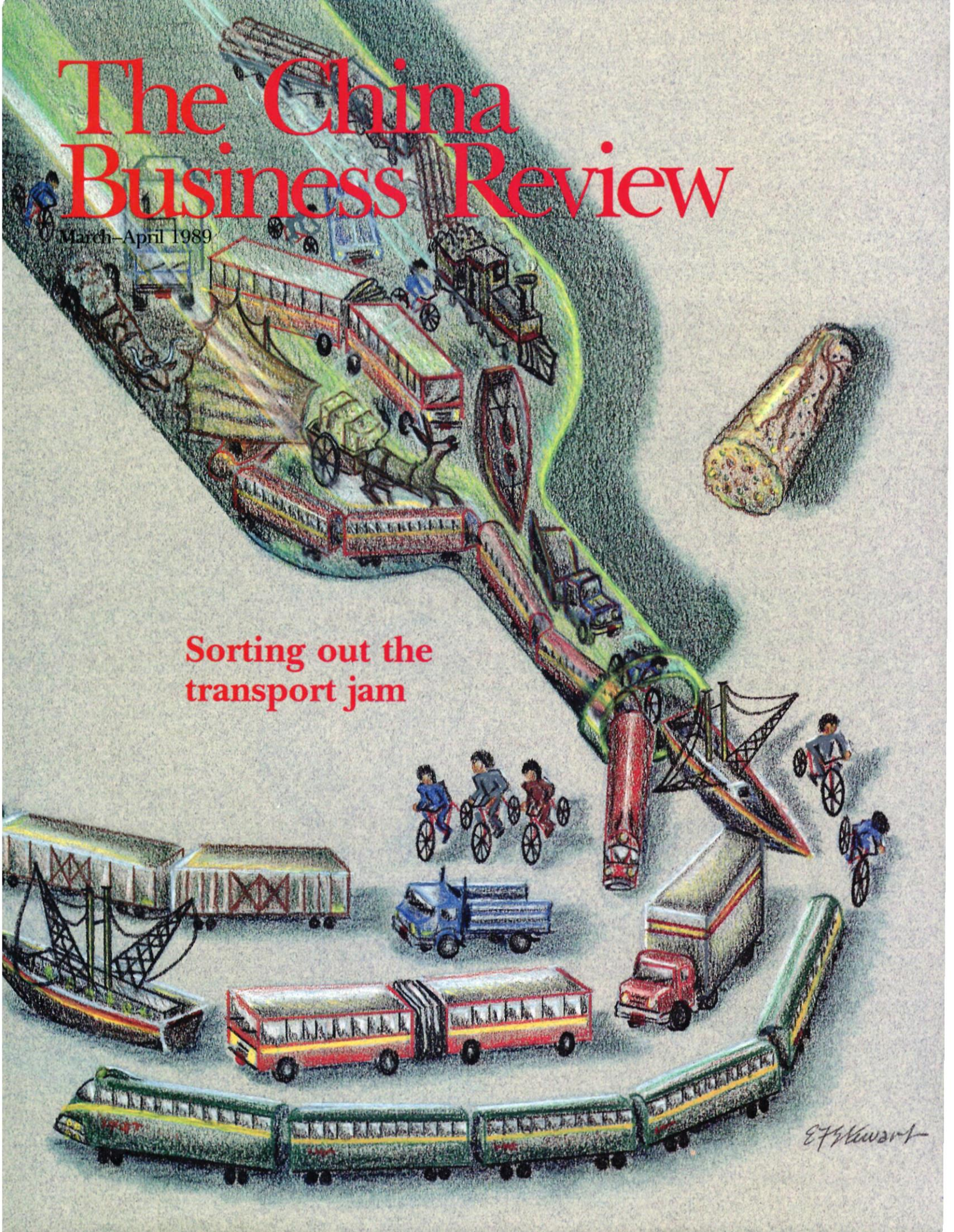
The China Business Review

March–April 1989



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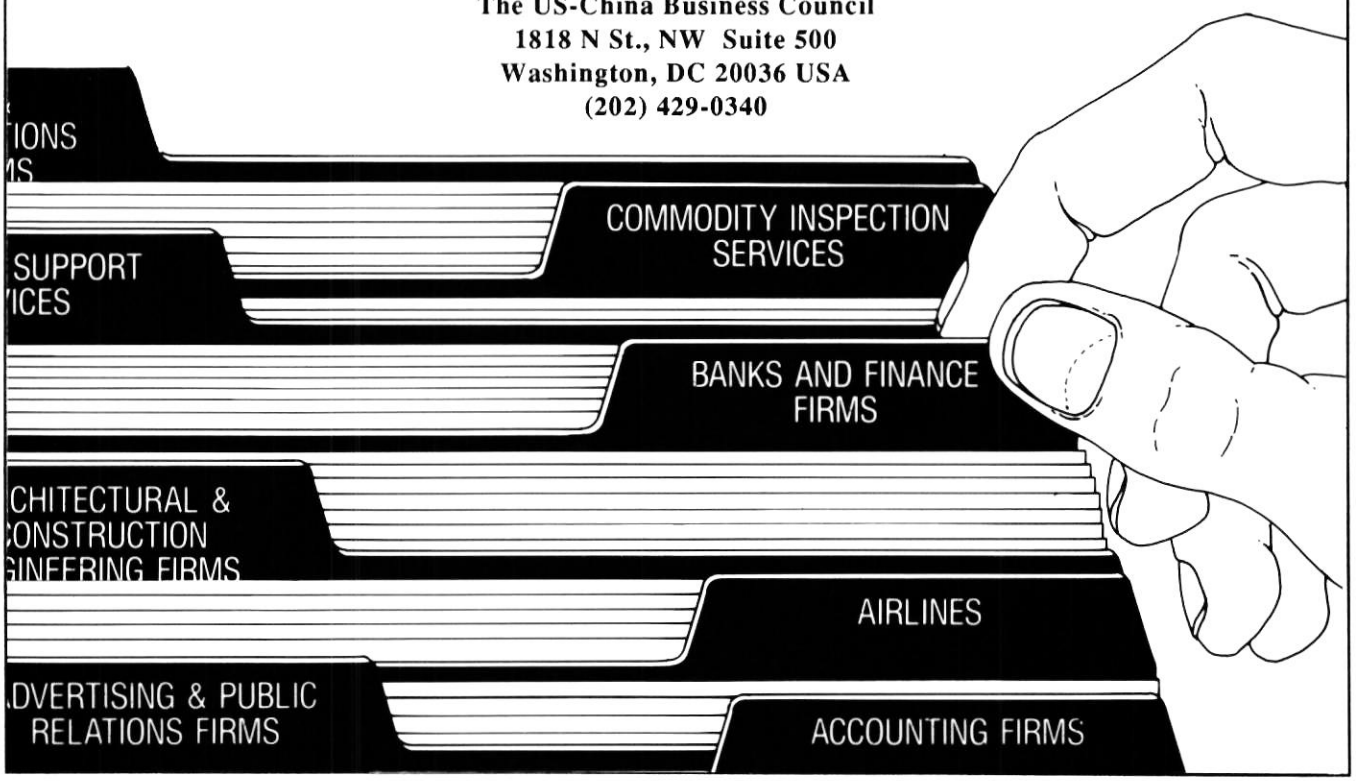


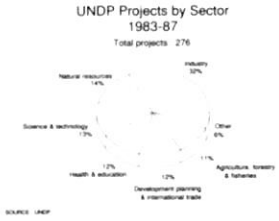
The China Business Review

The magazine of the US–China Business Council

March–April 1989 Volume 16, Number 2

Cover: Distributing freight and passengers more evenly among the transport modes is key to modernization. *Illustration by Elizabeth Stewart.*

FOCUS: SORTING OUT THE TRANSPORT JAM



UNDP: With $162 million, China is the primary recipient of UNDP resources. **Page 10.**

Autos: From 1984-87, China spent four times as much on imported cars as on its own fledgling auto industry. **Page 38.**

Departments

摘要

CALLING FOR QUALITY

As China's ongoing surge in production increases the number and variety of goods available, Chinese consumers are discovering that more does not necessarily mean better, and consumers and planners alike are becoming increasingly concerned with poor quality and counterfeit goods.

In a recent survey of 2,097 enterprises conducted by the State Bureau of Technical Supervision, 23 percent of the goods examined failed to meet State technical or quality standards. A China Quality Control Association (CQCA) report that surveyed 108 large and medium-size enterprises found that they lost an average of ¥600,000 annually on defective goods. CQCA concluded that although quality levels improved or remained the same in most industries last year, the coal, medical, nonferrous metals, and building materials industries saw quality decline.

As small and medium-size enterprises have sprung up around the country, the output of counterfeit products has also soared, with over 4,700 cases of making and selling pirate products reported in the first half of 1988. With trademark protection weak and the lure of easy profits strong, cracking down on counterfeiters is proving difficult. The Changzheng Rubber Shoes General Factory of Hebei Province, for example, had to change the name of its Gold Brand Cup sports shoes last May, because the famous brand was being used by more than 40 other plants. Agricultural products, such as fertilizers, pesticides, and seeds, have become popular targets for copiers, leading farmers stung by expensive, ineffective fakes to wage sit-in demonstrations in Shandong Province to urge the government to clamp down and halt further abuse.

The increasing public outcry has led Chinese officials to adopt a number of tactics to combat quality control problems. Over 600,000 quality control teams have been set up around the country, for example, as have 865 consumer protection agencies. CQCA and the Ministry of Light Industry (MLI) have also instituted an award system for factories that produce goods at or near international standards. The Shangcai Wok Factory of Henan Province earned an MLI award, for example, as "the king of the pig iron woks."

To put some teeth into the quality control campaign, the State Bureau of Technical Supervision, formed last July, is currently drawing up regulations that outline penalties for producers of counterfeit or shoddy goods. The penalties will apply to all commodities sold in China—whether foreign or domestically produced.

Authorities are also adopting some uniquely Chinese approaches to the problem. MLI held a "Rejects and Shoddy Products Exhibition" last year, for example, to embarrass the producers of low-quality products and shame them into improving their performance. Manufacturers were not warned that their products would be spotlighted, as a previous attempt to display shoddy goods backfired when companies were alerted about the upcoming event, and provided replacement products to about 40,000 customers in time to avoid taking a public rap.

The Xi'an Department Store has extended quality-control enforcement techniques to another problem area for Chinese businesses—customer service. Based on customer ballots, the store recently named the shop's 40 worst assistants. The "winners," honored for such antics as ignoring customers or throwing goods at them, had to forfeit their monthly bonuses, write self-criticisms, and hang "award" plaques over their work areas. The results are apparently so promising that the store may have started a new trend—representatives of several other enterprises have visited the store to study Xi'an's example. —PB

NEW PRICES, OLD VICES

Within days of price decontrol on July 28, 1988, the cost of a packet of coveted *Ashima* or *Zhonghua* cigarettes rose to around ¥10—a tenth of the average city-dweller's monthly salary. But instead of languishing on the shelves, the sought-after, high-tar brands found their way into the hands of black marketeers, who command still higher prices. Cheap brands have always been plentiful in China, but good tobacco is scarce, and it seems China's roughly 200 million smokers will pay any price to get it.

Stimulated by the increases, producers of the top 13 brands raised output nearly 38 percent in 1988. Supplies of prime tobacco remain short, though, since farmers still find it more profitable to reap inferior, high-yielding crops instead of good-quality leaf.

Before decontrol, the cost of the best brands was measured in *guanxi* (connections). Now top brands can usually be purchased, but stores may set conditions on buying the better smokes, for instance by requiring anyone who wants a pack of *Mudan* (Peony) brand to buy three packs of slow-selling brands.

The unflagging demand for premium brands derives from the importance of cigarettes in numerous cultural transactions in China. Due to cost, an average Chinese worker smokes inexpensive brands day-to-day, and smokes only half as much as the average American. But brands like *Zhonghua* (China) or *Hongtashan* (Red Pagoda Mountain) are a must at parties and business meetings. A newly married couple often spends as much on cigarettes and candy to hand out to acquaintances as on the wedding party, and anyone with a bureaucratic task to do is well advised to bring along a pack of *Hongshancha* (Scarlet Camellia), or even better, Kent or Winston.

US manufacturers have an advantage in penetrating China's market

for high-tar cigarettes, because American brands enjoy a good reputation throughout China. And as the US smoking population declines, China's smokers—who often are not fully aware of the habit's risks—represent an almost unlimited growth market. RJR Nabisco is the only US company now manufacturing cigarettes in China, at the joint-venture Huamei Co. in Xiamen, which produces Winston and Camel brands. Huamei has plans to manufacture two new brands, Golden Bridge and Sprint, to provide American cachet at domestic prices.

Like the US government, Chinese officials puzzle over how to minimize smoking's dangers without banning tobacco—and its profits—altogether. The cigarette industry is China's biggest taxpayer, supplying $4.58 billion in tax revenue in 1987. The Chinese government has taken a middle course, banning cigarette advertisements and curtailing smoking in some public places. Tax incentives promote the domestic manufacture of filters, on the grounds that they make smoking less harmful, while preferential funding and tax breaks encourage manufacturers to produce cigarettes with herbal medicine.

Meanwhile, Chinese pharmaceutical companies are rushing to find antidotes to the addiction. In 1988, two companies and a research institute independently came out with antismoking perfumes. Manufacturers say that inveterate smokers need only sniff the perfume sold by the Chunfeng Chemical Factory in Guizhou 10 minutes each day for three days to kick the habit. Those who cannot obtain a bottle might want to try a home brew. The recipe reportedly contains kelp, prickly ash, and peppermint. —ASY

BLACK AND WHITE, BUT NOT READ...

Raw material shortages and rising prices affect not only food, but China's food for thought as well. With prices and competition on the rise, official, wide-circulation journals such as *People's Daily* and *Guangming Daily* are newly aware of the power of consumer demand. These publications will have to earn more, if they are to compete successfully for scarce supplies, including pulp and caustic soda. But efforts to cater to mass taste sometimes conflict with the official philosophy that the news media should advocate and clarify government policy, and State journals may find themselves caught between the demands.

The cost of paper has nearly tripled since 1984, and the price of printing is up 50 percent over the same period. The cover prices of major official newspapers, including *People's Daily* and *Economic Daily*, have been boosted by 50 to 100 percent in the last few months to keep up with costs. The number of pages in most publications, except for the eight major party papers, has been slashed, and a few periodicals with flagging sales have been dropped altogether, such as the military journal *Hong Qi* (Red Flag). Circulation of many major national periodicals has plummeted, as subscribers, including many local work units on austerity budgets, react to price hikes by cutting back on reading materials.

