprises use data from the census to pinpoint and enter markets currently served inadequately.

The upcoming census has already resulted in greater foreign contacts. In preparing to conduct a sound survey, China solicited advice from both the United Nations and the US Bureau of the Census, with which it signed a statistical cooperation protocol in 1984. Unlike their counterparts in the Soviet Union, statistical authorities in China have been increasingly disposed to share their economic data with the outside world. Their willingness to publish the census results will take China much farther than ever before toward making its economy understandable to interested foreigners.

INDICATORS TO BE GATHERED IN CHINA'S 1986 INDUSTRIAL CENSUS

I. Basic conditions
Gross value of industrial output
Net value of industrial output
Output value of retail goods
Income from sales
Inventory of finished products

II. Major output indicators in physical terms
Output volume of major products
Sales volume of major products
Stocks on hand

III. Data on workers and staff
Number of workers and staff by sex, age, education, and skill level
Wages and bonuses of workers and staff by sex, age, education and skill level

IV. Material inputs and stocks
Consumption of raw material
Consumption of energy
Stocks of raw materials

V. Production capacity
Actual equipment usage and production capacity
Total production capacity of machinery

VI. Financial indicators
Fixed assets
Circulating assets
Cost of production
Current profits and taxes
Profits and taxes remitted to the State, current and earlier years
Investment, current and earlier years

VII. Miscellaneous items
Area and floor space of the enterprise

SOURCE: Guojia tongji ju [State Statistical Bureau], *Zhonqquo di erci gongye pucha jianjie* [A Brief Introduction to China's Second Industrial Census] (Beijing: November 1984)

Spotlight on large enterprises

China's large State-owned factories will receive especially detailed study in the census. These factories made up only 22 percent of all industrial enterprises in 1983, but produced a whopping 77 percent of China's gross value of industrial output. In addition to basic information being gathered, the government will require large enterprises to furnish data on energy use, costs and prices of major products, extent of mining resources, transport and shipping expenses, and educational, health, and welfare facilities at the enterprise.

Thus, some 60,000 of China's larger enterprises, many of which are State-owned, will be required to fill out a questionnaire with approximately 300 items. Two hundred thousand smaller enterprises that carry out independent accounting will have to fill out questionnaires with only about 100 items. Some 80,000 small enterprises that do not perform independent accounting will complete questionnaires with approximately 20 items. Village-run enterprises (formerly brigade-run enterprises) and small cooperative and individual ventures will not be surveyed directly, but will be indirectly counted using existing administrative records.

Such detailed data gathering is not unusual in industrial countries; the United States conducts a new industrial census every five years. But economic surveys of this scope are generally less frequent in developing countries, and truly momentous for China when one considers that the country's statistical system has only recently recovered from a period of neglect.

China's statistical work was thrown into turmoil during the Great Leap Forward (1958–1962), and the State Statistical Bureau (SSB) was virtually dismantled during the Cultural Revolution. The staff at the SSB headquarters in Beijing dwindled from 480 in 1966 to only 12 in 1970 as statisticians were sent to the countryside to "learn from the peasants." Statistical work resumed in 1978, but only recently have personnel and training levels advanced to the point where an industrial census could once again be attempted. China's positive experience with its 1982 population census undoubtedly helped bring statistical methodology back up to speed.

Preparations underway

Preparations for the industrial census formally got underway in November 1983, when the State Council released its "Decision on Conscientously Doing Well on Preparation Work for the Second Industrial Census." This document established an Industrial Census Leading Group directly under the State Council, headed by Zhang Jingfu, State Council member and former director of the State Economic Commission. The State Council decision also mandated the creation of the National Industrial Census Office, headed by Xu Gang. Finally, the decision fixed the 1985 calendar year as the census reference date for the flow indicators (volume and value of output, input use, wages, profits, and taxes), and December 31, 1985, as the reference date for stock items (value of fixed assets, and inventories of raw materials and finished goods).

A manual tabulation of preliminary census results should be completed by the end of 1986, but all other data will be processed via com-

The 1982 population census helped restore China's statistical system. Here, census-takers record family statistics in Gansu Province.

puter. Initial coding of the industrial census questionnaires will be carried out on the 650 IBM 5280 data entry systems that were originally used in each province for processing data from the 1982 population census. The information will then be read into mainframe computers in each province. Authorities plan to use the 28 computers currently in provincial statistical offices for this task (eight Wang VS-80 computers and 20 IBM 4331 E series computers), and are trying to procure eight additional IBM 4341 computers to help in data processing. All computer tabulations are scheduled to be completed by the end of 1987, and the final results published in 1988.

Lining up for the results

A least two publications will result from the industrial census. The first, summarizing the results of the manual tabulation, will be completed in early 1987 and contain 20 to 30 basic indicators on production, financial conditions, and economic efficiency for 20 to 30 industries. Capital equipment statistics and details of enterprises below the provincial level will not be included in this publication.

The second publication, which summarizes the results of the computerized tabulation, will be completed in 1988, and include statistical indicators for at least 200 to 300 industries. The precise level of detail to be presented in this publication remains to be determined. However, all the data will probably be included in a single volume, which may restrict its scope somewhat. Although provincial statistical offices will be permitted to publish more detailed materials from the industrial census on their own region, none has yet announced plans to do so.

Both of these data compilations will add greatly to the volume of information now available on industrial enterprises in China. For example, although provincial-level data are relatively plentiful on gross and net value of industrial output by branch, number of industrial enterprises, and physical output of individual commodities, there is still very little information on production costs, profits, taxes, ownership, average age of fixed assets, depreciation, employees, and wage bills by industry.

Those dissatisfied with the level of detail in the two census publications might have an alternative means of obtaining information. In addition to the forthcoming statistical publications, the SSB is forming an economic consulting service. This service will use official statistics to research special topics on a fee-for-service basis primarily for Chinese government agencies, although it will also consider requests from private businesses and trade associations. For example, one could arrange to have a special tabulation of industrial data for a particular county, or ask for highly detailed information on fixed assets in a given industry. There is, of course, no guarantee that all requests for special tabulations will be honored. As in the United States, fulfillment of some requests could violate the confidentiality of individual enterprise information. Moreover, the cost of servicing requests for special tabulations may be quite high. It is nonetheless an encouraging sign that China's statistical authorities are considering opening a new door for acquiring useful information. 完

The New Foreign Contract Law

A welcome addition to the growing body of economic legislation

Jerome Alan Cohen

China's ambitious law-making program took a major step forward on July 1, when the Law of the PRC on Economic Contracts Involving Foreign Interests went into effect. The first nationwide legislation to regulate almost all types of Chinese–foreign business contracts, this law covers purchase and sale contracts, supply of utilities, establishment of agency relationships and service centers, warehousing goods, constructing buildings, obtaining insurance, licensing technology and trademarks, processing, assembly, compensation trade, joint equity and cooperative ventures (including contracts between Chinese–foreign equity joint ventures and foreign firms), natural resource projects, financial transactions, and property and equipment leases. In fact, virtually all transactions except "international transport contracts" will be affected by the new law.

Western business people and lawyers who patiently anticipated the foreign contract law should not be disappointed. Although general in content, the law confirms the PRC's adherence to many principles widely shared by the international business community and, in many cases, clarifies or improves upon earlier laws. Moreover, unlike its experimental predecessor, the 1984 Provisions of the Shenzhen Special Economic Zone on Economic Contracts Involving Foreign Interests (*see The CBR*, Sept–Oct 1984), the law does not add any hurdles to an already difficult negotiating process. It reflects instead a spirit of flexibility and fairness that promises to facilitate the conclusion and administration of contracts. The following issues demonstrate how the law clarifies prior legislation and in some cases raises important new considerations for contracting parties in China.

▶**Laws governing contract disputes.** With regard to the delicate question of which country's law should govern the resolution of contract disputes, the new legislation is clearer and more liberal than the Shenzhen provisions. It requires that PRC law be applied only to equity joint venture, cooperative venture, and natural resource development contracts. In all other cases the contracting parties are free to set the governing law in their contract. If they fail to do so, Article 5 authorizes the arbitration panel or court hearing the dispute to apply "the law of the country with the closest relation to the contract," thereby adopting a standard principle of international private law. The new law does not suggest, as did the Shenzhen provisions, that other types of contracts may be so "closely related to Chinese sovereignty" as to warrant imposition of Chinese law regardless of the wishes of the contracting parties.

In cases where PRC law is applicable in principle but does not contain any provisions relevant to the dispute, the new law—for the first time in any PRC legislation—permits arbitrators and judges to consult "international practice" for rules to settle the dispute. This codifies a principle that has occasionally been used in investment contracts with Chinese firms, particularly offshore petroleum development contracts, by allowing the decision maker an opportunity to invoke precedents set by international practice.

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Nevertheless, the new law is not entirely satisfactory concerning governing law. Problems may arise if foreign law is applicable to the dispute but conflicts with some basic principle of China's new foreign contract law. In such cases, the scope of the latter will have to be determined on a case-by-case basis.

▶**Relationship of new legislation to existing contracts.** A basic question confronting all businessmen who have contracted with Chinese entities is whether or not new legislation will be applied to existing contracts, particularly when the foreign party would be adversely affected. Chinese leaders frequently suggest that foreign investors who enter into contracts without waiting for enactment of relevant legislation need not fear that future laws will harm their contractual rights. Nevertheless, the Ministry of Foreign Economic Relations and Trade, which approves investment contracts, has consistently rejected draft contract language stating that subsequent legislation shall not apply to a contract if it would harm the foreign investor's interests. Although the Ministry of Finance has set an encouraging precedent with its view that new tax legislation should not nullify tax provisions favorable to foreigners in existing contracts, this only affects taxation and could still be set aside at any time in the absence of legislative support.

Article 40 of the new law offers foreign investors their first promise of protection through legislative support. It states that when new laws appear, contracts for equity joint ventures, cooperative ventures, and natural resource development "may still be implemented according to the provisions of the contracts." Unfortunately, the wording is not specific, and introduces a note of uncertainty

by the use of "may." If this wording simply gives PRC officials the discretion to decide whether or not to apply subsequent law to existing contracts, few investors will find Article 40 very reassuring. A more positive interpretation would insulate equity, cooperative, and resource contracts from the impact of subsequent legislation unless the parties to such contracts request otherwise. The most that one can say prior to the State Council's promulgation of the Law's implementing regulations is that Article 40 is an encouraging sign. However, Western business people comparing the advantages and disadvantages of different forms of cooperation in the PRC should note that Article 40 does not cite contracts for wholly owned investments, licensing of technology, and compensation trade as being eligible for protection against future laws.

▶**Contract formalities.** Unlike the Shenzhen provisions, the new law does not emphasize the formalities of the contract negotiating process, such as requiring the parties to provide each other with evidence of their legal identity and the authority of their representatives to sign the contract. It also does not demand that each submit to the other an independently verified balance sheet, a credit certificate, and a guarantee. Obviously, in many situations it is desirable to observe these formalities. The new law, however, does not impose rigid rules to be followed at the cost of complicating negotiations, or to be ignored at the cost of creating disrespect for the law. Rather, it lets the contracting parties decide the appropriate procedure themselves.

▶**Equality of language texts.** The new law also takes a sensible approach to the issue of language. It simply prescribes that contracts should contain a provision dealing with this problem, leaving the specific solution to the parties. For both Chinese and foreign parties, surely this seems preferable to the Shenzhen provision, which states: "If a contract must be written in Chinese and in a foreign language, the Chinese-language version shall govern." The Shenzhen provision indirectly makes the Shenzhen special economic zone the only place in China where a contract's foreign-language text cannot enjoy equal status with the Chinese text. The PRC's nationwide equity joint venture law, it should be noted, states that foreign-language and Chinese texts of the joint venture contract are equally valid. It is the rare foreign investor who wants to base his legal rights exclusively on a Chinese text that he cannot understand.

▶**Ending a contract.** One problem that deserves attention is the distinction that the new law draws between "rescission" and "termination" of a contract. Rescission appears to mean unilateral termination. Nevertheless, the boundary between the terms is not self-evident, and in informal discussions some Chinese lawyers have found it difficult to draw the line.

The distinction has important implications. Although rescission does not require advance approval under the new law, it "must be reported to the original approving agency for the record." This gives the original approving agency an opportunity to intervene after the fact. By contrast, the new law does not require termination of a contract to be reported. Under Article 31 the parties can simply "consult and agree to terminate the contract," apparently without notice to the original approving agency. Indeed, the new law does not even require the parties to agree on termination in writing. Article 32 merely states that "modification or rescission of a contract must be in written form."

Yet the new law is not China's only legislation governing the termination of foreign contracts. What will be its relationship to earlier legislation? For example, the 1979 Law on Chinese–Foreign Joint Ventures authorizes the termination of equity joint venture contracts prior to scheduled expiration only after the parties obtain approval from the original approving agency and register the approved termination document with the administrative authorities. The 1983 Joint Venture Implementing Regulations speak in terms of dissolution of the venture rather than termination of the joint venture contract, but they too require approval by the original approving agency. Will the new law prevail over the joint venture legislation because it is more recent? Or, as seems more likely, will the earlier laws specifically regulating equity joint ventures prevail over the new law that is more general in scope?

▶**Dispute resolution.** Although the new law inevitably presents the challenge of reconciling its provisions with those of earlier legislation, it also sheds light on the proper interpretation of some clauses in earlier laws. For example, the PRC Civil Procedure Law, promulgated on a trial basis in 1982, prevents Chinese courts from accepting a lawsuit over a Sino–foreign contract dispute if the contract requires that disputes be settled by a Chinese arbitration organization. Yet, if read literally, the Civil Procedure Law would permit Chinese courts to accept this type of lawsuit if the contract requires that disputes be settled through arbitration *outside* China. Such a literal interpretation would unpleasantly surprise the many foreign companies that have successfully persuaded Chinese partners to agree in their contracts to submit disputes to arbitration in Stockholm or before other non-Chinese tribunals, for it would enable Chinese partners to ignore contract's foreign arbitration clause and instead bring suit in China.

Although some Chinese officials had previously taken the position that the Civil Procedure Law would not be interpreted literally, this did not give foreign business people adequate assurance. Article 38 of the new law, however, does appear to offer such assurance. It suggests, by negative implication, that if the parties have reached an agreement requiring arbitration anywhere—not solely in China—they cannot bring suit in PRC courts.

On the right track

As in the case of China's 1981 law regulating contracts between domestic enterprises, the nuances and significance of the new foreign contract law will become clearer only through practice. Clarifications by Chinese scholars, who have already done much to elucidate the provisions of the 1981 legislation, can also be expected to play a useful role.

However, this new law does reflect the fact that the drafting of PRC legislation is improving, and the choice of words is becoming more careful. For example, although the new foreign contract law does not clarify the difference between an "agreement" and a "contract"—a problem that frequently puzzles foreign negotiators—it does consistently use "contract" to describe documents that purport to be the final expression of

the parties' will. Western business people would be well-advised to follow this example when negotiating in China.

Chinese legislators are hard at work on additional laws that will have a significant impact on business contracts with foreigners. The forthcoming civil code will undoubtedly explain some basic contract concepts, and the long-awaited laws on cooperative and wholly foreign-owned ventures will set forth detailed guidelines. The corporation law and other economic legislation now being prepared will also be highly relevant. Yet PRC legislators can surely be forgiven if they paused for a moment on July 1 to note with satisfaction their most recent effort to use law as an instrument of international commercial cooperation. 完

Law of the People's Republic of China on Economic Contracts Involving Foreign Interests

CHAPTER I. GENERAL PRINCIPLES

Article 1. This Law is specially formulated to safeguard the lawful rights and interests of parties to economic contracts involving foreign interests and to promote the development of China's foreign economic relations.

Article 2. The scope of application of this Law is economic contracts concluded between enterprises or other economic organizations of the People's Republic of China and foreign enterprises and other economic organizations or individuals (hereinafter referred to as "contracts"), but excluding international transport contracts.

Article 3. Contracts shall be concluded in accordance with the principles of equality and mutual benefit and of achieving agreement through consultation.

Article 4. In concluding contracts, the laws of the People's Republic of China must be respected, and no harm may be done to the social and public interest of the People's Republic of China.

Article 5. The parties to a contract may choose the law to be applied to the handling of contract disputes. In cases where the parties have not chosen the applicable law, the law of the country with the closest relation to the contract is to be applied.

The law of the People's Republic of China is to be applied in the case of Chinese–foreign equity joint venture contracts, Chinese–foreign cooperative venture contracts, and contracts for the Chinese–foreign cooperative exploration and development of natural resources to be performed within the People's Republic of China.

On matters for which the law of the People's Republic of China has not yet made provisions, international practice may be applied.

Article 6. When an international treaty that relates to a contract and that the People's Republic of China has concluded or joined contains provisions that differ from the law of the People's Republic of China, the provisions of the said treaty shall be applied, except for clauses in respect of which the People's Republic of China has declared reservation.

CHAPTER II. THE CONCLUSION OF CONTRACTS

Article 7. A contract is formed when the parties have reached an agreement on and signed in written form the provisions of the contract. In cases of agreement reached through correspondence, telegrams, or telexes, if one party requests the signing of a confirming document, the contract shall be considered to be formed only at the time of signature of the confirming document.

Contracts that, pursuant to the provisions of the laws and administrative regulations of the People's Republic of China, are to be approved by the State shall be considered to be formed only when the approval is obtained.

Article 8. Appendices specified in a contract are integral parts of the contract.

Article 9. Contracts that violate the laws of the People's Republic of China or contravene the social or public interest are void.

Contract provisions that violate the laws of the People's Republic of China or contravene the social and public interest, once the parties have consulted and agreed to cancel or correct them, shall not affect the validity of the contract.

Article 10. Contracts concluded using methods of fraud or duress are void.

Article 11. When one party is responsible for the invalidity of a contract, it shall bear responsibility for compensation to the other party for losses suffered as a result of the contract's invalidity.

This Law was passed by the 10th Meeting of the Standing Committee of the Sixth National People's Congress on March 21, 1985. Translated by Paul, Weiss, Rifkind, Wharton & Garrison.

Article 12. Contracts should normally contain the following provisions: (a) the corporate or personal names of the parties to the contract and their nationalities, principal places of business or residential addresses; (b) the date and place of signing of the contract; (c) the type of contract and the categories and scope of the object of the contract; (d) the technical conditions, quality, standards, specifications, and quantities of the object of the contract; (e) the time period, place, and means of performance; (f) the price terms, amount to be paid, means of payment, and various types of additional charges; (g) whether or not the contract may be assigned or the conditions for assignment; (h) the compensation and other liabilities for breach of contract; (i) the methods for resolving disputes arising under the contract; and (j) the languages used in the contract and their effectiveness.

Article 13. Contracts should contain agreement, as needed, on the parameters of the risks undertaken by the parties for performance of the object and, when necessary, they should contain agreement on the scope of insurance for the object.

Article 14. In contracts that require a relatively long period of continuous performance, the parties should agree on the term of validity of the contract, and may agree on the conditions for extension of the contract term and early termination of the contract.

Article 15. The parties may agree in the contract on guarantees. The guarantors shall undertake responsibility within the agreed scope of such guarantees.

CHAPTER III. PERFORMANCE OF CONTRACTS AND LIABILITY FOR BREACH OF CONTRACT

Article 16. Contracts formed according to law are legally binding. The parties must perform the agreed obligations of the contract, and neither party may of its own accord alter or rescind the contract.

Article 17. When one party has actual evidence that the other party cannot perform the contract, it may temporarily cease performance of the contract, but must immediately inform the other party; when the other party provides a full guarantee of performance of the contract, the first party must perform the contract. When one party, without having actual evidence that the other party cannot perform the contract, ceases performance of the contract, it must bear liability for breach of contract.

Article 18. When one party does not perform the contract or its performance of the contractual obligations does not comply with the agreed conditions, it is in breach of contract, and the other party has the right to demand compensation for losses or to adopt other reasonable remedial measures. If adopting other remedial measures still cannot completely make up the losses suffered

by the other party, the other party still has the right to demand compensation for losses.

Article 19. The liability of a party that breaches a contract to make compensation shall equal the losses suffered by the other party as a result of such breach, but may not exceed the losses that the contract-breaching party, in concluding the contract, should have foreseen could result from the breach of the contract.

Article 20. The parties may agree in a contract that, when one party breaches the contract, it shall pay a fixed sum of breach of contract damages to the other party. They may also agree on the method of calculation of the amount of compensation for losses arising from breach of the contract.

Breach of contract damages agreed to in contracts shall be considered to be compensation for losses due to breach of the contract. However, if the agreed breach of contract damages are excessively higher or lower than the losses caused by the breach of contract, the parties may request an arbitral body or court to reduce or increase them appropriately.

Article 21. If both parties are in breach of a contract, each shall bear its respective liability.

Article 22. When one party suffers losses because of the other party's breach of contract, it must promptly adopt appropriate measures to prevent such losses from increasing. If the losses increase because of a failure promptly to adopt appropriate measures, such party shall have no right to demand compensation for the increased losses.

Article 23. If one party has not paid on time amounts required to be paid as provided by the contract or other amounts to be paid in connection with the contract, the other side has the right to collect interest on the amount in arrears. The method of calculating interest may be agreed to in the contract.

Article 24. When a party cannot perform all or part of its contractual obligations because of an event of *force majeure*, it shall be fully or partially relieved from liability.

When a party cannot perform in accordance with the contractually agreed time periods because of an event of *force majeure*, it shall be relieved of liability for delayed performance during the period of continued influence of the effects of the event.

An event of *force majeure* means an event that the parties could not foresee at the time of conclusion of the contract and the occurrence and effects of which cannot be avoided and cannot be overcome.

The scope of events of *force majeure* may be agreed to in the contract.

Article 25. When one party cannot perform all or part of its contractual obligations because of an event of *force majeure*, it shall promptly inform the other party in order to diminish the losses that might be caused to the other party, and it must within a reasonable period provide evidence issued by the relevant agency.

CHAPTER IV. ASSIGNMENT OF CONTRACTS

Article 26. A party shall obtain the agreement of the other party to the assignment to a third party of all or a part of its contractual rights and obligations.

Article 27. The assignment of rights and obligations of contracts that, under the provisions of the laws and administrative regulations of the People's Republic of China, are to be approved by the State in order to be formed shall be approved by the original approving agency, except in respect of contracts that are already approved in which it is otherwise agreed.

CHAPTER V. MODIFICATION, RESCISSION, AND TERMINATION OF CONTRACTS

Article 28. Contracts may be modified following consultation and agreement between the parties.

Article 29. In any one of the following circumstances, a party has the right to inform the other party of the rescission of the contract: (a) the other party has breached the contract, to the extent that such breach has seriously affected the economic benefits expected when concluding the contract; (b) the other party has not performed the contract during the period agreed to in the contract, and has still not performed within a reasonable time period allowed for delayed performance; (c) an event of *force majeure* has occurred, with the result that all of the contractual obligations cannot be performed; or (d) the conditions agreed on in the contract for rescission of the contract have arisen.

Article 30. In a contract that contains several mutually independent parts, some parts may be rescinded and the effectiveness of the others retained, in accordance with the provisions of the preceding Article.

Article 31. In any of the following circumstances, a contract shall be declared terminated: (a) the contract has already been performed in accordance with the originally agreed conditions; (b) an arbitral body rules or a court adjudges that the contract be terminated; or (c) the parties consult and agree to terminate the contract.

Article 32. Notices or agreements on modification or rescission of a contract must be in written form.

Article 33. Major modifications in contracts that, under the provisions of the laws and administrative regulations of the People's Republic of China, are to be approved by the State to be formed shall be approved by the original approving agency; rescissions of such contracts must be reported to the original approving agency for the record.

Article 34. The modification, rescission, or termination of contracts shall not affect the rights of the parties to demand compensation for losses.

Article 35. The provisions for resolving disputes agreed to in a contract shall not lose effectiveness because of the rescission or termination of the contract.

Article 36. The provisions regarding final accounting and liquidation agreed to in a contract shall not lose effectiveness because of the rescission or termination of the contract.

CHAPTER VI. DISPUTE RESOLUTION

Article 37. When contractual disputes arise, the parties should do everything possible to resolve them through consultation or through third party mediation.

If the parties are unwilling to consult or mediate, or if consultation or mediation is unsuccessful, they may, in accordance with the arbitration provisions in the contract or a written arbitration agreement reached after the dispute arose, submit the dispute to a Chinese arbitral body or another arbitral body for arbitration.

Article 38. If the parties did not conclude any arbitration provision in the contract, and also did not reach an agreement after the dispute arose, they may bring suit in the people's courts.

CHAPTER VII. SUPPLEMENTARY PROVISIONS

Article 39. The time limit for submitting to litigation or arbitration a dispute in respect of a contract for the purchase and sale of goods is four years from the time the party knew or should have known of the infringement of its rights. The time limit for the submission to litigation or arbitration of disputes in other contracts shall be stipulated separately by law.

Article 40. When there are new stipulations in law, contracts for Chinese–foreign equity joint ventures, Chinese–foreign cooperative ventures and the Chinese–foreign cooperative exploration and development of natural resources that are to be performed within the People's Republic of China and that have been approved by the State and formed may still be implemented according to the provisions of the contracts.

Article 41. If the parties consult and so agree, this Law may be applied to contracts formed before the day this Law goes into effect.

Article 42. The State Council shall formulate implementing rules in accordance with this Law.

Article 43. This Law shall go into effect on July 1, 1985.

US SERVICE EQUITY JOINT VENTURES IN CHINA

(as of June 1985)

Joint ventures that provide services, particularly related to construction and engineering, are among the fastest growing type of US–China equity joint ventures. This list of service joint ventures follows a compilation of manufacturing joint ventures that appeared in the May–June issue of *The CBR*.