Yet reports of dire shortages of raw materials, price hikes, and dwindling readership tell only half the story. While official papers are suffering from a slump, overall readership appears to be growing. Many Chinese are reading new, privately published and often specialized periodicals that are more attuned to the times and to their interests.

Competition for scarce raw materials brings to the fore a number of crucial questions for China's government: Should the press reflect popular tastes, and should a private press exist at all? No clear policy exists, and new publications have been springing up with no guarantee that they will be permitted to last.

Recent discussions in the media about the nature of press freedom have been sparked by the upcoming spring session of the National People's Congress (NPC), China's legislature, which may consider a draft press law. However, a recent poll of NPC deputies showed that members are far from agreement on whether an unofficial press should be permitted. Two-thirds of the delegates contend that only organizations, not private citizens, should publish newspapers or journals.

Some observers are skeptical, however, that the draft law will make it to the NPC this year at all, as policymakers differ on how far economic conditions should restrict the reach of the government's information arm. Meanwhile, the chase for paper will continue. —SER

MAGAZINE STAFF

Sharon E. Ruwart
editor

Pamela Baldinger
Anne Stevenson-Yang
associate editors

Priscilla Totten
production manager

Jennifer Little
book editor

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China's Metal and Minerals: A Comprehensive Guide

A newly released reference on China's metals and minerals reserves, mines, production facilities and development strategies. Contains recent foreign trade deals and major projects offering business opportunities to foreign firms. Includes maps and a comprehensive listing of major deposits and mines; organizational charts; and data on reserves, production, investment, and trade. 135 pages. October 1988.

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The most comprehensive guide available to China's electric power market. China spends more than $1 billion per year on imported electric power systems—a figure that will grow to an estimated $1.5 billion by 1991. This study provides you with information on buyers of power equipment and related services, analysis of the market for various types of equipment and services, details of ongoing electric power projects and the role of foreign companies, as well as major power projects planned for the 1990's. Includes graphs and tables detailing current and future production and needs. January 1989. 130 pages.

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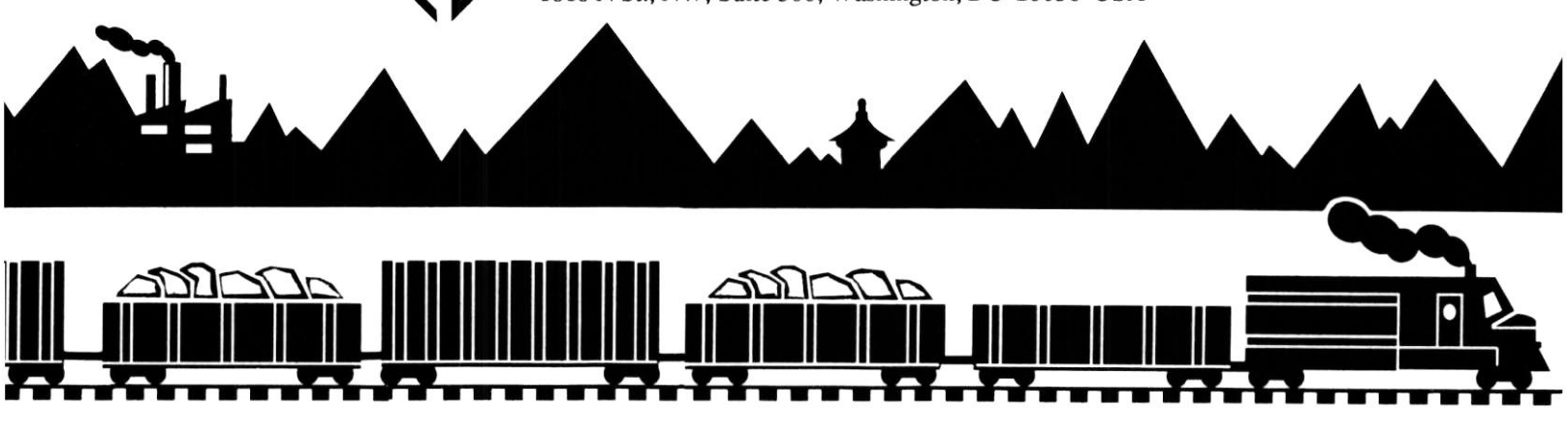

IN MEMORIAM

Walter Sterling Surrey

When Walter Sterling Surrey died in late January at the age of 73, a part of Council history went with him. One of the founding fathers of the National Council for US–China Trade in 1972 and intimately involved in US–China trade issues for the next 17 years, Surrey brought expertise, energy, and enthusiasm to all of his undertakings on behalf of the Council.

One of the founding fathers of the Council, Walter Surrey shared jokes and a warm rapport with Deng Xiaoping on a board of directors delegation to Beijing in 1979.

When the formation and purposes of the National Council were being discussed by US government officials and private businesspeople in the early 1970s, Surrey played a key role in coordinating and concretizing their ideas, eventually drafting the Council's articles of association and by-laws. In a hundred other ways—from obtaining the Council's tax-exempt status to meeting with Chinese officials in Canada to tell them about the new organization, from providing the Council with office space in his law firm to hiring its first employee—Surrey did all he could to promote the Council's goals.

Surrey continued his work for the Council until his death. In addition to being on the Council's board of directors, he was the organization's first general counsel, and filled that role for most of the Council's existence. During his tenure as Council chairman (1982–84), the Council hosted then-Premier Zhao Ziyang in Washington, DC, in January 1984.

Surrey's involvment with China actually began many years before the Council was formed. In the 1950s, he represented many China hands before congressional committees and loyalty boards after they had been accused by Senator Joseph McCarthy of "losing China." Surrey was at least as proud of his work on behalf of these people—which was highly controversial at the time—as he was of his many subsequent accomplishments. The knowledge and insights he gained through this experience led him to an affection and appreciation for China that grew with the years.

From that time on, Surrey was frequently called upon to assist with various diplomatic and commercial dealings between the United States and China. In 1973, for example, he was instrumental in obtaining Chinese permission for US companies to register their trademarks in China, despite the absence of official diplomatic relations between the two countries. The following year, he was appointed to the US team participating in the first formal joint conciliation of a trade dispute between a US company and a Chinese organization.

Surrey's abilities were recognized by the Chinese as well as by American diplomats and businesspeople. In 1979, the Chinese embassy retained him in the effort to unblock China's assets following normalization of relations. Surrey continued to perform legal work for the Chinese on both official and commercial affairs until his death.

Although Surrey knew very little of the Chinese language—and systematically mispronounced the few words he did know—he nevertheless communicated very effectively with the Chinese he met. One of his favorite anecdotes described a discussion he had with Deng Xiaoping on a trip by the Council board of directors that Surrey led to China in January 1979. When Deng asked how the United States and China could avoid all trade disputes, Surrey replied, "Stop trade." After a long pause, Surrey went on to explain that trade disagreements were a normal part of business between friends, and cited several US disputes with European countries to demonstrate his point.

Christopher H. Phillips, the Council's first president, noted that "the Council owes an enormous debt of gratitude to Walter Surrey. He gave unstintingly of his time and energy and was always available to provide advice and assistance in dealing with a host of problems which confronted us during the Council's early years. I will remember Walter especially for his boundless energy, his unfailing sense of humor, and his genius for getting quickly to the heart of a problem and arriving at a practical solution. He will be sorely missed by the Council and by all those who had the good fortune to be his friends and associates."

Current Council President Roger W. Sullivan added, "Walter Surrey was a source of support, encouragement, and wise counsel for me and for many others. But there was something else about him that should be remembered. Among his friends, the mention of Walter's name would bring a smile—not of amusement, although he was a very funny man—but of love. He gave of himself to all who needed help, encouragement, or advice without regard for what he would get in return. And for this he received great love from all who knew him."

FORECASTING CHINA'S PROGRESS

Despite retrenchment in 1988, China's economic reforms will continue to deepen in 1989, and the door will open wider to foreign investment. That was the consensus of the five experts on China's politics and economy who spoke at the Council's Forecast '89 meeting held in Washington, DC, on January 17, which drew over 120 attendees from 75 Council member companies.

In his introductory remarks, Council President Roger W. Sullivan cautioned listeners that in seeking to understand China, they must look at long-term trends rather than isolated events. Excessive media attention given to China's missile sales to Iran and to ongoing inflation, he pointed out, obscured the underlying constancy of Chinese policy.

• **A healthy contraction.** On inflation, Albert Keidel III of Rock Creek Research Inc. took the general optimism one step further, saying that current high inflation not only does not spell doom for the reforms, but is actually a healthy indicator of the boom-and-bust cycle powering China's growth. Inflation means growth, and growth in output now outranks inflation in importance, Keidel added. Layoffs and credit cutbacks also help reforms by forcing efficiency measures, such as the reallocation of labor. Keidel predicted that the current contraction would end by summer.

• **Abandoning the "poor-me" approach.** Karen Green, director of the Council's Business Advisory Services, noted that, "The key issues in 1989's overall bilateral relationship are economic issues directly relevant to US business interests." She argued that a change in attitude caused China to stop using exclusively political issues as keynotes of the two countries' relationship. "China is changing from a nation whose paramount concerns are issues of national sovereignty, and is gradually abandoning a

Kelly Ho Shea (right), manager of the Council's high-technology program, talks with Nancy Farris of Motorola Inc.

Edward T. Cote, Jr. of Alexander Trade Services (foreground) and Ronald Y. Koo of Caltex Petroleum Corp. browse through Council publications.

Anne Marie Banner of the Eaton Corp. and Hok Leung of Lummus Crest Inc.

At a cocktail reception following the talks, company representatives shared China experiences. Pictured here (l to r): Vincent P. James of Union Carbide, and Thomas Newman and Benjamin Lee, both of NYNEX International Co.

xenophobic, poor-me, Third World approach" that dictates suspicion of the West and adherence to the Third World bloc on international issues. Instead, China is "doing everything it can to become a big-time player economically," demonstrating a new willingness to adhere to international norms.

• **Ripe for investors.** "Foreign investment in China is booming," said Richard Brecher, manager of the Council's investment program. "China continues to take steps to provide more attractive options for foreign investors." Brecher suggested measures investors could take to secure themselves against a possible currency devaluation in China, such as factoring the devaluation into the final prices of products and reducing inventories to a minimum. He also counseled businesspeople to keep projects small, and to secure early approval from the authorities.

"The investment environment will continue to improve," he concluded. "For those of you who looked at China a few years ago and decided the time was not right, I suggest that you take another look."

• **Tracking the trade bureaucracy.** Gideon Rosenblatt, the Council's trade program manager, predicted a good year for trade with China, despite last year's problems with domestic inflation and raw materials shortages. Rosenblatt offered a quick guide to the bewildering array of bureaucratic reforms introduced in 1988, and concluded that "the increased decentralization of trading power that we witnessed last year is likely to stay with us for some time, and the changes this brings will present opportunities to companies that are prepared for them."

• **Depending on coal.** A cautionary note on China's energy sector came from David L. Denny, director of research for the Council. "China evaded the first energy crisis largely because of the reforms," Denny said, explaining that more efficient management and new, energy-saving technology hedged off the shortages predicted for the early 1980s. But Denny called the prospects for strong growth in hydropower, oil, and nuclear energy "less than bullish, to put it mildly," as China perpetuates its dependence on coal, effective use of which is hampered by transportation bottlenecks and slow progress in mines.

AEROSPACE SYMPOSIUM

Business opportunities in China's air-transportation industry and US government support of American aviation business abroad were the focuses of the Council's China Aerospace Symposium held in Washington, DC, on January 26. The symposium concluded that US firms hold a strong technological advantage over foreign competitors in China's air-transportation market. However, companies must be willing to commit time and resources to developing a successful strategy, and US firms should also perform better in such areas as airport design and air-traffic control. To improve US competitiveness, export controls must be further relaxed, and export financing should be expanded.

Steve Wang from Boeing, and Alec White and Don Tillery from Wilcox Electric were on hand to provide industry perspectives, and US government experts discussed some of the assistance programs available to American firms. Priscilla Raab, director of the US Trade and Development Program, and Ray Albright, vice president for Asia at the US Export-Import Bank, addressed financing concerns, while Tom Messier and Fred Randall of the Department of Commerce discussed government-to-government cooperation and trade development programs in aerospace.

Speakers stressed that China's efforts to develop its air transportation system—procuring more commercial airlines, developing airports and ground infrastructure, expanding the general-purpose fleet, and starting up its own commercial aircraft industry—have opened considerable opportunities for foreign companies to sell, manufacture, lease, train, and invest. Speakers cautioned, however, that although China's market is growing rapidly, it represents only a fraction of the world market.

In a discussion after the talks, representatives of more than 40 companies, including Ferranti International Signal, GE Aerospace, Hughes Aircraft, IBM, Martin Marietta, and United Technologies, shared details of their China business experiences.

Symposium panelists listen to a talk by the FAA's Director of International Aviation, Tom Messier. From left to right: Alec White of Northwest Airlines; Steve Wang, Boeing Corp.; Don Tillery, Wilcox Electric Co.; Priscilla Raab, US Trade and Development Program; Council Vice President Richard E. Gillespie; Ray Albright of the US Export-Import Bank, and Fred Randall, deputy assistant secretary for aerospace at the US Department of Commerce.

Ten Years of Cooperation: UNDP in China

UNDP grants provide key technical assistance—and attract new funds

William N. Raiford

The United Nations Development Program (UNDP), the world's largest grant development assistance organization, celebrated 10 years of cooperation with China in 1988. Funded by voluntary contributions from United Nations (UN) members, UNDP provided over $93.5 million for more than 200 projects in China from 1979–86 and has allocated $162 million for 1987–91, making China the primary recipient of UNDP resources.

UNDP was established in 1966 as the central funding agency for UN development activities, and it coordinates the development projects of over 30 agencies in the UN system, such as the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). Though UNDP's China operations budget is not as high as the World Bank's—which currently lends China over $1 billion per year—or that of the Asian Development Bank (ADB)—which has lent $500 million since 1986—UNDP represents a significant source of untied funds that help fill the technical assistance niche in modernization projects.

At any given time, UNDP is assisting more than 150 Chinese projects in such critical areas as technology acquisition and introduction of modern management techniques. In the current funding cycle (1987–91), projects are concentrated in five areas: human resources development, technical transformation of existing industries, development of advanced technology, improvement of living standards, and application of electronic information technology. Priority is given to human resources development, especially in management. Projects in the other four categories also involve significant training components.