Name of Venture	Total Investment	Partners (Equity Shares)	Purpose	Location	Date/Duration
Consulting					
C/Tech Ltd.	1.2 mil.	Georgia Institute of Technology's Advanced Technology Development Center/Technology Clearing House of China and China Association for Science & Technology (50%-50%)	Develop JVs to assist China in purchasing factories, licenses, and equipment; introduce advanced technology; and conduct business conferences	Offices in Beijing and Atlanta; ventures in Shenzhen City, Tianjin, and Nantong	Signed preliminary agreement 9/84 and final contract 5/85
—	—	M. W. Kellogg Co., sub. of Kellogg Rust Inc./CNTIC	Provide business facilitation services for foreign firms	—	Signed protocol 11/84
Engineering and Construction					
—	—	Bechtel China Inc./Xinjiang International Economic Cooperation Co.	Develop petroleum refining and petrochemical industries, and participate in mining, electricity, and transportation projects	Xinjiang	Signed letter of intent 3/14/85
China American International Engineering Inc.	Registered capital: $3 mil.	Bechtel International Inc./China National Coal Development Corp., sub. of Ministry of Coal Industry (50%-50%)	Contract to build open-cut coal mine and coal dressing plant at Junggar, Nei Monggol, and preliminary deal to construct Shidongkou Gas Works in Shanghai	Shenzhen; liaison offices in Beijing and Shanghai	Signed contract 8/20/84 15 years
CHEC-LBI Joint Engineering Consultants, Inc.	—	Louis Berger International Inc./ China Highway Engineering Consultants, Inc. (50%-50%)	Computer and design services for highways, bridges, and other large-scale projects	Beijing	Signed contract 1/12/85
—	—	E. A. Botti/Beijing Central Engineering & Research Inc.	Provide engineering consulting services and develop software products for large industrial projects	Beijing	Announced 1/20/85
Sino-American Intercontinental Engineering Inc.	$1 mil.	Fluor Engineering Inc./China National Nonferrous Metals Industry Foreign Engineering and Construction Corp. (50%-50%)	Provide engineering and construction procurement services for mining and nonferrous industries inside and outside China	Beijing	Signed protocol 10/10/84 15 years
Sino Fluor Engineers	$1 mil.	Fluor Engineering Inc./China Petrochemical International Co. (sub. of SINOPEC) and Beijing Design Institute (50%-50%)	Provide engineering and construction procurement services for oil refining and petrochemical sectors	Beijing	Signed contract 5/85 15 years
—	—	Kaiser Engineers and Constructors, sub. of Raymond International Inc./ China Metallurgical Construction Corp.	Perform engineering procurement, construction management and startup for iron and steel facilities in China, the US, and in selected third countries.	—	Signed protocol 12/84
—	—	M. J. Kelley Co./China State Construction Engineering Corp.	Bid for construction projects worldwide	—	Announced 1/84
—	—	M. W. Kellogg Co./Chengdu Chemical Engineering Corp. and China National Chemical Construction Co.	Form engineering and construction co. to build chemical, fine chemical, and pharmaceutical projects	—	Signed protocol 2/85
—	—	M. W. Kellogg Co./CNTIC	Design, plan, and build expatriate community	Beijing	Signed protocol 11/84 and contract 2/85
Sino-Kellogg Engineering Co.	Registered capital: $1 mil.	M. W. Kellogg Co./China Petrochemical International Co. (50%-50%)	Build petrochemical and gas-processing plants, oil refineries, and civil engineering projects inside and outside China	Lanzhou, Gansu	Signed protocol 2/85 and contract 5/85
Sino-Lummus Engineering Co.	—	Lummus Crest Inc., sub. of Combustion Engineering/China Petrochemical International Co. (50%-50%)	Provide design engineering and project mgmt. services for petroleum and petrochemical plants	Beijing	Signed protocol 2/85 and contract 6/85 20 years
Insurance, Finance, & Leasing					
China-American Insurance Co. Ltd.	Capitalized: $25 mil.	American International Group/People's Insurance Co. of China (50%-50%)	Insurance and reinsurance services primarily in marine and property sectors	Bermuda, New York, Beijing, and Hong Kong	Established 10/80
China International Nonferrous Metals Leasing Co. Ltd.	Registered capital: $3 mil.	First Interstate Bank (US) and Banque National de Paris (France)/ China National Nonferrous Metals Industry Corp., BoC Trust & Consultancy Co., and Industrial & Commercial Bank (US:20%-France:20%-PRC:60%)	Import equipment and lease it to nonferrous metals enterprises and institutions	Beijing	Signed contract 12/7/84 10 years
Offshore Petroleum Services					
Shanghai Offshore Petroleum Engineering Corp.	$10 mil.	AMAEE Holding Corp./Shanghai Mechanical & Electrical Industrial Co.; Shanghai Corp. of Shipbuilding Industry; and BoC, Shanghai Branch (US:40%-PRC:60%)	Provide rigs, vessels, petrochemical equipment and other service facilities	Shanghai	Signed contract 6/83 15 years

China-Nanhai Baker Drilling Corp., Ltd.	$20 mil.	Baker Marine Corp./China National Offshore Oil Corp. (50%-50%)	Provide expertise and labor for offshore drilling	Shenzhen	Approved 4/7/83 14 years
China Brown & Root Marine Engineering and Construction Corp.	$2.8 mil.	Brown & Root Inc./China National Offshore Platform Engineering Corp. (US:49%-PRC:51%)	Provide offshore structural fabrication and engineering services	Beijing	Approved 1/19/83 10 years
China-Corelab Ltd.	Registered capital: $2.9 mil.	Core Laboratories International Ltd./Scientific Research Institute of Petroleum Exploration and Development, sub. of CNOGEDC, and Nanhai Eastern Petroleum Corp., sub. of CNOOC (50%-50%)	Provide laboratory, engineering, consulting, and field services for offshore oil development	Head office in Beijing; branches in Shekou; Guangzhou; and Wanzhuang, Hebei	Signed contract 4/24/84 10 years
China Petroleum Logging-Dresser Atlas Joint Service Co.	$2 mil.	Dresser Atlas, div. of Dresser Industries/Ministry of Petroleum (50%-50%)	Act as functional sub. of CNOOC and provide well logging services	Beijing	Approved 4/81 10 years
China Nanhai Magcobar Mud Corp., Ltd.	Registered capital: $1 mil.	Magcobar Group of Dresser Industries/Nanhai Western Petroleum Corp., sub of CNOOC (50%-50%)	Provide mud products and equip. and technical services for offshore oil operations	Guangzhou	Signed 9/18/84; start-up 10/25/84 10 years
China Nanhai-Oxy-SEDCO Drilling Oil Corp.	Registered capital: $1.5 mil.	Occidental Equipment and Services, Inc. and SEDCO Inc./CNOOC (US:66.6%-PRC:33.3%)	Provide offshore oil drilling services	Guangdong	Announced 2/20/84 10 years
South China Sea, Raymond, Wah Chang Construction Corp., Ltd.	US & Singapore: $750,000	Raymond Offshore Constructions, Inc. (US) and Wah Chang International Corp. (Singapore) Pty. Ltd./Guangzhou Shipbuilding Ltd., sub. of China State Shipbuilding Corp., and Shenzhen Navigation Corp.	Build and operate structural steel fabrication yard, and related engineering and construction work for offshore drilling and production platforms	Shenzhen	Announced 4/17/84 15 years
China Nanhai-Reading & Bates Drilling Corp.	$1.5 mil.	Reading & Bates Drilling Co. (US) and Wah Chang International Corp. (Singapore)/CNOOC (US:25%-Singapore:25%-PRC:50%)	Provide contract drilling services in South China Sea	Guangdong	Announced 2/5/84 12 years
Zhong-Chang Offshore Marine Services Co.	Registered capital: $10 mil.	Sin-Hai Offshore Services Co. Pte. (US-Singapore joint venture between Seahorse Inc. and Wah-Chang International Corp.)/CNOJSC (US:49%-PRC:51%)	Provide supply vessels for South China Sea oil exploration	Guangzhou	Signed contract 12/82 10 years
China COESK-Taylor Diving Co.	Registered capital: $1.5 mil.	Taylor Int'l Diving Co./China Ocean Engineering Services Ltd., Guangzhou Branch (US:49%-PRC:51%)	Provide underwater technical services, including diving and remotely operated vehicles	Guangzhou	Approved 1/11/85 10 years
Shenda Shipping Service Co. Ltd.	—	Zapata Gulf Marine Corp. (US) and Houlder Offshore Co. (UK)/Shanghai Offshore Oil Service Corp. (US:25%-UK:25%-PRC:50%)	Provide foreign offshore oil companies with supply vessels and services	Shanghai	Signed contract 7/84 15 years
Property Development					
—	$20 mil.	BETS Int'l/Lashufang Industrial Development Co., Dalian (50%-50%)	Build hotel and entertainment complex	Dalian	Signed contract 4/85
—	$20 mil.	BETS International/Xi'an Tourist School (US:75%-PRC:25%)	Build hotel	Xi'an	Signed contract 4/85
—	$10 mil.	BETS International/Yantai Service Co., Shandong (50%-50%)	Build hotel and entertainment complex	Yantai, Shandong	Signed contract 4/85
Great Wall Hotel	$75 mil.	E-S Pacific Development and Construction Co., owned by Becket Investment Corp. and Union Pacific Corp./CITS, Beijing Branch (US:49%-PRC:51%)	Construct and operate hotel	Beijing	Signed contract 10/79; opened 6/84 10 years
Other					
China Computer World Publishing & Servicing Co.	$250,000	C. W. Communications/Ministry of Electronics Industry (US:49%-PRC:51%)	Publish *China Computerworld*	Beijing	Approved 11/12/80 10 years
China/USA Communications and TV Commercial Co.	—	China Communications Co. (a joint venture between Videocom/China Inc., and I. T. & Co.)/China Television Service (US: 64%-PRC: 36%)	Produce commercials, provide programming and documentaries, and sell commercial airtime on China Television Service network	Beijing, Los Angeles, Boston, and New York	Signed letter of intent 6/84 and contract 10/84 2 years
—	$2 mil.	China International Ventures Inc., sub. of Hua Shak Co. (USA) Inc./NA (50%-50%)	Retail-wholesale operation for fashion, cosmetics, and accessories	Tianjin	Signed letter of intent 5/85
Manpower China Joint-Venture Co., Ltd.	—	Manpower Inc., sub. of Parker Pen Co./China Economic Trade Consultants Corp.	Training and supplying temporary workers	Beijing	Signed letter of intent 9/6/84
China Great Wall Color Pictorial Co., Ltd.	$600,000	Pacific International Corp./China Sports News (50%-50%)	Develop and print color photographs and film	Beijing	Approved 5/83 13 years

List prepared by Betsy Saik, Jennifer Little, and Beth Keck. Due to the rapid pace of joint venture approvals, this list may not be exhaustive. We regret any inadvertent omissions. Companies that have signed joint ventures are encouraged to send press releases to Jennifer Little at the National Council library.

KEY

BoC	Bank of China	CNOOC	China National Offshore Oil Corp.
CNOGEDC	China National Oil & Gas Development Corp.	CNTIC	China National Technical Import Corp.
CNOJSC	China Nanhai Joint Venture Corp.	SINOPEC	China National Petrochemical Corp.

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NAME	PLACE	DATE
China SiliCom '85	Nanjing/ Jiangsu Province	1985 October 26 - November 01
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China Food-Bev '85	Nanjing/ Jiangsu Province	1985 November 06 - November 12
Equipment and technology for Food and Beverage Industries including Processing, Packaging, Storing and Warehousing		
China Auto/Office '86 Pavilion of the Americas	Beijing	1986 January 23 - January 30
Office Automation Equipment including products and technology; modern office stationery, and other equipment and supplies		
International Glass Industrial Expo in China '86 (in cooperation with Interglassmetal New York)	Shanghai	1986 June 03 - June 08
Flat glass, container glass, pressed/blown glass, fiber glass—technology and production equipment		
Beijing International Book Fair	Beijing	1986 September 05 - September 11
General, Educational, Business, Industrial, Reference, Scientific, Technical, Trade, Medical, Professional—published 1985/1986		

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书刊介绍

The 85 China Telex Book. Hong Kong: The China Phone Book Company (GPO Box 11581), 1985. 99 pp. $15 including airmail postage.

Designed as a supplement to *The China Phone Book & Address Directory*, the new *China Telex Book* is a valuable resource in itself. Over 2,000 telex numbers are listed in four different arrangements. The first section, by far the most important, lists telex subscribers in China in alphabetical order. Company names beginning with an initial are listed by that initial. China's foreign trading companies, followed by their branches, are all grouped under "China National." Other sections of the book list telex numbers by answerback, number, and city.

For a special offer on this directory, National Council members should refer to the May 1985 issue of *China Market Intelligence*.

China Telephone Directory, 1985, edited by China Telephone Directory Corporation of the Ministry of Posts and Telecommunications. Hong Kong: Ta Kung Pao, 1985. 665 pp. Order from Synergy Publishing, Inc., 15 Mercer Street, Suite 404, New York, NY 10013; delivery from Hong Kong. $37 airmail; $27.50 surface.

China's Ministry of Posts and Telecommunications has produced its own bilingual address and telephone directory to compete directly with the China Phone Book Company's *China Phone Book & Address Directory* (*see* Bookshelf, *The CBR*, September–October 1984). As it stands now, however, the *China Telephone Directory* is no competition to its Hong Kong rival.

This official directory is undoubtedly more complete and authoritative than the *China Phone Book*, but it is much harder to use. Rarely are directory listings in alphabetical order; in most cases the directory user must read through all entries to find the entry sought. Idiosyncracies also exist in the alphabetized "foreign offices" listings.

A total of 35,000 organizations are included in this volume. The arrangement of the directory is similar to that of the *China Phone Book*. Listings for Beijing precede those for the provinces, which are alphabetically arranged, and include 65 city lists. Organizations are listed by keyword, but not alphabetically, and there is no keyword index—an important feature of the *China Phone Book*.

China Telephone Directory contains a wealth of information for those with the time and patience to search its contents. But until this new volume is alphabetized and indexed, the *China Phone Book & Address Directory* will remain a better source for quick and easy access to addresses, telex, and telephone numbers in China.

1984 Almanac of China's Foreign Economic Relations and Trade, compiled by the Editorial Board of the Almanac of China's Foreign Economic Relations and Trade. Hong Kong: China Resources Trade Consultancy Co., n.d. Distributed in the US by Snodgrass & Associates, 267 N. Canon Drive, Suite 6, Beverly Hills, CA 90210. Bilingual, 1215 pp.; 841 in English, including advertisements. $150.

This first volume in an important new annual series, compiled by officials of the Ministry of Foreign Economic Relations and Trade, contains much of the most sought after China trade information: law texts, information on Chinese organizations, and statistics. The book opens with general policy statements on trade and investment made by Chinese officials. The 200-page collection of foreign trade and investment laws and regulations that follows is undoubtedly the most comprehensive and up-to-date compilation of China's legal texts in any single volume publication. Another 90 pages are a directory to Chinese organizations and the offices of foreign organizations in China. A final 200-page section of statistics covers China's trade from 1950–1983 trade, both by country and product, with statistics on specific commodities by volume and value for 1982 and 1983. Tables list China's utilization of foreign capital for 1979–1983 by form, country, source, and Chinese region in which the capital was used. Details are provided on equity and contractual joint ventures, oil exploration agreements, wholly foreign-owned enterprises in the SEZs, China's foreign contract and labor service projects, and foreign aid.

Other brief sections of the book describe China's SEZs and open cities, institutes and schools of foreign trade, and economic publications. There is also a chronicle of events in foreign economic relations and trade during 1983.

National Council members should refer to the July issue of *China Market Intelligence* for a special offer on this book.

US–China Trade Statistics 1984, compiled by Stephen W. Hoyle. Washington, DC: The National Council for US–China Trade, 1985. 197 pp. $25, plus $1 postage and handling ($5 overseas); free to National Council members.

The National Council's annual compilation of trade statistics provides a brief analysis of China's foreign trade and US–China trade. Included are tables of US–China trade 1971–1984; US imports and exports from China by category; leading items in US–China trade; China's total foreign trade and trade with its top 10 trading partners. Most of the book is devoted to detailed US–China trade statistics for 1980–1984 organized by 7-digit Schedule B number for US exports and TSUSA number for US imports. Both US dollar and quantity figures are given.

中外貿易

Jennifer Little
Research Assistant

The following tables contain recent press reports of business contracts and negotiations exclusive of those listed in previous issues. Joint ventures, licensing arrangements, and other forms of business arrangements are included if classified as such in Chinese and foreign media reports. For the most part, the accuracy of these reports is not independently confirmed by *The CBR*.

National Council members can contact the library to obtain a copy of news sources and other available background information concerning the business arrangements appearing below. Moreover, member firms whose sales and other business arrangements with China do not normally appear in press reports may have them published in *The CBR* by sending the information to the attention of Jennifer Little.

中外貿易

CHINA'S IMPORTS THROUGH MAY 31

Foreign Party/ Chinese Party	Product/Value/ Date Reported
Agricultural Commodities	
Transamerican Agricultural Development Corp. (US)	350 tons of high-grade dairy cows. $1.25 million. 2/4/85.
Norcal Dires (US)	Holstein semen. 2/4/85.
(UK)/Shanghai Zoo	22 David's deer. 2/27/85.
Betina Co. (France)	30,000 turkey eggs for breeding. $64,000 (Fr 600,000). 3/28/85.
(Australia)	60,000 tonnes of wheat. 4/16/85.
Agricultural Technology	
(W. Germany)	Has offered a technical assistance program to establish a national technical extension service for farmers, cooperate on angora rabbit breeding and wool finishing, plus other projects. $3.8 million (DM11.7 million+). 11/84.
Massey Ferguson Industries Ltd. (Canada)	90 self-propelled grain harvesters. $1.7 million (C$2.3 million). 4/11/85.
Simon-Barron Ltd. (UK)/ Beijing Foodstuffs Corp.	Signed contract to provide a poultry and a fish feed mill. $1.7 million. 4/17/85.
(Denmark)	Will provide loans for a dairy research center in Shanghai and a breeding swine testing center in Hubei. 4/29/85.
Chemicals and Chemical and Petrochemical Plants and Equipment	
NA (Italy)/Shaoyang Synthetic Detergent Plant, Hunan Daily-Use Chemical Works, and Hunan Light Industry Dept.	Signed a contract for two sets of equipment for making detergent. 10/19/84.
Furmanite International Ltd. (UK)/SINOPEC International	Will supply technology for under-pressure leak-sealing technology and equipment. 3/85.
NRM Corp. (US)	LIC: Technology for tire vulcanizing presses. $6–8 million. 3/85.
Santa Fe International, subsidiary of Kuwait Petroleum Co. and Arco China Inc./NA	Will set up ammonia plants in Hainan. 3/85.
Specialized Systems Inc. (US) and Tauran Industries (HK)	Will build a fiberglass plastic manufacturing plant in Henan. 3/1/85.
Zimmer AG (W. Germany)/TECHIMPORT	Received an order to build high-speed polyester spinning plants in Baoding, Tongling, Acheng, and Dandong. 3/21/85.
Zimmer AG (W. Germany)/Liaoning Foreign Trade Corp.	Will build a polyester plant in Benxi. 3/21/85.
Roussel-Uclaf (France)	Insecticides. 4/5/85.
Technip (France)/SINOPEC International and Liaoyang Petrochemical Complex	Awarded two contracts to revamp an ethylene plant and a nylon spinning plant. $10 million (Fr95 million). 4/10/85.
Himont Inc. and Mitsui Petrochemical Industries Ltd. (Japan)/China Yanshan United Foreign Trade Co. and Beijing Yanshan Petrochemical Corp.	LIC: Polypropylene manufacturing technology. 5/2/85.
Institute Francaise du Petrole (France)/Research Institute of Petroleum Processing, subs. of SINOPEC	Have agreed to develop and market new refining and petrochemical technologies. 5/18/85.
Diamond Shamrock China Ltd. and Eltech Systems Corp. (US)/ Jiangmen Electrochemical Factory, Guangdong	Will build a chloralkali plant to produce caustic soda. 5/22/85.
Eltech Systems Corp. (US)/TECHIMPORT, Tianjin International Trust & Investment Corp., and Tianjin No. 3 Chemical Reagent Plant	Will provide a complete membrane-cell plant to produce potassium hydroxide. 5/22/85.
Construction Materials and Equipment	
(Nepal)/Xizang	1,500 tons of cement. 2/8/85.
Magiboards Ltd. (UK)/ Beijing Foreign Trade Corp.	Enamel Steel whiteboards. $31,000 (£25,000). 3/85.

NA = Not available.

NOTES: Contracts denominated in foreign currencies are converted into US dollars at the most recent monthly average rate quoted in *International Financial Statistics (IMF)*. Contracts concluded over two months ago are also included if they were not reported in the last issue of *The CBR*. Licensing (LIC), Compensation (CT), and Assembling (ASSEM) deals are now included in the "China's Imports" section.

Covintec USA, subsidiary of Covington Technologies/China Swiss Engineering Ltd. (a PRC–Swiss joint venture)	Will sell machinery to manufacture Thermal-Impac Panels, a housing material. 4/8/85.
F.L. Smidth (Denmark)	Received an order for a cement plant to be built in Guangdong. $40.7 million (450 million kroner). 4/23/85.
Nittoboseki Co. Ltd. (Japan)/Taiyuan Slag Wool Products Plant, Shanxi and Shanxi International Trust and Investment Corp.	Leasing: A production line for mineral wool insulating tubes. 5/13/85.
Nippon Kokan (Japan)	Won an order for 7,300 tonnes of steel frames. 5/14/85.

Consumer Goods

Sharp Corp. (Japan)	LIC: Technology for refrigerator production for a large Sichuan plant. 3/11/85.
Sasib (Italy)/China National Tobacco Corp.	A complete production line for cigarette production and packaging. $50 million. 3/12/85.
Candy (Italy)/CITIC	Signed a letter of intent to convert an old tool factory into a refrigerator production plant. $5 million. 4/5/85.
Zanussi (Italy)/NORINCO	Signed an agreement to construct a plant to produce refrigerators. $17 million. 4/12/85.
Solitaire Products (France)/Tianjin Foreign Trade Corp.	Signed a contract to build a shoe polish plant in Tianjin. 4/25/85.
Mitsui & Co. and Toshiba Co. Ltd. (Japan)/ Changfeng Machine Plant and China National Electronics Technology Import and Export Corp.	Equipment to produce twin-vat washing machines. 5/13/85.

Electronics and Electrical Equipment

Osmonics Inc. (US)	Signed an agreement to transfer technology for reverse osmosis water purification used in semiconductor production. 2/85.
NCR (HK) Ltd./China Electronic Import & Export Corp., Zi Jin Industrial Information Corp., Nanjing	Received an order for 200 super microcomputers. $2 million. 2/85.
IBM (US)/Ministry of Education	Donated 100 multistation computers to Chinese universities. 2/85.
Telex Communications, Inc. (US)/Tianjin Optical Instruments Corp.	Will sign an agreement to produce sound-slide projectors. $1.8 million. 2/11/85.
W.J. Furse & Co. (UK)/ Shenzhen Coliseum	Stage lighting and control equipment. $161,525 (£130,000). 2/18/85.
Cambex Corp. (US)/ Computer Industry Adm.	Shipped 8 of 40 ordered IBM-compatible mainframe computers. 2/22/85.
Tokyo Electric (Japan)	ASSEM: Computer printer units for assembly at a plant in Shenyang, Liaoning. 2/25/85.
NCR (US) and Polydata Systems Ltd. (HK)/China Resources Purchasing Co.	Order for a super minicomputer and Chinese-language software. 3/85.
Data General Corp. (US)/ Tianjin Computer Co.	Signed a distributorship agreement. $10 million. 3/85.
Bone Markham Ltd. (UK)	Received contracts for a magnetic tape coating line for a plant near Beijing. 3/85.
EI-Honeywell (Yugoslavia)	Two EI DPS 6 computers. 3/5/85.
Semicon, Inc. (US)	Additional production equipment awaiting US export license approval. 3/17/85.
Mindset Corp. (US)	500 personal computers. 3/22/85.
Toshiba Corp. (Japan)/ Wuhan General Copying Machine Plant	Signed a contract to provide plain paper-copier technology and equipment. $77.8 million (J¥20 billion). 3/27/85.
Sanyo Electric (Japan)	Has set up a new company in Shenzhen to produce silicon transistors. 3/28/85.
Semiconductor Co. (US)/ Shanghai No. 7 Radio Factory	A silica plate integrated circuit production line. 3/28/85.
Future Computers (UK)/ TECHIMPORT and Ministry of Agriculture, Animal Husbandry & Fishery	187 computers. 3/30/85.
Renful International Ltd. (HK)/Chinese Communist Party Central Committee and State Council	Donated seven computer systems for Chinese governmental offices. 4/11/85.
Matsushita Electronics Corp./Shandong Foreign Trade Corp.	Signed a contract for integrated circuit production equipment. $12 million (J¥3 billion). 4/22/85.
Marconi Electronic Devices Ltd. (UK)/Chun Shu Rectifier Plant, Beijing	LIC: Technology and parts to produce power thyristors and silicon rectifiers. $500,000 (£450,000). 4/25/85.
Hewlett Packard (US)	Received an order for 14 HP3000 systems. 5/85.
Computerland (US)	Opened the Beijing Computerland Institute to provide training for primary and middle school students. 5/3/85.
Bull Co. (France)	Sold mainframes, minicomputers, Questar terminals, and Micral microcomputers. $6.5 million. 5/10/85.
Aritsu Electric Co. (Japan)/China National Electronics Technology Import & Export Corp. (CNETIEC) and Vanguard Radio Instrument Factory	Technology and equipment for production of signal generators. 5/13/85.
Fluke Co. (US)/CNETIEC and Vanguard Radio Instrument Factory	Technology and equipment to produce spectral analysers. 5/13/85.
Jialing Electronic Co. Ltd. (HK)/Shuguang Electronic Tube Factory, Changsha and CNETIEC	Technology and equipment to produce liquid display screens. 5/13/85.
Tokyo Boeki Co. Ltd. and TWD Electric Co. Ltd. (Japan)/Wanping Radio Component Factory, Jiangxi, and CNETIEC	Equipment and technology to produce dielectric adjustable capacitors. 5/13/85.
Sino Foreign Development Corp. (US)/CNETIEC, Guangzhou Branch	Precision metal film resistor production technology and equipment. 5/13/85.
BASF (W. Germany)/Aiwa Electronics Co. Ltd., Shenzhen and CNETIEC	Technology and equipment to produce magnetic disks. 5/13/85.
Hitec Corp. (Japan)/ Jinghua Radio Component Factory and CNETIEC	Porcelain fine-tuning capacitor production technology and equipment. 5/13/85.
ETA GmbH (W. Germany)/Xinyun Material Plant and CNETIEC	Tantalum capacitor production technology and equipment. 5/13/85.
Hell Co. (W. Germany)/ Beijing College of Printing, Beijing Electronic Scanner Technical Training Center and China Research Institute of Printing Science and Technology	Donated three printing scanners. $500,000. 5/13/85.
Sperry Corp. (US)/CAAC	Received an order for a mainframe computer and an airline software system. 5/20/85.
Apple Computer Inc. (US)/ACI Kaihin Co. Ltd. (a PRC–Singapore joint venture)	Reached an agreement to sell and distribute Apple II and Macintosh personal computers. 5/30/85.