Planning and coordinating projects

UNDP is supervised by a governing council, which is composed of representatives of 48 UN member countries. The council allocates budgets in five-year cycles and also designates a number of programs it would like to see carried out within the cycle. These are largely conceptual in nature and are not usually tied to specific projects. Selection of specific projects is made in cooperation with the Chinese.

UNDP's principal Chinese contact for planning and administering projects is the Ministry of Foreign Economic Relations and Trade (MOFERT). After soliciting requests from Chinese ministries, MOFERT provides UNDP with a list of projects that require technical assistance and foreign funding. Officials from both MOFERT and UNDP, as well as from the UN specialized organizations, then decide upon program and project priorities. Once an agreement has been reached, a formal list of projects is published, and an executing agency is selected for each project.

The executing agency is the organization entrusted with all practical aspects of funding a project, and it is most often a UN agency. China executes about 45 percent of the projects itself, usually through MOFERT's China International Center for Economic and Technical Exchange (CICETE). CICETE handles overall coordination for project funding, and assists the implementing agency (the beneficiary of the grant) in such areas as technical guidance, overall planning, and bidding procedures, while UNDP provides advisers and equipment to bridge critical technological gaps. CICETE often co-executes a project with a UN organization.

Once UNDP and MOFERT agree on a list of projects, the implementing and executing agencies begin negotiations on a "project document," which delineates the scope of work for each project. When the document is finalized, it is submitted to UNDP for final approval. If the project is valued at under $700,000, approval may be granted by the UNDP field office in Beijing; otherwise it must be approved by UNDP headquarters in New York. Once final approval from UNDP has been received, funds are released and bidding initiated. Final decisions on disbursements rest with the executing agency, which ultimately decides what is to be purchased and what types of services are required.

Bidding regulations vary with equipment cost

On average, 45 percent of UNDP project costs in China are for equipment, though the figure may be as high as 60–70 percent for some projects. More than $14 million was disbursed for equipment purchase for China projects in 1987, and the 1988 figure is expected to be higher.

Since much of the procurement is for small items of relatively modest cost, it would be inefficient to require international competitive bidding (ICB). Instead, a short list of companies with well-established reputations in the relevant field is invited to bid by the executing agency. Companies should contact the executing agency to be put on the

William N. Raiford is an information officer for the UNDP in New York. He was formerly a foreign policy analyst for the Congressional Research Service.

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short list.

Purchases of equipment over $40,000 require the implementing agency to follow ICB procedures. For Chinese-executed projects, project authorities in the respective ministry or local institution conduct the procurement and tender arrangements. Purchase and disbursement are channeled through CICETE, with the close collaboration of the UNDP office in Beijing.

Projects executed by UN specialized agencies conduct procurement procedures out of their respective headquarters (UNIDO in Vienna, FAO in Rome, etc.). Companies or individuals interested in bidding on UNDP contracts should register with these agencies, and also with CICETE.

Tracking projects subject to international tendering requires selective monitoring and perseverance. Companies can identify UNDP procurement opportunities in the bi-monthly periodical *Development Business*, available by subscription through the UN. The US–China Business Council office in Beijing and the commercial offices of larger embassies are also potential sources of procurement information on large projects. Developing contacts with authorities in Chinese ministries and local institutions is another way to find out what UNDP projects are inviting bidders at any given time.

Attracting further investment

An important feature of UNDP projects is their ability to attract additional investment—both Chinese and foreign. UNDP-supported pre-feasibility and feasibility studies have paved the way for multilateral and bilateral lending in a wide range of fields, including agriculture, education, technical training, hydropower, coal mining, harbor development, irrigation, and rehabilitation of saline lands. For example, when China decided to upgrade its university system, UNDP sponsored four study tours for Chinese staff to see what types of equipment foreign universities used in physics, engineering, chemistry, and computer science departments. These tours laid the foundation for a World Bank credit of $200 million for university modernization. In 1987, UNDP projects generated $1.8 billion in investment follow-up from the World Bank and other foreign creditors.

The links between UNDP and the World Bank are based on a UN interagency agreement that expedites cooperation between the two agencies in carrying out projects. Representatives from each organization meet regularly to update each other on upcoming projects, which are taken into consideration when each organization reviews and plans future funding. UNDP occasionally also provides technical assistance on World Bank projects. The two organizations are currently cooperating on a large-scale training project in Beijing under the auspices of the Bank's Economic Development Institute in China.

Current UNDP projects in phosphate fertilizers, rigid polyvinyl chloride, ramie textiles, silicones, tungsten filaments, garments, food additives, and leather goods and footwear may eventually lead to substantial investments by other parties. These projects provide the technical, economic (market information), and financial (size of investment required, rate of return, etc.) parameters of potential future projects, which the Chinese may opt to fund themselves or to invite outside investors in on. For smaller investments, such as tungsten filaments or food additives projects, the private sector rather than the World Bank or ADB is usually approached.

Rich opportunities for consultants

As a technical assistance organization, UNDP depends heavily upon international consultants. If a project involves a multidisciplinary approach, UNDP may subcontract a project to an outside consultant. To obtain information about subcontracting possibilities, companies should stay in touch with the executing agency, and pay close attention to UNDP programs when they are announced at the beginning of a funding cycle.

Most of the 2,000 consultants who have worked on UNDP-financed projects in China have been hired on short-term contracts, some under the aegis of two innovative UNDP-backed

FOREIGN SUPPLIERS TO UNDP PROJECTS

American companies supplied 43 percent of the more than $6 million worth of equipment for China purchased with UNDP resources in 1987. Canadian, European, and Asian companies—particularly those from Japan, West Germany, and Hong Kong—also sold equipment for use in UNDP projects.

Significant US orders have come for information systems and computers. For example, Computervision supplied computer-aided design (CAD) and computer-aided management (CAM) centers worth over $1 million last year, while several other US computer manufacturers and software suppliers provided more than $1 million worth of computer equipment and software for geophysical prospecting data systems.

US companies have also been extensively involved in energy and industrial sectors, winning contracts to provide nuclear safety equipment, oil field exploitation technology (especially well-logging instruments), and coal liquefaction equipment. Corexport Corp. and Fugro-McClelland, Inc., both of Texas, won contracts of $262,000 and $450,000, respectively, to provide marine engineering equipment. Other important sales were registered for measuring equipment to improve electrical products, research and development in carbon fibers, and carbon-type pressure transducer systems.

European and Japanese firms have also landed large contracts in industrial sectors. A Swiss company, for example, received an order for $435,000 worth of equipment to help China produce polyvinyl chloride, and an Austrian company won a near $1 million order for a diesel engine test stand to help China improve the efficiency of its locomotive products. West German manufacturers got the biggest share of a $1 million contract for equipment to develop synthetic fiber. The Midorya company of Japan won a $140,000 contract for a photo decay analyzing system.

The UNDP has recently approved—or is considering—a number of new projects, including:

- a $7 million steel industry project, which will require computer systems.
- a second-phase geothermal project in Tibet, which will require $7 million in consultancy services, drilling equipment, geothermal electric generating equipment, and training.
- a $6 million project to improve the safety of dams, which will require sensing and computer equipment as well as training and consultancy services.
- a $1 million pilot coffee development project, which will require processing equipment as well as training and consultancy services.

—WNR

programs. One, called Transfer of Knowledge Through Expatriate Nationals (TOKTEN), brings specialists of Chinese origin who live and work abroad back to their homeland for two-to-eight-week consultancies. These high-level professionals volunteer their services in such fields as computer software and biotechnology research, in exchange for round-trip air fare paid by UNDP and a living allowance provided by the Chinese host agency.

Similarly, the Senior Technical Advisers' Recruitment Programme (STAR) supplies non-Chinese foreign specialists willing to carry out short consultancies on a volunteer basis. STAR consultants are usually senior executives or managers, some retired, who advise in such fields as banking, science, and technical research.

Training a new generation

Short-term training abroad and experience gained in other parts of the world have become an essential part of the UNDP's China program. For example, UNDP has funded study opportunities and training for senior- and middle-level officials in key economic ministries such as the Ministry of Finance (MOF). The training may involve sending senior and middle managers to similar institutions in other countries, or bringing foreign experts to China. Chinese officials from the People's Bank of China (PBOC), for instance, have visited central banks in 14 countries to study specific policy issues or areas such as organizational structure.

UNDP is now helping PBOC establish a financial training center to meet short- and long-term staff requirements. Stress is on teacher training and curriculum development, with a goal of training about 3,000 staff within the next four years.

Supporting economic management

As economic reforms have evolved, UNDP has been invited to play a broader role in Chinese enterprise reforms and economic management. Since 1987, UNDP Administrator William H. Draper III, along with Andrew Joseph, assistant administrator and director of UNDP's regional bureau for Asia and the Pacific, have held several meetings with Gao Shangquan, vice chairman of the State Commission on Restructuring the Economic System (SCRES), to discuss UNDP involvement in China's economic management.

These meetings, among others, have led to a number of projects designed to improve China's management infrastructure. In 1988 UNDP financed consultants in the following areas:

- **industrial development planning,** to generate policy options for the State Council and other decision-making bodies;
- **tax reform,** in coordination with the World Bank;
- **joint venture law implementing regulations** and operational guidelines;
- **foreign investment policy;**
- **public administration policies and management** for both civil service and State enterprise personnel;
- **Hainan Province strategic development planning;**
- **an Asian regional seminar on enterprise reforms** and the role of the private sector.

Nurturing the private sector

One element of supporting the government's economic reform program is helping China create an environment favorable to private sector initiatives. At the national level, UNDP is assisting MOF in examining issues involved in the transfer of assets from the public to private sector. Consultants are also helping develop a new tax and budget system, which will differentiate and define the powers of the central and local governments.

At the local level, UNDP initiated a feasibility study one year ago to establish a number of "business incubators" for high-technology companies in major cities. The incubator is a form of industrial park in which centralized administrative, accounting, marketing, computer, and consultancy services are made available to new, innovative technology companies. The incubator provides an alternative way to meet the capital needs of start-up companies by enabling them to share the costs of common services, as well as helping them to obtain working capital. The first business incubator, in Wuhan, Hebei Province, became operational last year. UNDP is now providing management training to 30 of the new entrepreneurs.

China has plans to establish 50 more incubators in the next three years. UNDP expects to help evaluate the new incubators and design training for their participants.

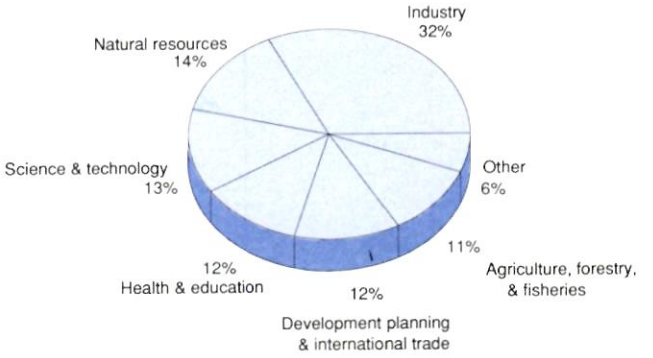
Strengthening reform implementation

UNDP will continue to help China modernize its financial and monetary policies in line with government efforts to reorient the economy toward market principles. A new program to further strengthen the PBOC, for example, will provide advisory services in credit policy and interest rate functions by such high-level personnel as former head of the US Federal Reserve Paul Volcker.

UNDP has also agreed to arrange an investment promotion seminar for China in New York later this year. The seminar will promote joint investments and subcontracts, primarily for medium-sized industries. These activities should further broaden the parameters of UNDP operations in China. 完

UNDP Projects by Sector 1983-87

Total projects: 276



SOURCE: UNDP

RAILWAYS

Thawat Watanatada, Clell Harral, and Pam Baldinger

A popular saying among Chinese maintains that "to take a train in China is to pay for suffering." What this lament does not reflect, however, is the unique position of China's railways both in China and compared to the rest of the world; in an era when most railways are scaling down, China's rail system cannot grow fast enough. Between January and June 1988, for example, railway transport volume rose 5.1 percent, while the level of industrial output rose 17.2 percent.

Passenger and freight demands on Chinese railways have increased dramatically since the onset of economic reforms, and on the whole, China's railways have responded admirably, meeting most of the rise in traffic by increasing productivity. Between 1981–85, for example, freight density (tonne-km per route-km) increased 34 percent, while passenger density rose 64 percent. The productivity of locomotives increased by 30 percent, and productivity of rolling stock by over 30 percent. Given that much of the technology used is a generation behind international norms (*see The CBR*, Sept–Oct 1984, p. 24), these accomplishments are no small feat.

Despite its improved performance, however, China's railway system is clearly being pushed to its limits, and a shortage of freight capacity has become one of the most serious constraints on China's economic growth. In addition, railway officials estimate that China, which currently has over 50,000 km of track, will need at least 80,000 km by the year 2000 to extend service to areas not now served—but China is currently adding only about 500 km per year. Compounding the problems of undercapacity and sparseness of the network, worn-out track and equipment—along with human error—led to numerous rail accidents in 1988, the worst year for rail safety since 1949.

Chinese authorities, acknowledging the railway sector's key role in China's transport infrastructure and economic growth, have promised improved operations and increased levels of investment, and have looked to foreign agencies such as the World Bank and the Japanese Overseas Economic Cooperation Fund (OECF) to help finance the country's massive railway modernization program. Foreign companies are playing important roles as suppliers of both equipment and technology, and should continue to do so as China's railway modernization gathers steam.

Traffic outgrows track

The Chinese rail system is the fourth longest in the world. In 1986, railways carried about 56 percent of China's passenger traffic, and 63 percent of total freight traffic. Freight traffic density in China averages about 17 million tonnes per km, second only to that of the Soviet Union and much higher than in the United States. Passenger traffic density is the highest in the world, though by international standards the average Chinese travels infrequently. Despite the obvious significance of railways in China's transport network however, in terms of geographic area and population, the density of its railway network is among the lowest in the world.

Thawat Watanatada, Sc.D., is senior transport economist and Clell Harral, Ph.D, is principal transport economist in the China department at the World Bank. Pam Baldinger is associate editor of The CBR.

Both freight and passenger traffic in China have grown rapidly since 1979, rising by about 8 percent and 13 percent per year, respectively. Despite this growth in demand, State investment in railways as a proportion of gross capital spending has decreased from a high of about 12 percent in the 1960s, to 7 percent in the mid-1980s, to 5.1 percent in 1987. Most of the money has gone toward expanding line capacity, with the rest going toward replacing or upgrading out-of-date equipment and technology.