Electronics (Consumer)

Studer Revox Far East Ltd./Yunnan Radio and TV Services Co.	Received an order for a Harrison MR-3 console used in radio and TV production. 1/8/85.
Matsushita Electric Industrial Co. (Japan)/Shanghai No. 3 Radio Plant	Agreed to provide technical assistance in radio-cassette production. 2/85.
Television Technology (US)	Television transmitter kits. 2/21/85.
Sankyo Seiki Mfg. (Japan)/Qingdao Microelectronics Factory and Qinfeng Machinery Factory	Technical assistance and equipment to produce micro motors used in audio equipment. $1.2 million per plant (J¥300–500 per plant). 3/85.
Funai Electric Co. (Japan)	Has shipped videocassette recorders. 3/85.
Philips (Netherlands)/ Shenzhen	Will deliver 10,000 LaserVision systems and 1.5 million disks. 3/85.
Philips (Netherlands)/ Changchun TV Factory	Received an order for television production equipment. 3/28/85.
Victor Co. (Japan)/China National Light Industrial Products Import & Export Corp.	ASSEM: Will supply radio-cassette units for assembly in Tianjin. 5/16/85.

Engineering and Construction

(W. Germany)	Will help develop and realign the Han River in Shanxi and Shaanxi. 3/31/85.
Ministry of Urban Affairs, Housing, and Transport (France)/Ministry of Communications	Signed agreements to cooperate on feasibility studies for highway and expressway projects. 5/6/85.
Transroute and Screg (France)/Beijing Highway Adm.	Signed a preliminary agreement to construct two 30-km highway stretches in Shanxi and Shandong. 5/7/85.
Transroute (France)/ Beijing Highway Adm.	Signed a letter of intent to modernize BHA's operations. 5/7/85.

Finance, Leasing & Insurance

American International Group (US)/China National Import–Export Commodities Inspection Corp.	Are cooperating to provide an insurance claim inspection and survey service for goods entering and leaving China. 4/11/85.
National Australia Bank Ltd./Jiangxi International Trust & Investment Corp.	Signed a business cooperation agreement. 4/23/85.
Sedgewick Group (UK)/ People's Insurance Co. of China	Will be the leading reinsurance broker for the Daya Bay nuclear power plant. 5/7/85.

Food Processing

APV Mitchell Dryers (UK)	Will supply equipment to produce gelatin. $1.24 million (£1 million). 2/6/85.
Baker Perkins (UK)	Secured an order to supply equipment to produce crackers and biscuits for a new factory in Zhaoqing, near Hong Kong. 2/12/85.
Bass Export (UK)/Bank of China, Tianjin International Trust & Consultancy Corp., and Tianjin Cigarette and Wine Corp.	Signed an agreement to expand a Tianjin brewing factory. 2/15/85.
NA (Canada)	Large rotary ovens, kneading troughs, and other bakery equipment. 3/14/85.
Simon Engineering (UK)/ Beijing Grain Bureau	Will build a new soybean plant to include a refining plant. 3/26/85.
Simon Engineering (UK)/ China National Agricultural Machinery Import and Export Corp.	Have an agreement to produce oilseed refining equipment in China. 3/26/85.
Berlin-Consult (W. Germany)/Jiangsu	Signed contract to provide consulting for the construction of a meat packing plant. $5 million. 4/85.
Cibieval (France)	Signed a contract to construct a meat packing plant. 4/15/85.
Pierre Cardin (France)	Opened a bakery in Beijing. 5/23/85.

Foreign Aid

UNICEF	Assistance for maternal and children's health facilities. $50 million. 3/15/85.
(Canada)/MOFERT	Signed a memorandum of understanding to train auditors. Grant of $2.34 million (C$3.2 million). 4/9/85.

Machine Tools and Machinery

Electroheating International Ltd. (UK)	Received an order for an induction tube welder. 12/84.
Mitsubishi Heavy Industries Ltd. (Japan)/ Jiangmen Diesel Engine Works, Guangdong, and EQUIMPEX	ASSEM: Signed an agreement to supply parts to assemble small diesel engines. 12/26/84.
Harris Graphics Corp. (US)/Chengdu Paper Co., Sichuan	Delivered a business forms press. 2/1/85.
Calorstat Industries (France)	Signed a contract to provide blower technology. 2/16/85.
Kubota Ltd. (Japan)	LIC: Technology to provide butterfly valves and rotors used in thermal electric plants for a factory in Tieling, Liaoning. $200,000 (J¥50 million). 2/19/85.
Hornefors Bruk (Switzerland)	Sold a used paper mill to a plant in Yibin, Sichuan. $2.2 million. 3/85.
Voith (W. Germany)/ Jincheng Paper Mill, Liaoning	Delivered Duoformer twin wire paper production equipment. 3/85.
Repco (Australia)/ MACHIMPEX and Hangzhou Bush Bearing Factory, Zhejiang	Negotiating sale of technology and materials to manufacture copper bearings. $1.2 million (Aus$2 million). 3/6/85.
Saginaw Machine Systems Inc. (US)	Sold a crankshaft-pin turning machine to a major Chinese automotive company. $750,000. 3/11/85.
Hielbornn and Siempelkamp (W. Germany)	Plywood and shaving board production equipment for a mill in Hunan. 3/25/85.
Mitsubishi Heavy Industries Ltd. (Japan)	Received an order for a refuse incineration plant for Shenzhen. 3/26/85.
Flow Systems Inc. (US)/ China National Aero-Technology Import & Export Corp.	Signed contracts to set up a service center for Flow Systems waterjet and abrasivejet cutting systems, to provide the technology to produce cutting machines, and to purchase machinery for demonstration purposes. $2–5 million. 3/29/85.
Mitsubishi Heavy Industries Ltd. (Japan)/ MACHIMPEX and Liaoning Testing Equipment Factory	LIC: Technology, parts, and equipment to produce semi-hermetic compressors. $2.2 million (J¥550 million). 3/29/85.
LSB Industries Inc. (US)/ Shanghai Foreign Trade Corp. and Shanghai Pujian Bearing Factory	Agreed to sell technology and equipment to produce bearings. 4/4/85.
Dover Japan Inc./China State Shipbuilding Corp.	LIC: Signed a contract to provide the technology to produce stern tube seals for a plant in Wuhan. $200,000+ (J¥50 million). 4/11/85.

Metals, Minerals & Processing Technology

Holton Machinery (UK)/ China Metallurgical Import–Export Corp., Hunan Branch	Signed a contract for a complete cold-extrusion plant and down-stream equipment. $621,000 (£500,000). 12/84.
Minero Peru	3,000 tonnes of zinc. 2/5/85.
(W. Germany)	Will grant technical assistance for feasibility studies for a design of two coal mines in Shanxi. $1.5 million (DM4.5 million). 2/6/85.
Babcock Wire Equipment (UK)	Negotiating the sale of a metal extrusion machine. $124,000 (£100,000). 2/7/85.
Doduco KG (W. Germany)	Signed a contact materials cooperation contract. $3.24 million (DM10 million). 2/8/85.

Stein Heurtey, subsidiary of Midland Ross (France)	Signed a contract to provide a reheating furnace for the Baoshan Steel Works. 2/12/85.
Ziscosteel and Mineral Marketing Corp. (Zimbabwe)/MINMETALS	30,000 tons of steel products. $6 million. 2/15/85.
Krakatau Steel (Indonesia)	5,000 tonnes of wire rod. 2/19/85.
AEG-Telefunken AG and Mannesmann Demag Sack GmbH (W. Germany)/TECHIMPORT	Received an order to modernize a hot strip mill at a Chinese plant. $13.55 million (DM45 million). 2/22/85.
KHD Humboldt Wedag AG (W. Germany)/ TECHIMPORT	Received an order to build an alumina calcining plant in Shanxi. 3/85.
Sumitomo Metal Mining Co. (Japan)	Will build an electrolytic copper refining plant in Guixi, Jiangxi. $3.8 million (J¥1 billion). 3/1/85.
Krupp Widia GmbH (W. Germany)/Tianjin Cemented Carbide Factory	Signed a contract to supply machinery and the expertise to produce cobalt, tungsten carbide, and cemented carbide for use in metal machining and forming. $9 million (DM30 million). 3/5/85.
Metallgesellschaft AG and Preussag AG (W. Germany)	Have a tentative agreement to build a lead smelter. 3/5/85.
Canadian Potash Exports Ltd.	750,000 tons of potash in 1984 and an expected 5 million tons from 1985 to 1990. 4/1/85.
Hitachi Zosen Corp. (Japan)/TECHIMPORT	Signed a contract to provide two continuous casting plants to be installed at the Baoshan Steel Works. $240 million. 4/16/85.
Fata-New Hunter (Italy)/ MACHIMPEX	Concluded an agreement for an aluminum rolling mill for sheet aluminum. 4/17/85.
Pechinery Group (France)/China Nonferrous Metals Industry Corp.	Signed contracts for aluminum foil and electric condenser processing facilities, five coilers for aluminum sheet, two continuous casting units for aluminum strip production, and equipment to produce aluminum heat exchangers for refrigerators. $13 million. 5/17/85.

Military Equipment

Dassault-Breguet (France)	Negotiating to sell Mirage 2000 aircraft. 2/15/85.
Flight Refuelling (UK)	Signed a contract to provide a target used to simulate Exocet and other missiles for warship crew training. 2/22/85.
(Italy)/Ministry of Defense Industry	Signed an agreement to sell radar systems, plans, helicopters, mines, torpedoes, electronics, and hydrofoils, and train Chinese troops in parachuting and mountain climbing. 4/7/85.

Mining Equipment

Gordon Audio Visual Ltd. (UK)	Sold high-speed analysis camera systems and equipment. 4/85.

Packaging

Inter-G (France)/Kui Seng Enterprise Ltd.	Will sign a contract to build a glass bottling plant near Macao. $11.7 million (Fr110 million). 12/20/85.
Mitsubishi Heavy Industries Ltd. (Japan)/ MACHIMPEX	LIC: Technology for small-size bottling machines. 12/25/85.
C.E. King Ltd. (UK)/Sino-Swed Pharmaceutical Corp. Ltd. and Sino-American Shanghai Squibb Pharmaceutical Ltd. (PRC-foreign joint ventures)	Received orders for three tablet-packaging lines. $497,000 (£400,000). 2/85.
Bone Markham Ltd. (UK)	Obtained a contract for a coextrusion and laminating line for toothpaste tube materials. 3/85.
Fata-New Hunter (Italy)/ MACHIMPEX	Sold a plant to be located in Tianjin to produce flexible wrapping materials. 4/17/85.