Replacing obsolete technology

Much of the technology employed in China's rail system dates from before World War II. Today, 61 percent of the locomotives are steam-powered, 33 percent diesel-powered, and 6 percent electric. The network has about 10,000 km of double or multiple-track lines and 4,400 km of electrified lines. Like the Soviet railways, Chinese railways use very few specially equipped cars for rapid loading and unloading of cargo. Manual reporting and record-keeping systems are still used for dispatching and controlling movements of locomotives and rolling stock.

Despite the system's age and overutilization, in many aspects it manages to operate quite effectively. The average freight car turnaround time of 3.5 days, for example, may be the world's best. However, shortages of route capacity and rolling stock restrict both freight and passenger traffic, and outdated technology in most aspects of operations, coupled with cumbersome, overly centralized management procedures, prevent China's railroads from meeting the country's transport needs.

To solve these problems the Chinese government has attempted to

expand the system's capacity both by increasing productivity and making new investments. Line capacity is being increased through double-tracking, electrification, and improved signaling on about 7,000 km of main routes. Locomotive and rolling stock production capacity are being augmented to increase the motive power fleet by over 50 percent by 1990. Operational efficiency is being improved by modernizing the telecommunications network, the operating information system, and the locomotives, rolling stock, and other equipment. The Ministry of Railroads (MOR) is also streamlining its management information system and delegating more decision-making powers to bureaus and regional administrations under an economic contract system introduced in 1986, designed both to give the bureaus greater managerial autonomy and to make them self-financing (*see* box).

Lower profits than meet the eye

While railway profitability figures may look impressive at first glance—$2.1 billion in 1986—artificially low State prices distort actual costs and weaken the railways' economic position. Railway tariffs have changed very little since the early 1950s—freight rates were increased in 1983, the first change since 1967. The 1983 reform raised the minimum chargeable distance to 100 km (trips under 100 km are charged the 100 km rate) and increased rates by an average 23 percent on bulk commodities such as coal, cement, oil, and fertilizers. To encourage short-haul traffic to move from railways to highways (*see* p. 28), further increases in freight and passenger rates were made in 1985. However, tariffs are still very low by world standards, averaging about 1.9 fen per tonne-km (tkm) for freight, and 1.9 fen per passenger-km (pkm) for passengers (one fen is approximately 0.27 cents).

Although tariff revenues exceed gross operating costs, operating costs don't reflect real costs, due to underreported depreciation (depreciation is assessed at low historic book values rather than real replacement costs), and artificially low prices paid for coal and electricity. In addition, the recent acceleration of inflation has substantially increased railway operating and construction costs. This situation may adversely affect MOR's financial health in the future unless tariffs are raised. Although there has been much talk on this subject, as of yet no changes have been announced. Therefore, MOR is beginning to look more closely at the profitability of individual routes and services, and has been encouraging the development of local railways in order to expand line capacity.

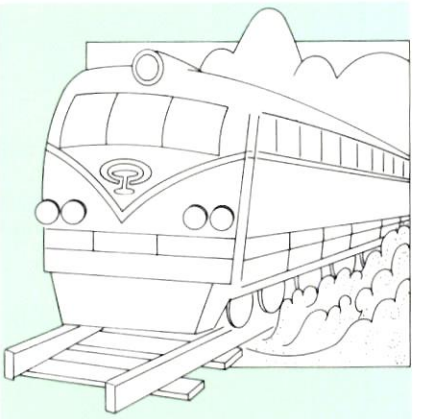
Encouraging local railways

China has built approximately 6,800 km of local railway lines, representing about 12 percent of the national railroad network. By 1990, local railways should approach a total route length of about 8,000 km. During 1991–2000, about half of the over 10,000 km of new rail lines planned are expected to be local railways. Local railways are typically built and operated by local governments and enterprises with State assistance. Large and medium-sized projects require approval from both the central and local governments, but small projects may be locally approved.

MOR integrates local railways into the national network by providing guidelines for management, conducting data surveys for construction and transportation planning, specifying technical standards for construction and operations, and assisting in the training of technical and managerial personnel. In conjunction with the State Planning Commission (SPC) and Ministry of Finance (MOF), MOR also sets forth guidelines on the financing of local railways, which specify that a local railway be financed by the beneficiaries of its operations, which may include one or more provincial governments. For example, the Inner Mongolia Railway Project, proposed for World Bank funding, is expected to receive State support through MOR and MOF because of its significance in opening up a major new coal route, and from the government of Inner Mongolia for promoting regional development.

Local railways tend to be more flexible than those run by MOR, since they have smaller staffs and simpler organizational structures. As there is typically greater local support for investment in local railways, land can usually be obtained faster and at lower cost than for national railways. In addition, greater use is made of secondhand materials and equipment, and using local labor makes mobilization easier and faster.

Artwork by Elizabeth Stewart



China's modernization is bringing staggering increases in trade and travel that are straining railways—the centerpiece of China's transport system—to their limits. Multilateral lending institutions are providing massive funding and project support to help in the race against time and demand. But central planners face the gargantuan task of upgrading facilities without slowing down service. How long can railways continue to shoulder the growing burden?

ORGANIZATION OF THE RAILWAY SECTOR

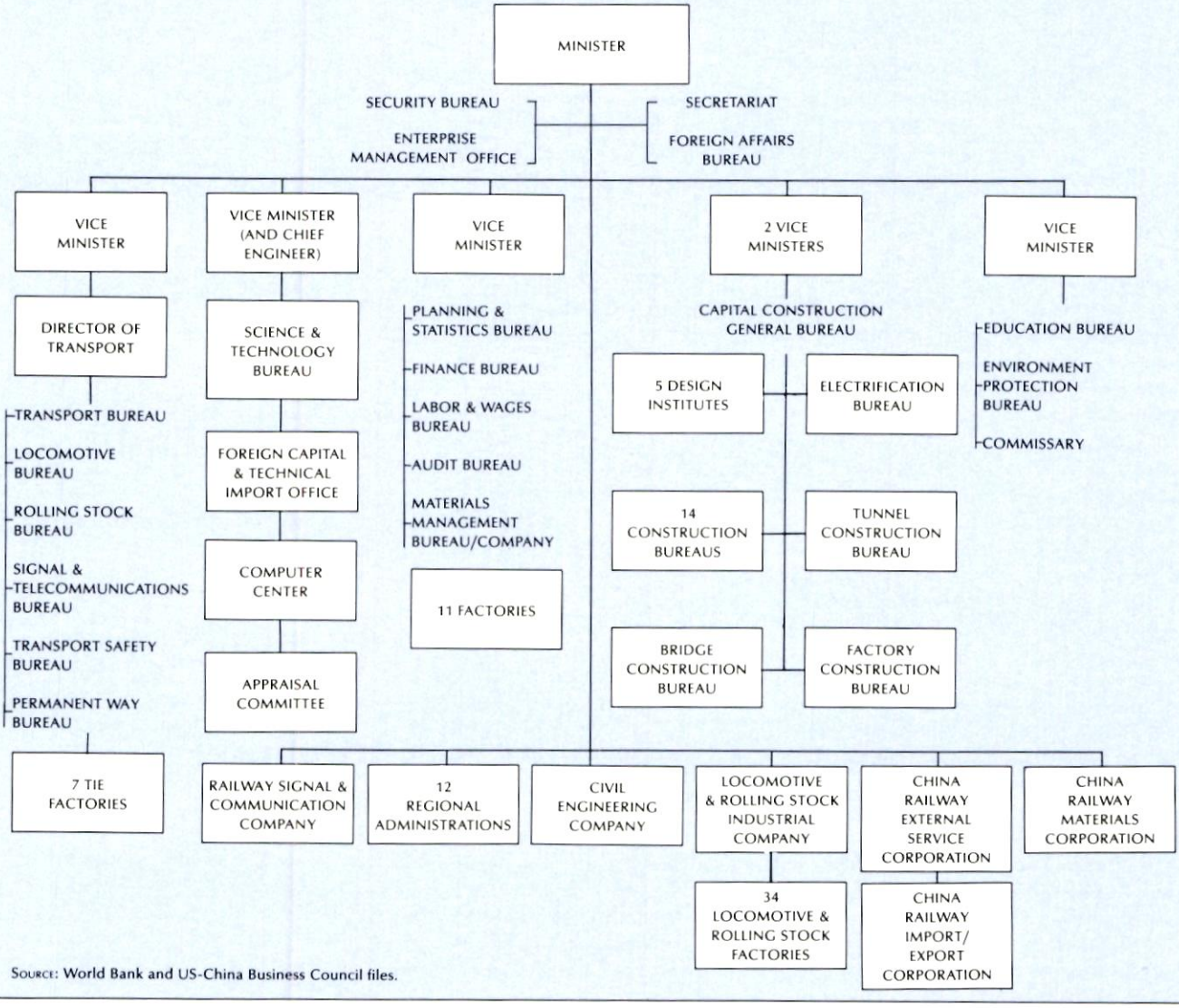
The Ministry of Railways (MOR) is the chief administrator of China's railway network. Several other ministries, such as the ministries of Coal Industry and Communications, take charge of railways for uses associated with their own operations, and provincial governments administer railways for limited services within their own jurisdictions.

With a staff of some 3.2 million, MOR consists of 24 bureaus and offices concerned with specific functions, such as safety, and 12 regional administrations, responsible for day-to-day operations. In 1986 the State made its relationship with MOR a contractual one, primarily to make the railways self-financing. MOR has been encouraged to maximize profits, although it is still required by the State to carry unprofitable freight traffic, such as coal. Higher rates may now be charged, however, for transport of goods produced outside the State plan.

Under the contract system, the regional administrations now have authority over their own profits. Administrative reforms, such as payroll bonuses based on traffic growth in each administration, have also been introduced. Although rail officials are supposed to take on additional business only after fulfilling State-assigned deliveries, the contract system has made delivery of goods outside the State plan much more lucrative, and has resulted in profiteering and a thriving black market for cargo space. The official rate for transporting a tonne of coal from Datong, Shanxi Province, to Shanghai, for example, is about ¥20—but the black market price for an equivalent amount of cargo space may reach ¥300. With the new profit incentives comes a tendency to neglect maintenance and repair of worn-out track, which contributed to several fatal accidents last year. Improving rail safety is now high on the agenda of central authorities; Railway Minister Li Senmao recently announced that over $1 billion will be spent in the next three years to bolster rail safety.

In addition to streamlining its organization and devolving authority, MOR has also changed its foreign trade practices. Last August it formed the China Railway Import–Export Corp. (CRIEC), to handle all importing and exporting work under the auspices of the China Railway External Service Corp. (CRESC). The scope of CRIEC's operations is still somewhat unclear, but it appears that MACHIMPEX, which has traditionally handled many of MOR's imports, will continue to carry out previous contracts, while CRIEC will negotiate and sign all new contracts. —PB

THE MINISTRY OF RAILROADS



Source: World Bank and US-China Business Council files.

Design standards tend to be lower than for national railways, reflecting local conditions and the lower traffic levels expected.

As an incentive to build local railways, the State allows them greater financial autonomy than national railways. For example, local railways are subject only to a 3 percent business tax on gross revenues and are allowed to retain their profits, while taxes on State railways amount to about 5 percent of gross revenues. Most important, local railways are permitted to set their own tariffs, subject to approval of the local price control board. While freight tariffs for local railways range from 3–12 fen/tkm, MOR's are only 1.4–2.5 fen/tkm, except for new lines, on which tariffs may be as high as 8–10 fen/tkm.

A new dimension for World Bank loans

China has welcomed foreign financing in its railway modernization program, and has obtained over $3 billion in foreign loans since 1978. The World Bank and the OECF have been the most important foreign suppliers in this sector, with the Bank lending $885 million for four projects and the OECF providing over $2 billion to date (*see* list).

The first three World Bank projects focused primarily on increasing capacity and technological modernization of individual railway lines and manufacturing facilities. The fourth project, however, also includes a strategic study to assess the potential contributions of technological modernization in China's railway sector, particularly in computerization and telecommunications areas. The study will extend the scope of World Bank technical assistance to broader, longer-term strategic planning, in addition to capital transfer. Results of the study are expected eventually to provide a basis for future World Bank railway projects.

Safety concerns add to foreign equipment needs

Foreign companies have been involved in nearly all facets of China's railway modernization. The General Electric Co. (GE), which exported 420 diesel locomotives to China in 1983–85 for $400–$500 million, is perhaps the most notable example, but French, British, East German, and Japanese companies have also

A PROFILE OF FOREIGN INVOLVEMENT IN CHINA'S RAILWAY SECTOR

US COMPANIES

ENSCO
Won a $2.3 million bid in October 1988 to supply trade inspection cars to the World Bank First Railway project.

General Signal Corp.
Established in March 1987 the China American Signal Company, a joint venture with the China Railway Signal Communication Company of Shanghai, to produce railway signal systems. The $4.8 million, 20-year contract calls for manufacture of centralized traffic control systems, classification yard systems, highway crossing warning devices, and equipment for detecting hot boxes on railway cards.

Pullman Standard
Agreed in March 1987 to provide technology to manufacture 70-tonne coal hopper cars, and shipped 200 used 65-tonne coal hoppers to the China Heavy Machinery Co. Pullman also sold braking units, car couplers, shock absorbers, and automatic bottom door unloading coal cars.

Ultimate Corp.
Won an order in May 1985 for minicomputers from the China Electronics and Communication Co. and MOR for $2.2 million.

Pittsburgh and Lake Erie Railroad
Signed a contract in February 1984 to export 200 70-tonne coal hopper cars and parts to the Ministry of Coal Industry for over $1 million.

Mutual Oil of America, Inc.
Signed a $450 million agreement with Hailinjie International Information Engineering Co., Ltd. of Shenzhen to help construct a railroad on the Nantou peninsula, Guangdong Province.

ASIAN COMPANIES

Japan Leasing Corp. (Japan)
Signed a $1.5 million contract in July 1987 with Tianjin International Trust and Consultancy Corp. for Tokyu Car Corp. to assemble six underground railway vehicles in China.

Mitsubishi Electric Corp. of Tokyo and **Kawasaki Heavy Industries (Japan)**
Signed a contract in April 1986 with MOR to produce and manufacture 80 electric rail locomotives.

Mitsui and Company, Ltd. and **Tokyo Kohtetsu Co., Ltd. (Japan)**
Signed a $9 million contract with MOR's Supply Department to provide 3,000 tonnes of steel to the World Bank Second Railway Project.

Marubeni (Japan)
Will supply 37 fault locators worth $1.6 million to the First Railway project.

Wo Sheng Co., Ltd. (Hong Kong)
Will jointly build a $70.4 million rail terminal to include restaurants, hotels, and stores with the Zhengzhou Railway Bureau.

EUROPEAN COMPANIES

South Wales Switchgear, Ltd. (UK)
Signed a $545,000 contract in July 1987 with China National Technical Import Corp. to supply three Hawkvac 25 trackside switching stations for the Datong–Beijing–Qinhuangdao railway electrification project.

Nokia Telecommunications (Finland)
Agreed in February 1987 to supply MOR with six digital DX 200 telephone exchanges, digital transmission systems, and control systems worth $4.4 million.

The 50 HZ Group of Europe (Alsthom of France, leading company)
Won a contract in October 1985 to deliver 300 electric locomotives.

ELIN (Austria)
Signed a contract with MOR to provide communication systems worth approximately $4.6 million.

Pirelli (Italy)
Will supply $3.3 million worth of optical fiber cable to the First Railway Project.

Compiled by Felicia Hwang from Council files. The accuracy of this list, which is not intended to be comprehensive, has not been independently confirmed by *The CBR*.

MAJOR FOREIGN-FINANCED RAILWAY PROJECTS

Modernizing China's railways is a costly endeavor—over $10 billion has been invested since 1979, and experts believe billions more will be needed to expand and bring the system up to international standards. The World Bank and the Japanese Overseas Economic Cooperation Fund (OECF) have been the most important sources of foreign funding for China's railway projects, the World Bank having lent $885 million for four projects, and the OECF over $2 billion (at current exchange rates) for four projects. Japanese Prime Minister Takeshita recently pledged nearly $6 billion for six additional projects to be undertaken in the next several years.

World Bank projects often involve training components and upgrading manufacturing facilities in addition to railway construction, and Bank loans are subject to international bidding procedures. OECF loans, however, are at least partially tied, requiring contracts to be awarded to Japanese bidders. The two organizations have supplied funds for the following railways:

Name of Project	Funding Organization	Project Description
Completed Projects		
Beijing-Qinhuangdao (Hebei)	OECF	Construction of 272 km of electrified double track. This project links Datong in coal-producing Shanxi Province to the port of Qinhuangdao.
Hengyang (Hunan)-Guangzhou (Guangdong)	OECF	Construction of double track between Hengyang and Guangzhou on the Beijing-Guangzhou trunk line.
Yanzhou (Henan)-Shijiu (Shandong)	OECF	Construction of a new line to help develop the port of Shijiu as a coal terminal.
Xinxiang (Henan)-Heze (Shandong)	World Bank	Construction of a new 165 km section and renovation of a 140 km section.
Zhengzhou (Henan)-Baoji (Shaanxi)	OECF	Electrification of a 673 km section between Zhengzhou and Baoji on the Gansu-Qinghai railway.
Datong (Shanxi)-Puzhou (Shanxi)	World Bank	Electrification of a 336 km section along this northern route.
Zhengzhou (Henan)-Wuhan (Hebei)	World Bank	Construction of 609 km of electrified line on the Beijing-Guangzhou trunk line.
Chongqing (Sichuan)-Guiyang (Guizhou)	World Bank	Electrification of a 415 km line between Chongqing and Guiyang.
Yueshan (Henan)-Xiangfan (Hubei)	World Bank	Double-tracking the 492 km line from Yueshan to Xiangfan, and electrification of a 113 km northern section of the line from Yueshan to Luoyang.
Not Yet Begun		
Hengshui (Hebei)-Shangqiu (Henan)	OECF	Construction of a 390 km section of the planned Beijing-Jiangxi line, which will become the fourth north-south trunk line.
Zhangping (Fujian)-Xiaocuo (Fujian)	OECF	Construction of a new line between Zhangping and Xiaocuo via Quanzhou.
Xi'an (Shaanxi)-Ankang (Shaanxi)	OECF	Construction of a new 274 km railway.
Baoji (Shaanxi)-Zhongwei (Ningxia)	OECF	Construction of a 500 km line will provide a new route to and from northwest China.
Nanning (Guangxi)-Hongguo (Guizhou)	OECF	Construction of the 870 km first phase of the Nanning-Kunming (Yunnan) railway, which will link coal and phosphate-rich southwestern areas to the coast.
Shenmu (Shaanxi)-Shijiushi (Shandong)	OECF	Construction of a new 920 km line to link Shenmu and Fugu coal mines in northern Shaanxi to the coast.
Inner Mongolia Local Railway	World Bank	The World Bank is considering providing $150 million for construction of a 948 km single-track line connecting Jining in coal-rich central Inner Mongolia to Tongliao in the eastern part of the province.

Compiled by Pam Baldinger from Council files.

been involved in upgrading manufacturing plants, electrifying track, coproducing equipment and technology, and exporting locomotives and rolling stock (*see* box).

Although China is importing more technology and equipment to boost its domestic production, it will continue to import locomotives and other manufactured products as it tries to phase out steam engines and bring its fleet, infrastructure, telecommunications, and signaling up to international standards. US companies should be competitive in contracts calling for diesel locomotives and technology, automated signaling equipment, machine tools, and components such as braking systems.

Safety equipment has recently become an important feature of China's railway modernization program. In response to a number of fatal rail collisions in 1988, Railway Minister Li Senmao (whose predecessor, Ding Guangen, resigned last March after three crashes killed over 150 people), announced that around $1.1 billion will be spent over the next three years to improve railway safety. Most of the money will go toward installing radiotelephones, cab signaling, and automatic stop devices on locomotives. Other types of technology, such as axle temperature infrared inspection systems and rail defect-detecting vehicles, will also be purchased. MOR plans to step up replacement of track from 4,000 to 4,500 km per year in 1989, as at least three of the major 1988 accidents occurred due to track breakage. Experts estimate that China has 12,860 km of worn-out track—or 21 percent of the entire network—with 10,722 km in urgent need of replacement.

Boosting railway exports

Despite the enormous size of China's railway manufacturing sector (over 100 enterprises employing more than 380,000 employees), and its heavy foreign exchange requirements, railway enterprises have engaged in minimal export trade, usually barter or countertrade deals with East European countries. In an attempt to boost exports, the China Railway Import and Export Corporation (CRIEC) was established last July (*see* box). In its first three months, CRIEC signed contracts worth over $5 million, including $200,000 worth of locomotive frames, rockers, and brake shoe pin exports to the United States and Australia. However, China still has difficulty fulfilling State production targets for track, locomotives, and railway cars due to low State purchase prices and shortages of electricity and raw materials, so imports are likely to greatly exceed exports for some time to come.

Railways to remain transport linchpin

China's railways have been able to cope with an unprecedented explosion in traffic with relatively small investments by greatly increasing the productivity of existing equipment and facilities. But transportation backlogs are growing, and productivity gains will probably not be able to absorb such a significant share of increased demand in the future. The productivity of China's railway network is already among the highest in the world.

Meeting growing demand will require major investments in technological modernization. Increasing rail throughput will require heavier, faster, and more frequent trains in corridors that are already congested. This can be accomplished only with improved operating information systems, telecommunications, signaling, and much greater reliance on computerization in general.

The strategic planning component of the World Bank's Fourth Railway Project will help China assess its needs in telecommunications and operating information systems, as well as provide state-of-the-art tools for network capacity simulation and analysis to help evaluate alternative operating plans and network configurations.

But even if improved technology yields a 50 percent increase in capacity, at current rates of growth the added capacity would be absorbed in less than five years. And pent-up transport demand is so great that there is little likelihood of these growth rates diminishing—only a radical reduction in demand for coal (which is unlikely) would have a significant impact.

Much of the traffic now carried by railways could be more economically served by other modes of transport. Many short hauls of both freight and passengers, for example, could be moved more economically by trucks and buses; some dry bulk traffic (including coal) could be transported most efficiently by rail to nearby ports, and thence by coastal shipping; and many long-distance passengers could travel more economically by air (over 50 percent of the 258 billion pkm in 1986 were generated by passengers on trips of 1,000 km or longer). The Chinese have used a combination of mechanisms, such as increases in freight tariffs and passenger fares, as well as administrative measures, to encourage some of the desired diversions. But since the other transport modes are even less developed and increasingly congested, further diversion from rail transport will be constrained for the foreseeable future.

To relieve all the transportation bottlenecks that constrain China's economic growth thus requires major investments in all forms of transportation. But as travel and shipping demands grow with the economy, the vital railway network must stay in the forefront of transport modernization. 完

US–China Business Council files

An updated model of this "East Wind" locomotive produced in a technology cooperation agreement with General Electric is now being tested in Dalian.

PORTS

Paul Jensen

One of the major goals of enhancing China's interior transportation networks is to move materials more smoothly to the coastal ports, which play a key role in getting goods in and out speedily, safely, and cost-effectively. Recognizing the critical role ports play in modernization, Chinese planners began in 1981 an extensive port modernization and expansion program in order to increase capacity and efficiency, and decrease layover time for ships in berths (*see The CBR*, Jan–Feb 1983, p. 14).

Have these efforts paid off? The answer, overall, is yes. While certain vessels, particularly those carrying grain, coal, and steel, still encounter delays and cargo congestion in some ports, China's efforts to construct new facilities and modernize existing ports has led to a steady growth in both handling capacity and efficiency. In 1980, China's ports handled about 150 million tonnes. By 1985, the cargo volume had doubled, and in 1987, the country's 227 serviceable 10,000 deadweight tonne (dwt) berths handled a total of 370 million tonnes of cargo. During the same period, the average lay time—the amount of time it takes a vessel to load or discharge its cargo—for foreign vessels also improved. Between 1985 and 1986, for example, the average lay time for foreign ships declined from 11.1 to 7.32 days. The figure decreased to an average of 7.17 days in 1987, for a total drop of 35 percent over three years.

Container transportation has also increased substantially since 1985. For example, Huangpu Port in Guangdong Province, which in 1985 handled 46,000 TEUs (20-foot equivalent units), handled 52,000 TEUs in 1986, 57,200 in 1987, and there have been estimates that 90,000 TEUs were handled in 1988. (The surge between 1987 and 1988 is primarily due to the opening of China Ocean Shipping Co. (COSCO) service between Huangpu and the US West Coast in May 1988.) China now has an estimated container capacity of 800,000 TEUs per year. (By contrast, the Port of Seattle will handle more than 1 million TEUs in 1988.)

China's port projects have not only facilitated foreign trade and improved operations for foreign ships, but have also provided business opportunities to foreign investors and equipment manufacturers. As China continues to pursue its three-pronged port modernization strategy—increasing the size and number of berths and attendant storage facilities, using more specialized equipment, and enhancing the efficiency of port management—foreign involvement in this area is likely to grow, with both short-term profits and long-term benefits in terms of improved port facilities.

Foreign vessels loading or discharging flowable bulk cargoes such as grain or coal, however, as well as ships discharging difficult cargoes such as steel, can still expect delays in some ports.

Building more and deeper berths

Increasing the number of berths—especially large, deepwater berths—has been a key element of China's port modernization, since larger vessels can take advantage of economies of scale in cargo handling. During the Sixth Five-Year Plan (1981–85) construction commenced on 132 deep water berths of 10,000 dwt or more in 19 ports, of which 54 have been completed. The Seventh FYP (1986–90) continues the push to modernize ports, with a completion target of 120 deepwater berths and 80 smaller berths.

Qinhuangdao in Hebei Province, for example, a vital coal exporting port, began work in the early 1980s to supplement its original wooden finger pier with four mechanized coal berths, one for 20,000 dwt vessels and three for 50,000 dwt ships.

Construction at the Beilun deepwater terminal at Ningbo port in Zhejiang Province also highlights China's commitment to enlarging deepwater capacity. The new berths accommodate large ocean vessels: one 100,000 dwt and two 25,000 dwt berths for iron ore carriers are already completed, along with a 25,000 dwt general cargo berth. The second phase of the project, scheduled for completion in the early 1990s, will consist of three 30,000–50,000 dwt berths, one for container ships and two for general cargo ships. Long-range plans call for three additional deepwater berths.

With its 17-meter draft, large container and general cargo berths, and lack of siltation problems, the Beilun terminal will provide efficient facilities for large modern container ships and bulk carriers, which are rarely used in China now. In addition, Ningbo's close proximity to Shanghai will help relieve congestion in that overburdened port.

In Tianjin, the Dongtudi project will add 11 new berths for vessels up to 25,000 dwt. A two-stage project now underway in Dalian's Dayao Bay will add two 30,000 dwt container

Paul Jensen is an independent consultant on market development and operations management in Asia. A former ship's officer with extensive sales and negotiating experience, he managed marine cargo operations in China for several hundred ships while working for the Weyerhauser Co. from 1980–85.

berths and two general purpose berths for 25,000 dwt ships by 1992, when China expects to have a total of 1,200 berths in coastal and lower Yangtze River ports with a total annual capacity of 550 million tonnes.

Bringing aboard modern equipment

Providing berths for more and larger ships will not decrease congestion, if the ports lack adequate equipment to load and unload quickly. Chinese planners have actively addressed this problem by upgrading and improving specialized equipment to facilitate handling of flowable materials, break-bulk goods, and containers, with favorable results in the past several years.

In Qinhuangdao, for example, coal loading efficiency at shipside has been dramatically improved since 1980, when small gondola cars were unloaded by hand and shovel in the storage yard and then laboriously transferred yet again to the ship's cargo hold. In 1983, the port installed two 6,000-tonne-per-hour automated ship loaders from Japan. These rotary dumpers pick up the rail cars and dump the coal onto the ship, bypassing the storage yard altogether. In addition, the port's coal storage yard has been expanded, and modern stackers and reclaimers added. Qinhuangdao's coal terminal now has an annual throughput of 20 million tonnes.

The new Ningbo ore terminal is equipped with two 2,100-tonne-per-hour clam shovels for unloading, and two ship loaders, each served by 4,200 tonne-per-hour conveyers. This set-up represents a vast improvement over the old slow-moving, 10-tonne cranes. Tianjin's newly refurbished grain terminal is also equipped with two conveyers that can move 1,000 tonnes per hour of grain from ship to silo. Tianjin is now also equipped with pneumatic loaders and unloaders for grain (*see* box).

China must also begin to provide more cranes to replace the slow, 10-tonne general cargo cranes most Chinese wharves now use for loading and unloading. Because the cranes used now sit right on the edge of the dock, they restrict the flow of large trucks, log stackers, and other loading and unloading equipment. Most cranes should be replaced with larger cranes that can transfer heavier loads. Although larger equipment can also cause congestion alongside ship, the increase in tonnage per cycle will compensate.