Petroleum, Natural Gas, & Related Equipment

JGC Corp. and Marubeni Corp. (Japan)/ TECHIMPORT	Received orders for three liquefied petroleum gas and one liquified natural gas plant for oilfields in Liaoning and Shandong. $9.9 million (J¥2.5 million). 12/27/85.
British Gas Corp./China National Oil & Gas Exploration & Development Corp.	Was awarded a consultancy contract to design a 370 km pipeline between Henan and Hebei. 2/85.
Cougar Tools Ltd. (UK)	Offshore oilfield equipment. $500,000. 2/5/85.
Offshore Marine Engineering (UK)/CNOOC	Received a contract for a deep-sea diving vessel. $1.1 million (£900,000). 2/14/85.
Noll Rig & Equipment Mfg. Co. Ltd. (Canada)/ MACHIMPEX	Contract for five mobile oil rigs for onshore wells. $6.3 million. 3/85.
Tokyo Gas Co. (Japan)/ Beijing Municipality Gas Co.	Will build a gas meter plant. $800,000 (J¥200 million). 3/6/85.
(Canada)	Signed a memorandum of understanding to cooperate to improve China's energy conservation and oil and gas production. $4.8 million (C$6.3 million). 3/38/85.
Reading & Bates Construction Co. (UK)/ MACHIMPEX	LIC: Signed a contract for a horizontal drilling rig. 4/15/85.
Solum Oil Tool Corp. (US)/Ministry of Petroleum Industry	Awarded a contract for two gravel-injection blending units for use at the Shengli oilfield, Shandong. $1 million+. 4/21/85.
Far East Equipment Corp. (US)	Five land-based oil rigs. $10 million+. 5/16/85.
CSR Orient Oil Pte. Ltd., BHP Petroleum (China) Inc., Basin Oil N.L., and Base Resources Ltd. (Australia)/CNOOC	Will sign a exploration contract for a 1,080 sq mile area north of Hainan. 5/28/85.

Pharmaceuticals

Hoescht (W. Germany)/ Shanghai Institute of Pharmaceutical Industry	Signed a 10-year cooperation agreement covering exchange of scientists and technology and joint research on new drugs. 3/4/85.
Pharmacia AB (Sweden)/ Shanghai Institute of Pharmaceutical Industry	Signed a technical and commercial cooperation agreement. 5/1/85.

Ports

Simon-Carves (UK)	Signed a contract to supply two ship unloaders for grain receipt and storage. 2/12/85.

Power Plants & Equipment

Alsthom-Atlantique (France)/Fujian Investment & Enterprise Corp.	Won a contract for two gas-turbine power stations. 3/27/85.
Ecolaire Inc. (US)/Ministry of Machine Building	Signed an agreement to provide technology for handling ash from coal-fired electric power plants. 4/12/85.
Rolls Royce (UK)/China National Aerotechnology Import-Export Corp.	Signed a contract for the manufacture of gas turbine engines for the Xinjiang oilfield. $19.9 million (£16 million). 4/16/85.
(Argentina)	Signed a cooperation agreement on peaceful uses of nuclear energy. 4/15/85.
Mitsubishi Heavy Industries Ltd. (Japan)/ TECHIMPORT and Huangtai Thermal Power Station, Shandong	Signed an agreement to supply a boiler. $39.7 million (J¥10 billion). 4/26/85.
Kraftwerk Union, subsidiary of Siemens (W. Germany)	Plans to sell two nuclear power plants. $3.95 billion (DM12 billion). 5/85.
British Columbia Hydro International (Canada)/ Electric Power Research Institute	Signed a hydroelectric power technical assistance contract. $7.5 million. 5/2/85.

International Rectifier Corp. (US)/Tianjin International Trust & Investment Corp. and TECHIMPORT	Signed a contract for technology to manufacture high-voltage thyristor and rectifier products. $4.2 million. 5/13/85.
China–American International Engineering Inc. (US–PRC joint venture)/ Guangzhou Power Development Corp.	Signed an agreement to build a coal-fired power plant. 5/20/85.

Property Development

Kim Realty Investment, jt. subsidiary of Lee Kim Tah and Woh Hup Cos. (Singapore)/Xiamen Construction Project Corp.	Signed an agreement to construct a hotel in Xiamen. 5/7/85.
Hong Leong Group (Signapore)	Will build a hotel in Xiamen. $22 million. 5/7/85.
Kisaburo Architects and Engineers (Japan)	Will design the new Beijing International Service Center. 5/13/85.
Intercontinental Hotels Corp. (US)	Will manage the Overseas Forum Hotel in Shenzhen. 5/17/85.
Mutual Oil of American, Inc. (US)/Hai Lin Jie International Information Engineering Co. Ltd., Shenzhen	Signed an agreement to develop and help construct an oil refinery, harbor facilities, a railroad, and an information center on the Nantou Peninsula. $450 million+. 5/17/85.

Scientific Instruments

Kane-May (UK)/Shanghai Automation Factory and Nanjing Analytical Instruments Factory	Received contracts for infrared thermometers and combustion analyzers. $2.17 million (£1.75 million). 1/24/85.
Charmilles/ESI (Switzerland)	Sold an electron beam processor. 2/85.
Crown Agents (UK)/ TECHIMPORT and Shanghai Fisheries College	Won an order for a fishing and navigation simulator. $165,000 (£133,000). 2/15/85.
Fisher Scientific (US)/ Baoshan Iron & Steel Works	Awarded a contract to equip the plant with quality control facilities. $3 million. 2/18/85.
VG Isotopes (UK)/Ministry of Geology, Chinese Academy of Sciences, and Geological Research Institute	Sold two thermal ionization mass spectrometers. $621,250 (£500,000). 2/28/85.
CompAir Industrial Ltd./ CATIC	Electro-hydraulic pressure ration and anti-surge controls. $621,250 (£500,000). 3/85.
Fisher Controls (HK)/ SINOPEC	Received contracts for control valve, measurement instrumentation, and control room instrumentation products. $1 million. 3/85.
Datron Instruments Ltd. (UK)/China Electronics Import & Export Corp., Tianjin Branch	Signed an agreement for cooperation on multimeter production. $4.34 million (£3.5 million). 3/85.
Mizuho Electric Industry (Japan)/Nanjing Investment Corp., Fujian	Production of mini-lab systems. 3/85.
Keihin Densokko Co. (Japan)/China Electronics Import & Export Corp. Beijing Branch	LIC: Technology to produce magnetic measuring machines. 4/11/85.

Shipping

Celsiunator (SA) Pty. Ltd./ China Ocean Shipping Co.	Sold 24 crane spreaders for handling containers. $125,000 (HK$975,000). 12/31/84.
C.H. Bailey (UK)	Sold part of a floating dock for demolition in Ningbo. 2/13/85.
Osaka Shipbuilding Co. and Oshima Shipbuilding Co. (Japan)/ Fujian Shipbuilding Corp.	Signed an agreement to modernize Fujian's shipbuilding industry. 3/2/85.
(Australia)/China United Shipbuilding Corp.	Will demolish a former naval flagship. 5/1/85.
Ministry of Urban Affairs, Housing, and Transport (France)/Ministry of Communications	Signed an agreement to cooperate in waterways and shiplocks management and construction and management of river ports. 5/4/85.

Telecommunications

Telenokia (Finland)	Received an order for 12 38-channel PCM systems for Zhuhai. 1/28/85.
Hasna (Switzerland)/ Guangzhou Economic and Technological Development Zone	Signed a contract to sell telephone exchange equipment and a digital microwave system. $62 million. 2/85.
LM Ericsson Telefon AB (Sweden)	Received orders for Axe digital telephone exchanges for the cities of Dalian, Beijing, Qinhuangdao, and Ningbo. $17 million. 3/6/85.
Cable & Wireless (UK)/ Guangdong Posts and Telecommunications Adm. Bureau	Signed an agreement to cooperate on the joint development of semi-automatic telephone dialing equipment. 3/20/85.
Telecom Australia/Ministry of Posts and Telecommunications	Signed a technical cooperation memorandum. 3/27/85.
STC Telecommunications Ltd. (UK)/Ministry of Posts and Telecommunications	Signed a contract for a high capacity single-mode optical system to link Guangzhou and Foshan in Guangdong. $621,250 (£500,000). 4/85.
Egyptian Radio and Television Union/Ministry of Posts and Telecommunications	Signed a cooperation agreement. 4/14/85.
Alcatel Thomson (France)	Won an order for three digital telephone switching systems. $3.8 million (Fr35 million). 4/25/85.
(E. Germany)/Ministry of Posts and Telecommunications	Will sign an agreement on scientific and technological cooperation. 4/25/85.
Nixdorf Computer Ltd. (W. Germany)/No. 1 Radio Factory, Jinan, and Shenzhen Electrical Appliance Co.	Sold telephone switching systems. $500,000. 5/17/85.

Textile Plants & Equipment

Babcock Textilemaschinen GmbH (W. Germany)/ MACHIMPEX and China National Textile Machinery Corp.	Signed an agreement to jointly produce Artos loop steamers. $3.2–$5 million (DM10–15 million). 1/85.

Transportation Equipment

O'Phee Industries (US)/ Beijing Agro Machinery Corp. and Beijing Trailer Co.	LIC: Grain tippling trailers and technology. 1/2/85.
Denro Laboratories, subsidiary of CP National Corp. (US)/Guangzhou Airport	Will deliver an air traffic control system. 2/5/85.
Polar Motors (UK)/China National Automotive Industry Import–Export Corp.	Sold a Ford truck. $16,460 (£13,250). 2/6/85.
Aéroports de Paris (France)	Signed a contract to design and plan an airport for Xining, Qinghai. 2/8/85.
Fuji Heavy Industries (Japan)/Ministry of Railways	Six units of railway cars for electrification work. 3/85.
B&D Instruments (France)	15 measuring instruments for installation in transport jets. 3/9/85.
Saab-Fairchild (Sweden)	Negotiating sale of 50 SF340 aircraft. 3/23/85.
Batchelor Enterprise (US)	Has agreed to sell five Boeing 707-300C aircraft to a Shanghai-based airline. 4/8/85.
Chrysler Corp. (US)/First Automobile Works, Changchun	Signed an agreement to study the manufacture of 2.2 liter engines and minivans. 4/10/85.

McDonnell Douglas Corp. (US)/Shanghai Aviation Industry Corp. and China Aviation Supplies Corp.	Signed an agreement to cooperate in producing MD-82 aircraft. 4/12/85.
Overseas Joint Group, subsidiary of Hechang Comprehensive Enterprises Ltd. (HK)/ Zhengzhou Railway Adm., Henan	Reached a tentative settlement to construct a railway station terminal. $200 million. 4/15/85.
Airbus Industries/China Aviation Supplies Corp. for CAAC	Received an order for three wide-body A310-200 airliners. 4/16/85.
Hawker Pacific Pty. Ltd. (Australia)/CAAC and CATIC	Has negotiated contracts to supply aircraft parts and overhaul jet engines. 4/19/85.
Ministry of Communications (Poland)/Ministry of Railways	Signed a railway technology cooperation agreement. 4/24/85.
General Electric Corp. (US)/MACHIMPEX	Signed contracts for 200 electric locomotives. $200 million. 4/24/85.
British Aerospace (UK)/ China Aviation Supplies Corp.	Signed a memorandum of understanding to supply 10 passenger jets. $150 million. 4/25/85.
Boeing Co. (US)/CAAC	Sold eight jetliners. $350 million. 5/23/85.
Miscellaneous	
Eurounion Ltd. (UK)	Received an order for 22 bumper boats for amusement parks in Shanghai and Beijing. $70,000 (£56,000). 2/14/85.
Amicus Television (Australia)/China Central Television	Sold 85 hours of television programming. $100,000. 2/21/85.
Japan–China Fishery Council/Ministry of Agriculture, Animal Husbandry & Fishery	Signed an agreement on fishery operations in the East China and Yellow seas. 3/9/85.
NBC International, subsidiary of RCA Corp. (US)	Sold a television program on the life of Toscanini. 3/22/85.
Cluff Investments and Trading Ltd. (UK)	Have an agreement to act as exclusive trading and investment agent for Ningbo and Wenzhou. 3/25/85.
TF1 Co. (France)	Signed a contract to exchange films, documentaries, news, and sports programs. 3/27/85.
Vekoma International (Netherlands)	Sold a Canyon Trip ride to a Chinese amusement park. 3/30/85.
Queens College of the City University of New York (US)/Ministry of Machine-Building, Language Training Center	Signed a contract to provide an English-language training program for scientists and engineers. 5/1/85.
European Chinese Technology Corp., Ltd. (UK)/ Tianjin New Technology Development Corp. and CCPIT, Tianjin Branch	Signed cooperation contracts to develop information and technical training and to hold exhibitions. 5/9/85.