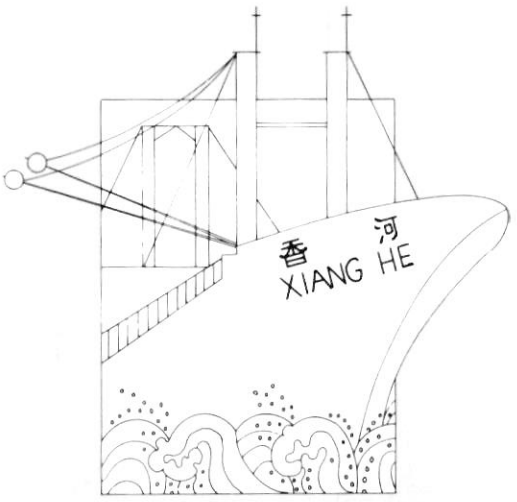
China's slow but steadily increasing use of containers will eventually require most ports to invest in specialized container-handling equipment. In 1983, for example, China handled 224,000 containers totaling 1.5 million tonnes of cargo, or 0.6 percent of China's total cargo handling. In 1987 the total had risen to 1.5 percent of cargo handling, or 689,000 containers with 5.2 million tonnes of cargo. Planners estimate that by 2000, containerized goods will comprise 5 percent of China's cargo, and will require 3.8 million containers.

Tianjin, Huangpu, Shanghai, and Dalian ports have already purchased modern container cranes from Japanese companies such as Hitachi, Ishi Kawajima Harima Industries (IHI), and PACECO, a subsidiary of General Electric Corp. These ports are now adequately served by modern transtainers, which are crane vehicles that hoist a container from the top and move it short distances on the wharf. In the early 1980s, by contrast, transtainers in Tianjin—now China's showcase for state-of-the-art container facilities—sat idle due to a lack of parts.

Installing modern equipment may create new problems even as it solves old ones. Some docks, built years ago for a previous generation of vessels and equipment, cannot support much larger and heavier modern equipment. Some of the equipment China purchased in the early 1980s, such as a set of large mobile cranes bought for Shanghai's wharves, sat idle for years because the dock for which it was purchased couldn't support the loaded weight. Shanghai still needs much in the way of dock renovation, perhaps more than any other Chinese port due to its extremely heavy use. Few docks, however, do not need fortification, and Chinese port managers should be devoting more attention to this area.

Localizing port authority

Chinese ports have become noticeably more responsive to problems ranging from creaky docks to antiquated equipment, in part because of the bureaucratic decentralization of port management ongoing since the mid-1980s. Formerly operating as



Ten years after a massive development program began, China's ports are a modernization success story, though laytime and handling capability for certain goods could improve still more. The secrets? Large capital investment, a balance between central and local authority, and strategic purchases of foreign equipment. Other transportation sectors may find it difficult, however, to follow the example of ports, whose frontline role in foreign trade gives them unusual bureaucratic and financial clout.

Photo courtesy of the Port of Seattle

Key foreign equipment purchases have done much to improve Chinese ports. These container gantry cranes, built by a Chinese factory under license from Paceco, were installed in late 1988 at the port of Dalian.

MOVING FORWARD BY MOVING BACKWARD

China's grain production and import patterns over the past several years highlight the difficulty of long-term port planning. Back in the 1970s, China began importing large quantities of grain, which was unloaded in the ports via small, movable conveyers filled from the ship's hold and carried to warehouses a few dozen yards away. There the grain was repackaged for transportation inland. The small conveyer tubs took weeks to empty a large ship, and the grain had to be handled twice before it even left the dock.

After analyzing and projecting the country's grain consumption trends, Chinese planners began in the early 1980s to install high-volume, high-speed conveyers and other modern equipment that greatly facilitated the unloading of grain at ports such as Tianjin. The new economic policies of recent years, however, complicated the neat production and import formulas on which the planners had relied. Although China's grain production still did not meet domestic demand, increased emphasis on exporting took some of the grain out of China and into new markets in South Korea and Japan. To maximize foreign exchange profits, Chinese ports needed to move grain twice as efficiently as before—but in the other direction. The existing systems designed to transport grain from ship to shore could be used for the reverse operation only after lengthy and costly modifications—an expense that no one could have anticipated nearly a decade ago.

Photo courtesy of Paul Jensen

Small grain conveyors took weeks to unload ships.

Some ports, such as Tianjin, can now move grain in both directions. But port planners are still trying to predict China's future grain consumption, purchase, and sales patterns in order to equip all facilities adequately. Will China be a net grain exporter, or an importer? Which regions will be involved in foreign grain trade? Will domestic economic policies 10 or 20 years from now continue to promote exports, or will the pendulum swing back to self-sufficiency? Will other crops requiring different types of transport equipment be encouraged as export items? For Chinese port planners, these are million dollar questions. —PJ

subsidiary branches of the Ministry of Communications (MOC), the ports of Tianjin, Dalian, Qingdao, Yantai, Lianyungang, Nantong, and Huangpu had all been placed under local management by late 1986, leaving only a few key ports, such as Qinhuangdao, still administered by MOC itself. These new port authorities are generally a combination of the previous local port management staff and municipal officials.

Decentralization has given the local port managers not only more authority, but also financial incentives to operate efficiently. Until two or three years ago, local ports rarely used their authority to make despatch and demurrage agreements for the vessels moving through their ports, because all revenues went to Beijing and penalties were handled centrally as well. (*Despatch* is the bonus paid for expeditious service. *Demurrage* is the penalty or compensation paid when a vessel is delayed.) When foreign shipowners insisted on negotiating arrangements directly with the port, authorities generally requested extremely high despatch incentives, and the regulations were worded in such a way that foreign cargo or vessel owners received little protection in the event of delays.

With authority less centralized, ports may now keep a greater proportion of their revenues, and thus have greater incentive to move goods efficiently according to depatch and demurrage agreements. Recent reports from foreign shipowners suggest that China's despatch and demurrage situation has seen noticeable improvement, though some ports still have a way to go.

Foreign shipowners are also moderately encouraged by a general improvement in the attitudes of port managers. Dalian, for example, has instituted quality control circles along the Japanese model, to focus attention on facilitating and improving services. Although it's difficult to measure the true impact of such measures, the trend toward better management is an encouraging one.

New rules and new players

Giving Chinese ports increased authority and financial incentives has improved overall operating efficiency, but also—not surprisingly—caused headaches for foreign ship operators. Where once foreign oper-

ators bringing many ships into Chinese ports could count on established relationships with central MOC officials, now they must pursue relationships and agreements with individual port managers, some of whom are not yet sufficiently familiar with Chinese procedures, not to mention international norms and standards. And as in ports throughout the world, some of China's port managers are not averse to accepting payment to expedite services. Conducting negotiations at each port thus adds considerable time and expense to the cost of doing business for foreign shipowners.

The establishment of several new Chinese shipping agencies has also complicated the picture. In the past, the MOC's China Ocean Shipping Agency (known familiarly by its cable tag, PENAVICO) acted as agent for all foreign parties. In April 1988, a new shipping agency called Sino Agents formed by the China National Foreign Trade Transportation Corp. (SINOTRANS) was authorized to act as ship's agent for any foreign vessel. On the one hand, foreign owners see Sino Agents as welcome competition to PENAVICO, which they have not always been convinced will vigorously defend their interests, when they conflict with those of local port authorities. On the other hand, owners are not sure that local port authorities will cooperate with Sino Agents, which is not only inexperienced but a direct competitor of MOC. As of late 1988 there was no record of a foreign shipowner's retaining Sino Agents, although some interest had been expressed.

Both Tianjin and Dalian ports have also announced plans to operate their own shipping agencies. While foreign ship operators hope that these developments may increase efficiency and reduce costs, it is also possible that the agent will defend the port over the owner's interest.

Out of port, out of sight

One of the biggest problems for foreign shipowners starts in the port—but continues well beyond it. China's poorly coordinated intermodal transport system means that once containers leave the port, they become difficult to trace. The port itself is responsible for the loading of containers in the con-

tainer yard, but once the containers are discharged, they become the joint responsibility of PENAVICO, which handles all the paperwork, and SINOTRANS, which arranges for rail or truck transportation inland to the final destination. Although this trio of port and agents works well in other countries, in China communication is not effectively coordinated among the parties involved, and thus many containers are lost without trace upon leaving the port. The problem is exacerbated by some cargo receivers, who simply hold onto the containers and use them for storage. Significant improvement in port management skills and the introduction of computers will be needed to facilitate container tracing.

Clearly it will take many years to eliminate the problems involved in moving goods both in and out of ports, including inadequate highway and rail networks and lack of computerized communication. In the meantime, intermodal transportation more than 200–400 km from the port will remain difficult and costly.

Seeking foreign funding

Foreign involvement in China's port projects began in 1979 when the Japanese Overseas Economic Cooperation Fund (OECF) pledged $1–$2 billion in loans to China, a significant part of which went to port projects. Since then, Japan has allocated J¥126 billion in loans for various port projects in China, with much of the money going toward foreign equipment purchases. The World Bank has also provided $383 million worth of loans for port renovation and expansion projects in Huangpu, Shanghai, Tianjin, and Dalian, and plans to support projects in Xiamen and Ningbo. Most of the foreign involvement has taken the form of equipment sales. Some design and management assistance has

SEA STORIES

In the early 1980s, Chinese ports had an assortment of chronic problems—congestion, delays, inefficiency—compounded with some uniquely Chinese characteristics. Just as the first foreign negotiators for joint ventures were exasperated by the Chinese tactic of invoking "secret" rules and regulations, foreign ship operators found that such simple tasks as determining whether a ship would fit into a designated berth were hampered by the port auhorities' restriction of standard berth information "for security reasons."

While calling a certain port in those early years, for example, we were told that the only berth large enough for our 26,000 dwt ship had a draft of 9 meters. The port managers would not say more, which left us with no idea of the actual depth or contour of the berth's bottom—vital information, since we knew from experience that this port had problems with siltation, so depth and contour could change from time to time.

We got the ship into port safely, and began the lengthy unloading process. All went smoothly until one afternoon when the tide went out. The ship hit bottom and began to list to starboard. In order to take proper action the captain asked the port managers the exact depth of the water—but if they knew, they weren't telling. Cargo operations were halted, at great cost and inconvenience, until the tide came back and the ship righted itself.

That incident taught us to take exceptional precautions, which ultimately reaped rewards. Later that night, the ship sent out a seaman equipped with a hand lead to sound the berth—an action of questionable legality in China. Our captains repeated the procedure in every port they called in the next months, and thus avoided unpleasant surprises. The foreign operators further learned to protect themselves against such incidents by rewriting sales contracts to absolve the ship of responsibilty for delays in which lack of details on berths resulted in loss of loading or unloading time. Finally, the managers of that port, perhaps feeling a bit guilty, procured for the ship a copy of China's tide tables—which, if not officially a "secret" document at the time, was nevertheless extremely hard to come by.

* * * * *

Delays in loading and unloading, which could run into weeks and cost millions of dollars, motivated ports, ship operators, and cargo owners to protect themselves against financial responsibility for such problems. One tactic Chinese port managers used, for example, was to avoid clearing the vessel for loading/discharge.

In most contracts, lay time, or the time specified for loading or discharging, is calculated from the time the vessel delivers formal notice that it is ready to work. Such notice is normally delivered in writing when a ship first arrives off the port and is inspected by the relevant authorities. To avoid taking responsibility for delays while in port, some Chinese port managers would simply refrain from boarding and clearing a ship when it first arrived. They could then maintain, with some legal justification, that lay time hadn't begun, since no formal notice of readiness had been received. Thus the time the ship spent waiting before notice was received by the port became the ship's responsibility—and expense. As in situations where they lacked adequate berth details, foreign ship operators had to rewrite sales agreements and ship chartering contracts to cover these contingencies.

* * * * *

The one thing I feared most during my days on ships calling Chinese ports was that a Chinese worker would get hurt aboard one of our chartered vessels. The unsafe labor practices of some workers made that almost inevitable, as we were putting over 50 ships into Chinese ports each year.

One day in 1981 I was notified in Beijing of an accident aboard one of our ships in Shanghai. I hurried south nervously, mindful of tales told by an English friend of mine about calling Chinese ports during the Cultural Revolution. At that time, when accidents happened aboard foreign ships, the captains were taken straight to jail, until Chinese demands for compensation were met—regardless of the accident's causes. Thus I had no idea what to expect, where I would find our South Korean captain, or what it would take to get the vessel released.

I was astonished, therefore, to find the vessel unloading normally. The ship's captain, relatively calm, introduced me to the harbor district safety officer, who explained that only that day he had warned the victim, a longshoreman, to stop discharging logs only from the center of the hold. While this makes unloading easier, it also destabilizes the cargo. The Chinese worker ignored the warning. Hours later, the cargo shifted and, sadly, crushed the man to death.

The safety director noted that the accident was clearly the longshoreman's fault, as the vessel's equipment and stowage were found to be in perfect order. Cargo operations continued as usual, the appropriate forms were signed, and the incident was closed—confirming my impression that for every devious port official was at least one other who performed with great professionalism. —PJ

also been provided.

Much of the first foreign equipment China purchased came from Japan, because the OECF loans were tied. More recently, however, German, British, and US firms have made major equipment sales. While Chinese admire American port operations technology, until recently US firms have not been price competitive compared with Japanese and European competitors, and have had only moderate success in this market. The drop in the dollar should make US companies more competitive.

Although China is increasing its domestic capability to build equipment such as cranes and transtainers, newer ports will continue to require foreign equipment for some time.

Investing in port projects

In addition to selling equipment, a number of foreign companies have formed joint ventures with Chinese port authorities and equipment manufacturers. Guangdong's Huangpu Port, for example, reportedly has 15 foreign-invested joint ventures with the port authority to date. One such venture with a Hong Kong company, for example, operates a small passenger ship equipped with a restaurant and night club for tourists traveling between Guangzhou and Hong Kong.

Photo courtesy of Paul Jensen

Small movable cranes such as these are easily maneuvered around the wharf, but can cause congestion shipside, and in most ports should be replaced with large stationary cranes.

The port of Tianjin also has several joint ventures with foreign companies. One, with Japan's Sankyu, provides chassis for the movement of containers. Another Tianjin venture with a Hong Kong subsidiary of Holland's Royal Nedloyd Group has committed $9 million for the contruction of bonded warehouses within the port. When the facilities are completed, probably by 1995, the total storage area will be 130,000 sq m, with an additional 20,000 sq m for offices and ancillary services. Increasing the number of such facilities, which are common in North America and Europe, will relieve some of the congestion on Chinese docks and in short-term storage areas. An additional advantage is that shippers may store imported goods in bonded warehouses without paying duty.

The Tianjin venture may serve as a model for future bonded warehouses in other ports, and MOC officials have actively explored this and other possibilities for Sino–foreign cooperation through visits and exchanges to such ports as Rotterdam, Yokohama, and Seattle. Other joint venture opportunities may exist in container-management systems, hazardous-cargo handling, and other aspects of port operations.

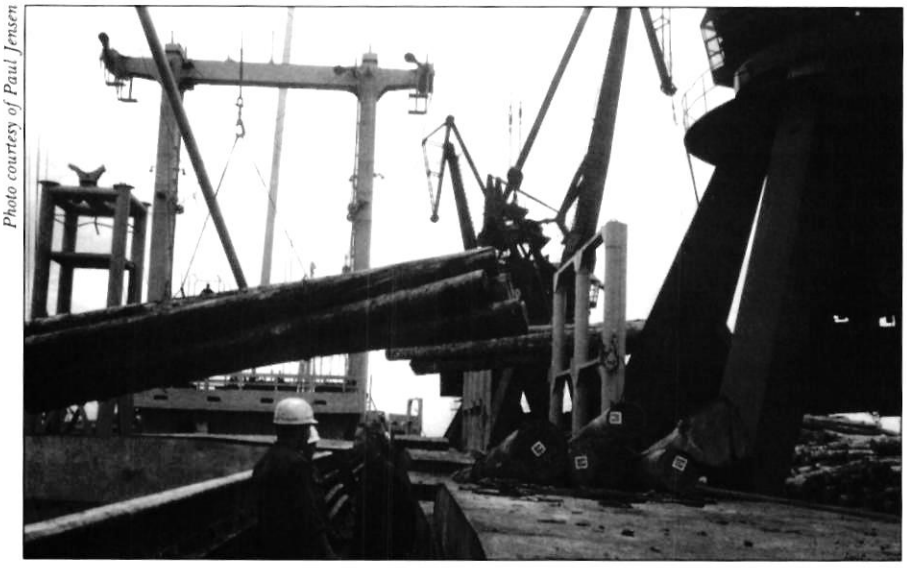


Photo courtesy of Paul Jensen

Laytime in Chinese ports has decreased significantly for a number of major cargo commodities, including round logs.

Although China has spent only a small portion of total port modernization funds on foreign equipment, its impact has been substantial, and in many cases critical to increasing throughput and decreasing laytime in several of China's major ports, including Shanghai, Tianjin, and Qinhuangdao. As equipment sales stabilize sometime in the future, joint ventures such as bonded warehouses between foreign companies and Chinese ports present the greatest potential for cooperation. Foreign companies will have to take the lead in identifying and exploring these opportunities—and Japanese, American, and British firms, among others, are actively scouting the territory.

Staying the course

China's ambitious port modernization program, now in its intermediate stage, seems to be keeping pace with current and projected demands. Foreign shipowners will continue to see improvements in laytime, cargo handling, and storage and staging operations as projects now underway are completed in the early 1990s.

Movement of cargoes such as round logs, which regularly encountered long delays and caused major congestion in the past, is now usually very smooth. Hard to handle cargoes such as coal, grain, and steel, however, are still subject to significant delays. Container transportation to and from China's ports and within a small radius around these ports is relatively efficient, if expensive.

Decentralization is breaking up the old monopolies and will continue to lead to improved service. For now, however, both Chinese and foreign organizations are grappling with the inevitable confusion, as organizations adjust to a new operational structure. New ship's agents such as Sino Agents may offer competitive rates, but their own inexperience and the distrust of port authorities make them an unknown quantity for now.

While China's ports will take years, if not decades, to function as efficiently as such ports as Singapore or Kobe, they have not only improved considerably in a short time, but are more effective than some other major Asian ports. In Bangkok, for example, severe congestion and delays have earned the wrath and sanctions of international shipping organizations. Bangkok's notorious crane cartel has also driven up costs and inefficiency for years, first by attempting to monopolize the market, then by charging exorbitant fees. Despite a recent surge in illicit practices accompanying decentralization of authority, Chinese port managers are a long way from the ranks of Asia's most corrupt.

As ports continue to improve, China's major challenge will be to fully coordinate river, rail, and highway networks to get goods in and out of ports faster and more reliably, to prevent simply shifting tranportation bottlenecks. If other transportation sectors develop as quickly and impressively as ports have done in this decade, China should reap a substantial return on its investment in port development. 完

TRANSPORTATION CALENDAR

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URBAN MASS TRANSPORTATION SYSTEM SYMPOSIUM & EXHIBITION. March 7–12, 1989. Guangzhou. Exhibits include metro trains, metro communication, control, monitoring, and power supply systems. *Contact:* Coastal International Investment Consultants Co., Ltd. in Hong Kong (Telex: 80295 CIICR HX).

1989 INTERNATIONAL AUTO PARTS AND ACCESSORIES SHOW. March 20–25, 1989. Beijing. Exhibits include automotive electronics, parts, accessories, and manufacturing technology. *Contact:* Zhou Guochang at China Chamber of Commerce for Auto Import and Export in Beijing (Telex: 22656 CNAIC CN).

CHINA AVIATION MAINTENANCE 89/CHINA'S 1ST AVIATION MAINTENANCE & GROUND SUPPORT 89. April 20–24, 1989. Beijing. Exhibits include aircraft maintenance services, aircraft maintenance and protection equipment, ground support, hangar equipment, instrumentation, tools, inspection equipment, corrosion control and prevention, and diagnostic and testing equipment. *Contact:* Larry Tang at Tradeshow Consultants International Ltd. in Hong Kong (Telex: 49690 EXPCO HX).

TRANSPO 89/INTERNATIONAL CONFERENCE AND EXHIBITION ON TRANSPORT. May 7–13, 1989. Beijing. Exhibits include road construction and repair equipment, traffic safety and control technology, road transport technology, road environment protection equipment, coach bus manufacturing technology and equipment, auto maintenance equipment and tools, and auto energy-saving equipment. *Contact:* Qie Weizhou at Technology Exchange Center of Road and Water Transport of the Ministry of Communications in Beijing (Telex: 22462 COMCT CN).

ENGINE CHINA 89/INTERNATIONAL EXHIBITION ON ENGINE TECHNOLOGY CIMAC 89. June 4–9, 1989. Tianjin. Exhibits include diesel engines, gasoline engines, gaseous fuel and alternative-fuel internal combustion engines, turbo chargers, engine parts and components, ceramic engines, instrumentation, testing facilities and instruments, machine tools for engine parts and components, and package products. *Contact:* Commedia Associates in Hong Kong (Telex: 62489 CANID HX).

AUTOMOTIVE CHINA 89/INTERNATIONAL EXHIBITION ON AUTOMOTIVE INDUSTRY. July 5–10, 1989. Shanghai. Exhibits include cars, buses, light and heavy trucks, motorcycles, engines, coachwork, chassis, electronic equipment, automotive manufacturing and maintenance technology, and traffic control systems. *Contact:* Monica Kan at Adsale Exhibiton Services, 618 Royal View Street, Duarte, CA 91010 (Tel: 818/359-4653).

HARBOUR 89/INTERNATIONAL EXHIBITION ON HARBOUR FACILITIES AND CONSTRUCTION EQUIPMENT 89. August 8–12, 1989. Guangzhou. Exhibits include port handling equipment; port electrical and communications equipment; underwater systems; rescue, diving and navigation equipment; inspection and testing apparatus; and contamination prevention technology. *Contact:* Coastal International Investment Consultants Co., in Hong Kong (Telex: 80295 CIICR HX).

SPACE 89/4TH CONGRESS ON EXHIBITION OF THE INTERNATIONAL ASTRONAUTICAL FEDERATION. October 7–12, 1989. Beijing. Exhibits include equipment, components, instruments, materials related to aerospace and models and pictures of aerospace vehicles, shuttles, satellites, aerospace engines, and space orbital stations. Contact: Look Ease Enterprises, Ltd. in Hong Kong (Telex: 61011 LKEEL HX).

AVIATION EXPO/CHINA 89. October 17–20, 1989. Beijing. Exhibits include aircraft; aircraft engines; air traffic control and navigation technology; air defense technology; avionics; aircraft production and components; rocket, missile, space, and satellite equipment; and maintenance and overhaul equipment. *Contact:* Linda Davidson at Glahe International, 1700 K Street, NW, Suite 402, Washington, DC 20006 (Tel: 202/659-4557), or China Promotion Ltd. in Hong Kong (Telex: 76270 CHOCH HX).

AUTO CHINA 90/INTERNATIONAL AUTOMOBILE MANUFACTURING TECHNOLOGY AND EQUIPMENT EXHIBITION. June 20–25, 1990. Exhibits include cars, articulated and double-decker buses, trucks, special purpose vehicles, auto parts, electronics, generators, and accessories. *Contact:* Hu Junmei at China International Exhibition Center in Beijing (Telex: 210214 CEXHN CN).

TRANSPORT EXPO 90. August 28–September 1, 1990. Guangzhou. Exhibits include planning, maintenance, and construction systems and equipment for land, port, and air transportation. *Contact:* Coastal International Investment Consultants in Hong Kong (Telex: 80295 CIICR HX).

Compiled by Paul Abrahamse.

HIGHWAYS

Chen Yuanhua

Sometime in an idealized future, enterprises throughout China's hinterland will send vital raw materials and sophisticated consumer goods along an extensive, high-grade highway network to factories for processing and to ports for distribution abroad. But this vision is a long way from the honking, congested reality of road travel in China today. Most of the country's 995,000 km of roads are low-speed thoroughfares on which farmers bring produce to market on mule carts, and bicycles and tractors compete with weaving cars for right of way.

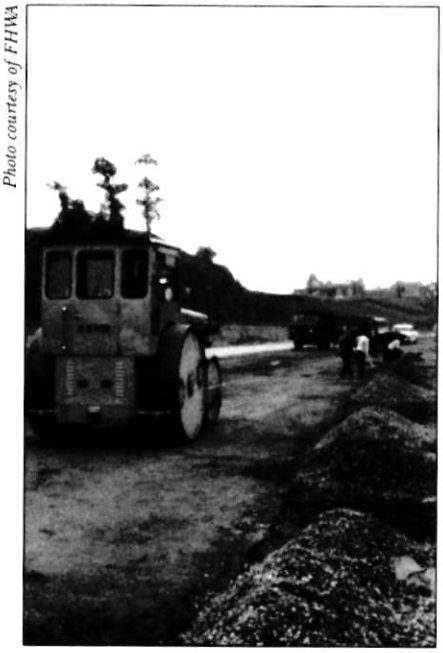
Until recently, China simply ignored the problem, building few new highways and allowing heavily traveled roads to deteriorate. Now, however, China is devoting serious attention to highway planning. The Seventh Five-Year Plan (FYP) allocates more money than ever before for construction, and planners have found ways to share the financial burden with road users.

Recognizing the magnitude of the work required to upgrade and maintain its highway network, China has opened the door to foreign involvement in highway construction, seeking funding as well as design and construction assistance. So far, however, US firms, despite their expertise, have failed to get a firm foothold in this burgeoning market.

Changing transport needs

China has a fairly extensive network of roads linking all of the nation's counties—except one in a remote part of Tibet—and some 95 percent of its towns. However, only 83 percent of the roads are all-weather (surfaced mostly with mixed bitumen, sand, and gravel), and only

Photo courtesy of FHWA



24 percent of the surfaced roads are paved with high-standard concrete. By comparison, almost one-third of the Soviet Union's 1.5 million km of roadways are surfaced with asphalt or concrete.

Until a few years ago, officials favored railways over highways almost exclusively. But as reforms changed the structure of the Chinese economy, planners began to realize that transport needs would no longer be met simply by improving the efficiency of hauling goods long distances via rail. Besides, the railway network was already extensive on the east coast, and rail capacity was saturated.

Agricultural decentralization, along with growth in the light industrial and service sectors, has dictated that more freight be moved by truck, with smaller loads being transported shorter distances. Provinces and industries are increasingly interdependent, with more factories now producing parts that are shipped out for assembly rather than finished in-house. An increase in domestic processing of goods has also increased the number of short hauls, which trucks can usually make more efficiently than trains.

These factors have combined to increase pressure on China's highway system, with the amount of freight transported by road growing 17 percent annually between 1980 and 1987, and passenger traffic rising 15 percent over the seven-year period. In 1988, about 7 billion tonnes of freight traveled on China's roads. Existing roads, which are poorly routed, congested, and rundown, cannot much longer stand up to the growing strain.

Making up for lost time

The Seventh FYP (1986–90) marked the beginning of a concerted effort to address the problems afflicting road transport by raising highway spending to a record ¥2.7 billion annually, which represents 16 percent of the transportation budget—up from 14 percent in the previous FYP. In 1986 the government built more high-quality roads and bridges than ever before: 20,368 km of roads were constructed and 15,000 km repaired, and of the new roads, 2,855 km were high-speed roadways of class 1 or 2 (*see* chart). That year also saw construction of 4,945 bridges.

By the end of the Seventh FYP in 1990, China will have added at least 60,000 km of new roads and reached a nationwide total of 1 million km. The new roads will include 1,600 km

Chen Yuanhua is an officer of foreign affairs at the Ministry of Communications, and a World Bank consultant temporarily residing in Washington, DC.

CHINESE HIGHWAY SPECIFICATIONS

Classification	Expressway	Class 1	Class 2	Class 3	Class 4
Design speed (km/hr)	120	100	80	60	40
Width of carriageway (m)	2 × 7.5	2 × 7.5	9	7	3.5
No. of lanes	4	4	2	2	1-2
Maximum longitudinal grade (%)	3	4	5	6	6

SOURCE: Chen Yuanhua

of class 1 roadways and expressways, and 10,000 km of class 2 roads. To ease some of the strain on high-speed roads, the government has also begun upgrading 80,000 km of existing roads. Plans concentrate on building intercity trunk roads that will connect smaller roadways, and building or upgrading 42 trunk roads, 27 of them by 1990.

In line with China's overall development strategy, highway construction has priority in developed areas along the coast. Other goals include linking major ports, building highways along coal-transport routes, relieving railroad congestion by funneling traffic away from railway bottlenecks, and finally, improving access to major cities and tourist areas.

Casting a wider net for funding

Faced with capital shortfalls, the central government is looking abroad for partners to share the burden of financing roads. China's government gave the go-ahead in 1987, for example, on what will be the country's first privately owned road. Much of the $1.02 billion funding for an expressway between Guangzhou and Zhuhai in Guangdong Province is being provided by Hong Kong's Hopewell China Development Co. and a Chinese partner, the Guangdong Provincial Highway Construction Co., which will build, own, and operate the road for 30 years (*see* table, p. 28).