中外贸易 CHINA'S EXPORTS THROUGH MAY 31

Foreign Party/ Chinese Party	Product/Value/ Date Reported
Agriculture	
(South Korea)	600,000 tonnes of corn in the past six months. 2/12/85.
Electronics	
Samkor Computer Systems Ltd. (HK)/Shenzhen Electronics Research Institute	Sold 100 Chinese-character generator cards. 2/85.
Foreign Aid	
Red Cross Society of Thailand	Relief funds for Indochinese refugees. $1 million. 3/12/85.
(Africa)	50,000 tonnes of grain in first half of 1985. 3/13/85.
(Guinea)	700 tonnes of maize, 3,000 tonnes of rice seeds, and biogas equipment. 4/2/85.
(Congo)	Signed a protocol to send Chinese medical teams to Congolese hospitals. 4/2/85.
UNESCO	$600,000. 4/8/85.
(Western Samoa)	$500,000 grant. 4/22/85.
(Papua New Guinea)	$800,000 grant. 4/25/85.
Military Equipment	
(Iran)	Signed a two-year arms agreement. $1.6 billion. 3/28/85.
Minerals	
Japan Coal Development Co., Electric Power Development Co., Mitsubishi Mining & Cement Co., and Sumitomo Cement Co./China National Coal Import & Export Corp.	Have agreed to purchase 2.3 million tons of steam coal. $40.44 tonne fob. 4/9/85.
Petroleum	
Coastal Corp. (US)/ SINOCHEM	Will process Chinese crude oil. 2/11/85.
Caltex Australia	Will import a trial shipment of 350,000 barrels of heavy crude from Daqing. 4/29/85.
Textiles	
Hanil Carpet Co. (S. Korea)	Carpets from Tianjin. 2/12/85.
Trade Agreements	
USSR, Philippines, EEC	Signed trade agreements in April and May.
Thailand	Signed agreements on investment protection and on establishing a joint committee on economic cooperation. 3/12/85.
E. Germany	Signed a protocol on technical and scientific cooperation. 4/26/85.
Sierra Leone, Tanzania, France, and Ecuador	Signed agreements on economic and technological cooperation in March, April, and May.
Transportation Equipment	
Zeller Co. and Panax Co. (US)/Hangzhou Couplings Factory	Will purchase 200,000 auto transmission couplings. 3/27/85.
General Electric Co. (US)/ MACHIMPEX	Will purchase locomotive parts. $2.8 million. 4/24/85.

中外贸易 JOINT VENTURES AND DIRECT INVESTMENT THROUGH MAY 31

Foreign Party/ Chinese Party	Arrangement/Value/ Date Reported
Agriculture	
NA (Japan)/Lishu State Farm, Jilin	Signed a contract to manage a corn and chicken farm. 5/11/85.
American Kolgate Vegetable and Fruit Co. Ltd. (HK)/Shenzhen Agriculture Reclamation Co.	Set up the China Agriculture Reclamation of Vegetable and Fruit Ltd. to introduce vegetable and fruit hydroponic technology. Investment: $2 million. (50–50). 5/13/85.

Chemicals and Chemical and Petrochemical Plants & Equipment

Lithcon Petroleum USA/ SINOPEC International	Formed Sinocon Petroleum Co. based in Houston to market paraffin wax in the US. 3/28/85.
Dainippon Ink & Chemicals Inc. (Japan)/ Shenzhen Light Industry Corp. and Shanghai Ink Corp.	Reached an agreement to establish a joint printing ink venture in Shenzhen. Capital: $3 million. (Japan:40%–PRC:60%). 4/9/85.
Takahashe Precision Machines Co. Ltd. (Japan)/ Dalian Plastics Industry Corp.	Formed the TD Mould Center Co. Ltd. in Nagoya, Japan, to design and manufacture plastic moulds for appliances, automobiles, and tools. Investment: $400,000. (Japan:51%–PRC:49%). 4/24/85.
Polysar Ltd. (Canada)/ Gaoqiao Petrochemical Corp.	Signed an agreement to jointly produce and market synthetic rubber latex in China. (50–50). 4/26/85.

Construction Materials

American Standard Inc. (US)/Qingyuan County Economic Development Corp. and China National Light Industrial Products Import–Export Corp., Guangzhou Branch	Signed a contract to set up Hua Mei Sanitary Ware Ltd. near Guangzhou to produce plumbing fixtures. $11 million. (US:51%–PRC:49%). 4/9/85.
Pennvasia Ltd., subsidiary of PPG Industries (US)/ China Southern Glass Mfg. Co.	Have begun construction of the Guangdong Float Glass Co. Ltd. located in Shekou, which will manufacture glass, chemicals, and coatings. $50 million. 4/12/85.
NA (Egypt)/Islamic International Investment Co., Ningxia	Will set up a venture in Egypt to produce blocks, bricks, and door and window frames. 4/27/85.
Daqing Enterprise Co. Ltd. (HK)/Fushun Aluminum Co.	Will set up the Dalian Pacific Aluminum Building Materials Co. in Liaoning to produce doors, windows, cupboards, etc. Investment: $15.5 million (¥44 million). 5/3/85.

Consumer Goods

Toppan Moore (Japan)/ Beijing Paper and Package Industry Corp.	Will set up a venture to produce computer business forms. 3/6/85.
Bandai Toy Co. (Japan)/ Fujian Foreign Trade Corp.	Signed a 15-year agreement to set up China Fuwan Toy Ltd. located in Fuzhou to produce toys. Investment: $4 million. 3/24/85.
Choong and Han Investments Ltd. (HK)/Liming Paper Making Mill, Hebei	Signed a 10-year contract to set up the Yayou Maternity and Child Hygiene Articles Co. to produce and market maternity and child hygiene articles. Investment: $750,000; Capital: $250,000. (HK:25%–PRC:75%). 4/15/85.
Ministry of Machine Tools and Electronics Industry, Precision Instrument Research Institute and Electronics Industrial Import & Export Corp. (Romania)/Tianjin Wrist-Watch Factory	Signed an agreement to jointly produce wrist watches in Romania. 4/15/85.
Calo Development Co. Ltd. (HK)/Beijing Western Suburbs Timber Factory	Signed a 10-year agreement to form the Beijing Calo Furniture Factory to produce mattresses, furniture, and other houseware materials. Investment: $325,000 (¥1 million). (HK:60%–PRC:40%). 4/22/85.
Young's Enterprises (HK)/ Hebei International Trust & Investment Corp. and Handan City Leather Products Factory	Signed a 10-year agreement to set up the Hebei International Leather Products Co. Ltd. to produce brief cases and other leather products. Investment: $800,000 (¥2.5 million); Capital: $390,000 (¥1.11 million). (HK:25%–PRC:75%). 4/22/85.
Universal International Toys (Holdings) Co. Ltd. (HK)/Shanghai Toy Import & Export Corp., SITCO, Shanghai Industrial & Commercial Patriotic Construction Corp., and BOC, Shanghai Branch	Established Shanghai Universal Toys Co. Ltd. to produce tin toys. Investment: $3.52 million (¥10 million); Capital: $1.8 million (¥5 million). (HK:35%–PRC:65%). 5/6/85.
Carroway Enterprises Ltd. (HK)/Shanxi Commercial & Labor Service Corp.	Set up the Zhongbei Color Photo Co. in Taiyuan to develop and print color film, shoot commercials, assemble appliances, lease film equipment, and provide consultancy services. Capital: $200,000. 5/13/85.
Klockner Stadler Hurter Ltd. (Canada)/CITIC	Discussing a papermaking and pulp processing venture in Guangxi or Fujian. Investment: $105,600 (¥300 million). 5/16/85.

Electronics and Electrical Equipment

Nam Tai Group (HK)/NA	ASSEM: Signed a contract to set up a factory in Guangzhou to assemble calculators. $1.3 million (HK$10 million). 2/85.
Toppan Moore (Japan)/ Ministry of Textile Industry, Engineering Institute	Have agreed to set up Xijing Computer Technical Development Co. to sell IBM Japan personal computers. Capital $600,000. 3/6/85.
Yun Hoi Trading Co. (HK)/Linfen Electronics Equipment Factory and BOC Trust, Taiyuan Branch	Signed a 10-year contract to set up Linhoi Electronics Industry Co. Ltd. in Shanxi to produce computers and other electronic products. 4/1/85.
Chiu Hwa Electronics Ltd. and William Electronics Engineering Co. (HK)/NA, Dalian	Will set up the Dalian Orient Computer Technology Development Co. Ltd. to produce microprocessors, develop computer technology, and provide consultancy and training services. Investment: $422,000 (¥1.2 million). 5/3/85.
Bailey Controls Co. (US)	Opened the Beijing Bailey Technical Center to sell and service its process controls. 5/3/85.
Hitachi Ltd. (Japan)/Institute of Railway Science, Ministry of Railways	Signed an agreement to jointly develop Chinese-language microcomputer software and export personal computers to the ministry. 5/6/85.
Philips International (Netherlands)/China National Electronics Import & Export Corp., Beijing Branch and Beijing Radio Factory	Signed a 25-year agreement to manufacture and sell audio and video products. Investment: $4.8 million. (50–50). 5/13/85.

Electronics (Consumer)

Likoton Co. Ltd. (HK)/ Tianjin Trust & Consultancy Corp. and Tianjin No. 15 Semiconductor Appliances Industrial Corp.	Set up the Tianjin Xinzhong Electronics Products Factory Ltd. to produce lighters, pens, meters, watches, and clocks. Investment: $141,000 (¥400,000). (HK:45%–PRC:55%). 4/1/85.
Kong King International Ltd., subsidiary of Wong's Industrial (Holdings) Ltd. (HK)/Jiangxi Electronic Industries Corp.	Will form a venture to manufacture VCRs, washing machines, refrigerators, and other appliances. $10 million. 4/29/85.

Engineering and Construction

Shimizu Construction Co. Ltd. and Nissho Iwai Corp. (Japan)/CITIC and Beijing Institute of Architectural Design	Set up the China Prosperity Building Design Joint Venture Corp. Ltd. to build a trade center and office complex in Hangzhou and provide other design and consultancy services. Capital: $1 million. 2/6/85.
Chodai Co. (Japan)/Wuhan Bridge & Foundation Engineering Corp., Ministry of Railways	Reached a basic agreement to set up a company to design and supervise construction of large-scale bridges. 4/9/85.
Takenaka Komuten Co. (Japan)/Chang Cheng Construction Corp.	Will establish Chang Cheng–Takenaka Construction Co. in Beijing to undertake construction design, materials procurement, and provide consultancy services. 4/22/85.

Finance, Insurance, and Leasing

Japan Leasing Co. and Long-Term Credit Bank of Japan/Shanghai Foreign Trade Corp., China Leasing Co., and Bank of Industry and Commerce Trust & Investment Co.	Set up China Pacific Leasing Co. in Shanghai to import technology and raise funds to upgrade enterprises in the Shanghai Economic Zone. (Japan:25%–PRC:75%). 4/15/85.

Food Processing

NA (US)/Urumqi Economic Development Co. Ltd., Xinjiang	Signed an agreement to form a company to produce French fries. 2/1/85.

Orchid Foods International Inc. (US)	Signed a 10-year agreement to set up the Tianjin–Orchid Fast-Food Co. Ltd. $300,000. (US:40%–PRC:60%). 3/2/85.
V-Mark Trade Co. (HK)/ China Joint Animal Husbandry, Industrial & Commercial Corp., Honey Corp.	Signed a contract to set up the Sino-HK Nutritional Food Co. in Beijing to produce honey, pollen, jelly, and other honey products. Investment: (¥1 million). Capital: $106,000 (¥300,000). (HK:40%–PRC:60%). 5/13/85.
Coca-Cola Co. (US)/ Zhuhai Beverage Co. and Macao Beverage Co.	Set up the Zhuhai Coca-Cola Bottling Co., Coca-Cola's fourth plant in China. 4/19/85.
Borden Inc. (US)/Qiqihar First Light Industry Bureau	Signed a letter of intent to form a venture to produce powdered milk. (50–50). 4/23/85.
Nisshin Oil Mills Ltd., Mitsubishi Corp., and Liaoning Corp. (Japan)/ Dalian Oil and Fat Industry Factory, Dalian Economic & Technical Development Corp.	Have agreed to set up a venture to produce edible oil in Dalian. 4/23/85.
Dairy Farm (HK)/ Guangdong Food Industry Technical Development Corp.	Signed a 30-year contract to set up the International Food Corp. Ltd. to process meats and vegetables and to produce biscuits, candy, seasonings, and other products. Investment: $14 million. (HK:70%–PRC:30%). 5/22/85.
Machinery	
NA (Italy)/NA	Provided equipment to start the Dongyide Laundry Factory in Beijing to provide drycleaning service. 3/4/85.
Steinmuller Inc. (W. Germany)/CITIC	Discussing joint production of industrial boilers. 3/22/85.
Atlas Copco (Sweden)/ MACHIMPEX	Jointly established a parts supply center in Beijing for mining machinery, air compressors, and construction machines. 4/3/85.
Chloride Group PLC (UK) and Singer Products Inc. (US)	Plan to jointly produce batteries in China. 4/18/85.
Medical Equipment	
National Patent Development Corp. (US)/Wuhan Medical Group and Huaxing Scientific Development Corp., Shanghai	Agreed to form two ventures to sell Caridex 100 Dental Caries Removal Systems. 4/4/85.
Minerals & Metals	
International Geosystems Corp. (Canada)/Jiangxi Engineering Consulting Corp.	Formed Geosystems Engineering International in Beijing to market computer products for mineral exploration and mining. (Can.:30%–PRC:70%). 4/85.
Hamersley Iron (Australia)/China Metallurgical Import & Export Corp.	Plan to jointly mine Australian iron ore. $137.9 million (Aus$200 million). (Aus:60%–PRC:40%). 4/4/85.
Metro Industries (Australia)/China Metallurgical Import & Export Corp.	Discussing construction of a joint plant to produce steel webbing. 4/4/85.
Packaging	
Daiwa Packaging Co. (Japan)/Chinese Academy of Sciences	Agreed to form a joint company to produce food packaging materials. 3/26/85.
M C Packaging (HK) Ltd./ Guangzhou Beverage Industry Corp., China National Packaging Import & Export Corp., China Light Industry Enterprise Ltd., and Guangzhou Industrial Development Corp.	Have set up the Guanghzou M C Packaging Ltd. to produce cans and ring-pull lids in Guangzhou. Investment: $30 million. 4/20/85.
Petroleum	
Weir Engineering Services (UK)/Guangzhou Marine Geological Exploration, Energy Machines and Tools Technology Corp., and Dong Jing Resources Exploitation Co.	Set up the Nanyou–Weir Engineering Services Corp. to supply maintenance, service, and training facilities to foreign oil companies exploring Nanhai fields. (50–50). 2/85.
Pharmaceuticals	
Chinese–Japanese Tonic Medicines Co. Ltd. (Japanese–PRC joint venture) and NA, (Japan)/ Dongfeng County Pharmaceutical Factory, Jilin	Signed a 15-year agreement to set up a venture to produce ginseng extract and antler powder. (50–50). 12/22/84
Janssen Pharmaceutica NV (Belgium)/Shaanxi Pharmaceutical Industry Corp. and State Pharmaceutical Adm.	Signed an agreement to set up Xian–Janssen Pharmaceutical Ltd. to produce a wide range of pharmaceutical products. 4/19/85.
Ports	
Rotterdam Co. (Netherlands) and Polycalia West consortium/Nantong Port Adm.	Will jointly build the Nantong port, Jiangsu. 3/31/85.
Power Plants & Equipment	
Kanematsu-Gosho Ltd. (Japan)	Signed an agreement to invest in developing two Shenzhen coal-fired power plants. $397 million (J¥100 billion). 3/26/85.
Babcock and Wilcox International Inc. (US)/ Beijing Boiler Plant	Agreed to jointly produce boilers. $12 million. 5/11/85.
Property Development	
Active Building & Civil Construction (Singapore)/Tianjin Travel & Tourism Agency	Signed a 15-year agreement to construct and manage the Yanyuan International Hotel. Investment: $22.5 million. (50–50). 10/15/84.
Pung Toh Co. (Singapore)/Chee Loy Hiong	Signed an agreement to lease, renovate, and run a Jiangmen hotel. Investment: $39.95 million. 2/7/85.
Thorens Co. Ltd. (HK)/ NA, Hunan	Signed a contract to build a trade center in Shenzhen. $38.6 million (HK$300 million). 3/4/85.
Sino–Japanese Development Co./Longtan Travel Development Co., Beijing	Will construct an amusement park in Beijing. 3/4/85.
Sino–Japanese Development Co./Ming Tombs Reservoir Development Co.	Will build an underwater crystal palace in Beijing. 3/4/85.
Hopewell Tourism Development Co. Ltd. (HK)/ Guilin Tourism Co.	Signed a contract to build the Yuelai Hotel. Investment: $120 million. 3/11/85.
NA (HK)/Guilin International Sports and Recreation Development Corp.	Signed a 20-year agreement to build a hotel, recreation center, stadium, and sports clubs. Investment: $50 million. 3/21/85.
Industrial Bank of Japan and Kowa Real Estate Investment Co./Shanghai Trade Center, Shanghai Minhang and Hongqiao Development Corp., Shanghai Foreign Service Co., and CCPIT	Will establish an 18-year venture to form Shanghai International Trade Center Ltd. to construct two 40-story buildings in Shanghai. (IBJ:5%–Kowa:45%–PRC:50%). Capital: $15 million. 3/26/85.
NA (Japan)/NA	Have established a venture to build a skiing and mountaineering resort in Xinjiang. $6 million. 3/28/85.
BETS International (US)/ Lashufang Industrial Development Co., Dalian	Signed a contract to build a hotel and entertainment facilities. Investment: $20 million. (50–50). 4/3/85.
BETS International (US)/ Yantai Service Co., Shandong	Signed a contract to build a hotel and entertainment complex. Investment: $10 million (50–50). 4/3/85.
BETS International (US)/ Xi'an Tourist School	Signed a contract to build a hotel. Investment: $20 million. (US:75%–PRC:25%). 4/3/85.
BETS International (US)/ Lintong County Food Co., Xi'an	Will build a restaurant in Xi'an. 4/3/85.

Okura (HK) Ltd./ Shenzhen Industrial Development Service Co., Ku Shing Trading Co., and Zhou Zi Prefecture Trading Co.	Set up Shenzhen Municipal Zhen Hang Enterprise Ltd. to bid for construction projects in the Shenzhen area. 4/8/85.
Cindic Holding Ltd. (HK)	Signed an agreement to construct and manage the wholly owned Cindic Grand Hotel in Qinhuangdao. $30 million. 4/22/85.
Sun Hung Kai China Ltd. (HK)/Hubei Foreign Economic Relations & Trade Dept.	Will jointly build the Hubei Foreign Economic and Trade Center. $150 million. 4/22/85.
Chang Shun Trading Co. (HK)/Jiangsu Joint Trade Corp.	Will jointly construct the Jingling Mansion to contain a hotel, apartments, office space, and a shopping center. 5/13/85.

Scientific Instruments

Ballantine Laboratories, Inc. (US)/China Institute of Metrology	Have established a technical sales and service center in Beijing to handle calibration and standards equipment as well as oscilloscopes, multimeters, voltmeters, and counters. 4/22/85.

Shipping

Zhenhua Development Co. (HK)/Shenzhen Shipping Co. and Guangdong Demolition Engineering Co.	Formed the Shenzhen International Gulf Engineering Corp. to plan, design, and construct wharves, navigation lanes, shipyards, and other projects. 11/84.
Ishishiba Service Co. (Japan)/Tianjin International Ship Service Corp., Tianjin International Trust & Investment Corp., China Ocean Shipping Agency, Tianjin Branch, and Dagu Shipyard	Signed a contract to form the Tianjin International Ship Service Corp. to repair and maintain ships and supply ship parts and accessories. Investment: $1 million. Capital: $1 million. (50–50). 12/84.
Metalock PTE Ltd. (Singapore)/Shanghai Ocean Shipping Repair Voyage Dockage	Jointly started a repair service in Shanghai. 5/21/85.
Crown Pacific (HK)/China Ocean Shipping Co., Guangzhou	Have an agreement to expedite freight. 5/24/85.

Telecommunications Equipment

NA (HK)/Wuhan Communications Co. Ltd., Wuhan Communications Power Supply Factory, Huaxing Electronics Co. Ltd., and Wuhan Switch Factory	Opened Tianda Communications Co. Ltd. to produce and assemble telephones, communications equipment, and electrical appliances. Capital: $2.2 million (¥6.2 million). 4/1/85.

Textiles & Textile Plants & Equipment

Tada Textile Industry (Japan)/Tianjin Economic & Technological Development	Will set up a venture to produce carpets. $3.9 million. (J¥1 billion). (Japan:60%–PRC:40%). 3/85.
NA (Mauritius)/Shanghai Foreign Economic & Technical Cooperation Corp.	Agreed to form the Hong Kong–Shanghai Knitwear Co. Ltd. in Mauritius to produce knitwear products. 3/4/85.
Oriental Enterprises, Ltd. (Mauritius)/Shanghai Foreign Economic & Technical Cooperation Corp.	Signed an agreement to set up a polyamide sock production plant. 3/4/85.
Okamoto Nitto Knitwear Co. Ltd. (Japan)/Nanjing Trust & Consultancy Corp. and Jiangdu County Light & Textile Industrial Co.	Signed a 15-year agreement to set up Yangzhou Okamoto Nitto Co. Ltd. in Jiangsu to produce wool sweaters. Investment: $700,000. (Japan:51%–Jiangdu:39%–Nanjing:10%). 4/1/85.
Jermi SpA (Italy)/ Shandong Silk Corp.	Have set up a silk production plant in Yantai. 5/2/85.
Bassetti SpA (Italy)	Negotiating a joint venture in Hunan to produce ramie items. 5/3/85.

Transportation & Transportation Equipment

International Trading Co. (Japan)/Xiamen Construction & Development Corp., Xiamen Bicycle Corp. of the Xiamen Light Industry Corp.	Will set up a venture to assemble bicycles. Capital: $915,000 (¥2.6 million). (50–50). 4/16/85.
Mazda Motor Corp. and C. Itoh & Co. (Japan)/ Yangzi Enterprise Co., Sichuan	Set up a taxi venture in Chengdu, Sichuan. Investment: $1.03 million. (Japan:40%–PRC:60%). 4/22/85.
Jyde-Kompagniet Herning AS (Denmark)/ Tianjin Bicycle Industrial Co.	Signed a 20-year contract to set up Sino–Danish Enterprises Co. Ltd. to produce bicycles. Investment: $2.1 million (¥6 million). 4/30/85.
Santa Fe Transport International Group (US)	Signed two cooperative joint freight forwarding ventures, one in Guangdong and one covering most of the rest of China. (50–50). 5/23/85.

Miscellaneous

United Industrial Corp. (Singapore)/CITIC	Signed a 30-year agreement to set up CITIC Corp. to introduce foreign investment, technology, and set up ventures inside and outside China. Investment: $10.55 million. (¥30 million). (50–50). 4/9/85.
China International Ventures Inc. (US)/NA, Tianjin	Concluded an agreement to begin a joint retail–wholesale operation in Tianjin. Investment: $2 million. 5/9/85.
Sunshine Australia Ltd./ China Great Wall Industrial Corp.	China plans to purchase an 8 percent stake in the Australian company. $5.3 million (Aus$8 million). 5/9/85.
Swedish Performing Rights Society, Ltd./China Record Co.	Reached an agreement to jointly produce stereo recordings. 5/11/85.
United Industrial Corp. Ltd. (Singapore)/CITIC and Shandong International Economic & Technical Cooperation Co.	Signed a contract to form the Shandong International Economic Development Corp. to introduce technology, equipment, and management expertise to Shandong. Capital: $21.1 million (¥60 million). 5/25/85.

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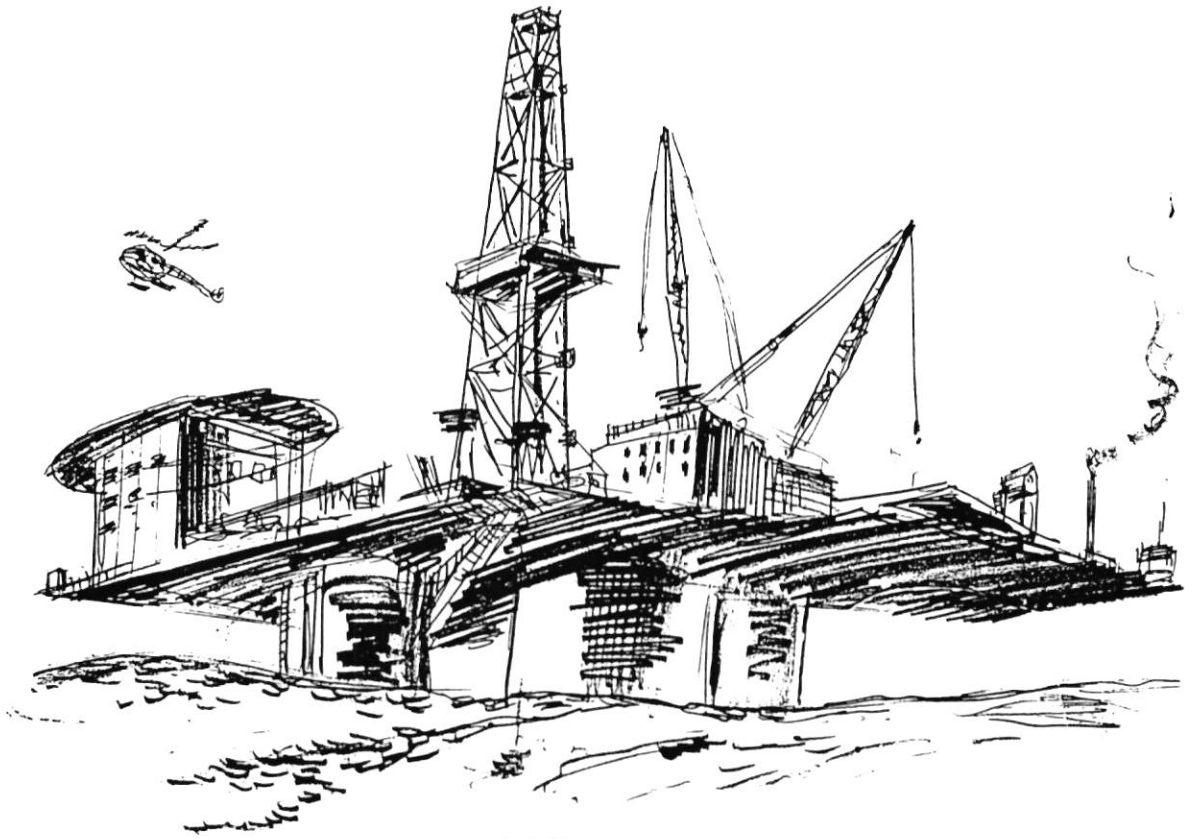

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