Foreign loans, primarily from the World Bank, have accounted for roughly 22 percent of funds for highway construction since 1986, with the rest of the money coming from various levels of China's government. Local governments use up to 25 percent of the maintenance fee collected from road users to finance new construction, and they also sell domestic bonds, mostly to finance construction of toll roads, since proceeds from the tolls can be used to repay bond holders.

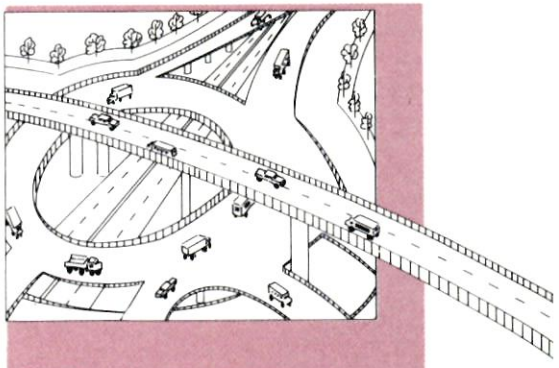
In 1985, taxes on road users provided two additional sources of road revenue. A fee imposed on vehicle purchases supplemented irregular government allocations for

LENGTH AND TYPE OF CHINESE ROADS, 1980–86

(×10,000 km)	1980	1985	1986
Class 1	.0196	.042	.075
Class 2	1.26	2.12	2.37
Class 3	10.80	12.85	13.68
Class 4	40.60	45.63	47.64

TOTAL KM OF CHINESE ROADS, 1950–88

	1950	1960	1970	1980	1988
Total km (×10,000)	9.96	51	63.67	88.83	99.5



Beijing's ambitious plans to take pressure off the railways by expanding the highway system have attracted international financing and expertise, and encouraged foreign companies to scout out engineering and equipment sales opportunities. But China is still miles away from turning today's few thousand kilometers of high-speed roads into a system extensive enough to support a significant share of the country's passengers and freight.

CHINESE HIGHWAY PROJECTS

Expressways and Highways Under Construction

Shanghai–Jiading expressway, 20 km, begun in 1985, expected to be completed this year.

Shanghai (Xinzhuang)–Songjiang expressway, 20.5 km, expected to be completed in 1990.

Guangzhou–Foshan highway, 23 km, begun in 1986, scheduled for completion this year at an estimated cost of $51.46 million.

Guangzhou express ring road, 57 km around Guangzhou, begun in April 1987 and scheduled for completion this year at a cost of $29.8 million. The road will include traffic-control facilities and three bridges.

Guangzhou–Shenzhen–Zhuhai expressway, totaling 302 km to be built in three stages, the first 120 km to be completed in 1990. The Hopewell China Development Co. Ltd. in Hong Kong will provide 85 percent of the funding for the $1.02 billion project. Hopewell and the Guangdong Provincial Highway Construction Corp. will build and own both the road and related businesses, such as service stations and restaurants, in a 30-year joint venture arrangement.

Xi'an–Tongchun road, Shaanxi Province, scheduled for completion before 1990. The World Bank will finance 34 km of this 100 km road.

Beijing–Tianjin–Tanggu expressway, 142.5 km, approved in 1987. The four-lane divided highway—China's first intercity expressway— will include 52 bridges, 106 tunnels, 364 culverts, and a number of toll booths. The $275.8 million project will be funded partially by World Bank loans ($150 million), with the remaining $125.8 million coming from the central government.

Jinan–Qingdao highway, Shandong Province. Louis Berger International is doing consulting work funded by a $225,000 US Trade and Development Program grant on this 318 km, four-lane, divided road, which is scheduled for completion in 1992. The World Bank will provide funding and contracts will be awarded by international competitive bidding.

Chengdu–Chongqing highway, Sichuan Province, will total 340 km, of which 88 km will be four-lane, class 1 road and 252 km will be two-lane, class 2 road, when completed in 1995. The highway will include 90 bridges, eight mountain tunnels, and toll booths. The $399.8 million project will receive $75 million from the World Bank, of which $50 million consists of IDA credits. The central government is providing $50 million, and the Sichuan provincial government $224.8 million. The US engineering consulting firm Wilbur Smith & Associates will do consulting work for the project on a $320,000 US Trade and Development Program grant.

Shaanxi Provincial highway, 67 km linking the cities of Sanyuan and Tongchuan, will include 34 km of class one highway when completed in 1995. The project also includes upgrading of 660 km rural roads. The total cost of $117.8 million will come from the World Bank ($50 million), Shaanxi Province ($54.3 million), and the central government ($13.5 million).

Projects in the Eighth Five-Year Plan

Shenyang–Dalian highway, totaling 360 km, of which 92 km may be completed this year. Foreign funds may be sought for the remaining section.

Shanghai–Nanjing highway, 300 km. Foreign funds may be sought.

Shanghai–Hangzhou–Ningbo highway, 340 km. Foreign funds may be sought.

Nanjing–Lianyungang highway, about 400 km of class 1 road.

Dandong–Beijing highway, 1,100 km.

Nanjing–Hefei highway, 110 km.

Source: Chen Yuanhua and Council files

highway development with a steady flow of funds, while tolls for road users were raised 12–15 percent.

Vying for contracts

A portion of China's urgent need for roads can be met by upgrading existing routes, and several provinces have begun to inventory their roads with an eye to beginning a major maintenance and upgrading program within five years. However, the magnitude of needed improvements in the highway network has prompted China's expert engineers to tap foreign assistance. Since international competitive bidding (ICB) was introduced to Chinese projects in 1985, foreign companies have been competing for multimillion-dollar contracts to help build China's roads. Louis Berger International, for example, along with two Danish partners, won a more than $1 million contract in 1988 to supervise construction on the Beijing–Tanggu expressway. Sino–French and Sino–Japanese contractors won four other contracts totaling $107 million to assist in the road's construction.

US firms have not actively participated in the bidding, and US involvement in China's highway development so far has been confined to consulting projects, such as consulting work on the Chengdu–Chongqing highway by Wilbur Smith & Associates, which was funded by a $320,000 US Trade and Development Program grant.

US firms can still bid on larger construction contracts yet to awarded for the Jinan–Qingdao highway to be built in Shandong Province, and for a $100 million class 2 road scheduled for construction between Jiujiang and Nanchang in Jiangxi Province.

US contractors' currently low interest in the Chinese market may reflect a thriving market at home, where the 43,000-mile US interstate system has for decades provided ready-made contracts to US companies in return for modest marketing efforts. However, most of the work that now remains to be done consists of reconstruction and widening, and American contractors will need to begin looking for new markets. When that time comes, China, comparable in size to the United States and linked by less than one-sixth the roads, may become more attractive. 完

BUILDING A 174-MILE SHOWCASE

In the Ming Dynasty, foreign merchants, forbidden to trade openly with China, brought their wares in the guise of tribute to the emperor. If he liked what he saw, he offered "gifts" of equal value to the envoys. Now the US government is proposing to use a more modern bait for business. The Federal Highway Administration (FHWA) wants to help US companies offer China a jewel—a state-of-the-art highway—that may entice China into buying a mother lode of US expertise.

Last June, the FHWA and Chinese authorities discussed building a model highway together to showcase US expertise and to train Chinese participants in US methods of highway design, construction, and maintenance. The road would follow a 280 km route, possibly along the heavily traveled Shanghai–Nanjing corridor. The FHWA further proposed that after the highway is complete, the United States could maintain an on-site training center, staffed partly by US volunteers, to continue exchanges between Chinese and US technicians.

The proposed highway would not only help fulfill the FHWA's formal commitment to China's government to aid modernization, but also provide an entree for US highway design and construction companies as well as suppliers and equipment manufacturers to compete for China projects.

The FHWA believes that US construction companies can more profitably sell technical expertise in China than labor. Joint ventures could provide a channel into the market by permitting US companies to send only key personnel to China, while using local labor on construction jobs. The proposed US–China Friendship Highway might open the way to future cooperative ventures by creating a US presence in highway construction, providing training for Chinese workers, and giving American contractors a chance to demonstrate the outstanding quality of US highway technology.

To realize the plan, future organizers of the project must overcome major roadblocks, the largest of which is financing. An FHWA action paper released in January estimates that the highway's actual costs will run much higher than the $465.4 million originally proposed. The current plan calls for Chinese partners to raise half this amount, with the rest to come from US private sector loans.

One financing strategy proposed is the build-operate-transfer (BOT) system, under which the builders would own the road and collect revenues from its tolls and ancillary businesses for a period before ownership reverted to China.

FHWA officials hope that circulating the action paper to US companies will encourage some of them to get involved with the plan. King W. Gee of the FHWA's International Highway Programs Office says around 60 companies have expressed interest in the highway project, and between five and 10 may contribute to financing a feasibility study. However, many uncertainties remain. Agreement with the Chinese Ministry of Communications, for example, has been reached only in principle; as yet no detailed accords exist on the financing mix, or on other parts of the proposal, such as securing the needed real estate and maintaining the training center.

The FHWA has provided a general blueprint, and now hopes interested private-sector groups will take charge of implementation. Specifically, officials hope the plan will attract a private-sector advocate to coordinate and promote the highway project both in the United States and China. Until interested companies take an active role, the model highway will remain just a drawing-table dream. —ASY

URBAN TRANSPORTATION

John Hamburg

Chronic congestion plagues urban China and extends to every part of the transport network. Problems include not only inadequate facilities, but also inefficient use of space. A chaotic competition between motorized vehicles—especially buses—and bicycles tends to slow all traffic to the bicycle's pace, and causes frequent accidents.

A variety of trends will likely increase demand on existing urban transport facilities and could cause traffic in China's big cities to slow to a crawl, unless comprehensive planning, better management of exisiting facilities, and education about rules of the road are called into play. These efforts alone will not keep traffic flowing, however, without a major new construction program. The size and nature of the needed construction projects will require foreign funding, which may provide American companies with opportunities in consulting, equipment sales, construction, design, and management.

Growing consumer demand

An ongoing study of the major transportation problems confronting Shanghai reflects the situation in many of China's large cities and shows that demand on urban transport systems threatens to far outstrip capacity (*see* box, p. 35). Many of China's densely populated cities were built hundreds or even thousands of years ago, with narrow streets in which the constant scramble for right-of-way among pedestrians, bicycles, animal-drawn carts, trucks, and automobiles creates danger, confusion, and a general slowing of traffic (*see* illustration, p. 34). Intersections seldom include separate lanes or signals for left-turning vehicles and bicycles, which pre-empt the right-of-way, so through traffic must wait, creating additional delay.

The mingling of motorized and nonmotorized vehicles adds to the chaos. The right lane on China's streets, for example, is reserved for bicycles, but there is no restraining barrier, so the bikes regularly use the automobile lane as a passing lane. Pedestrian and bicycle interference creates further problems loading and unloading passengers for the more than 5,500 buses that run daily on Shanghai's narrow streets. These vehicles cram as many as 13 riders into each square meter, compared with 3–4 in a typical American city bus. Because of existing traffic congestion, adding more buses is not feasible.

Chinese urban residents make many fewer trips each day and walk more than urban Americans. Trips on foot are the most common, accounting for 40 percent of the total in Shanghai. The second most frequently used form of transportation is the bicycle, with bus and trolley third. Private automobiles carry only 3 percent of all travelers.

If all pedestrians were suddenly to shift to bicycles or public transportation, vehicular traffic would swell by 70 percent. Even if one-half of pedestrian travel switched to vehicles, the resulting 35 percent increase in demand would overwhelm existing facilities.

Switching to bikes and buses

Current demand on existing facilities is not the city planner's only worry. A broad range of socioeconomic trends suggests that today's pedestrians may in the future begin to use vehicles, increasing bicycle and automobile traffic without any rise in per capita travel. A rise in the average number of trips taken is also probable, and the average trip length is likely to increase as well. Growing flexibility in the choice of jobs and housing is allowing urban residents to make a more complex trade-off between distance and travel costs for intangible improvements in the quality of life. Greater efficiency in the flow of traffic may bring more pedestrians onto buses. And as higher incomes make refrigeration available in more households, shoppers are likely to travel farther to new supermarkets that will spring up to compete with street markets.

Complex planning issues

An overall increase in travel may also be waiting in the wings, triggered by the same trends influencing the choice of travel modes. City residents earning higher incomes may, for example, choose to make more recreational trips, many of them on public transportation. The exact level of such increases cannot be calculated, but it is likely that if current trends continue, by 2005 Chinese urban residents will make 75–100 percent more trips each day. Expected changes in pedestrian travel habits suggest a potential increase in demand for vehicle travel from 240 to 374 percent, and this estimate does not take into account population growth. China's fledgling automotive industry and a host of foreign companies are already seeking a stake in this expanding market (*see* p. 38).

The planning issues that confront China's large cities have no simple or uniform solutions, and even choos-

John Hamburg, a principal associate with Barton-Aschman Associates in Washington, DC, is project manager for the company's ongoing study of Shanghai's urban transportation.

ing priorities is problematic: Should city planners try to minimize the distances residents need to travel? Improve roadways and manage traffic more efficiently? Build new roadways? Build subways? A blueprint for the future should encompass management of existing transport facilities and implementation of traffic education programs, construction of new facilities for people and freight, and construction of subways and light-rail transit systems where necessary.

Because Chinese city governments have considerable control over the location of housing, commercial, and industrial facilities, they might be able to control travel distances within a certain range. Unfortunately, there are no examples of success with this approach. Pressing demand for better living conditions and a willingness to travel farther for better housing and employment will increase rather than reduce travel over time.

Making full use of capacity

China could make substantial progress simply by implementing efficiency measures that require little capital infusion. While a large part of the congestion found in major cities results from undercapacity, a significant portion of congestion results from inefficient use of existing facilities. Confusing signaling and conflicts at intersections between bicycles and other vehicles not only exemplify inefficiencies but cause accidents as well. Authorities need to embark on an intensive program, involving the school, workplace, and the news media, to educate urban residents about the rules of the road and the penalties of disregarding them. The Shanghai Public Security Bureau has already initiated programs of this type, but other cities need to follow suit.

Traffic management can go even farther than educational efforts to reduce congestion. Transportation Systems Management (TSM) encompasses a broad array of improvements, such as better use of traffic signals, turning and parking regulations, auto-free zones, high-occupancy vehicle lanes, and so on. Such improvements can add as much as 15–20 percent to capacity. China needs a major TSM program to separate the flow of motorized and nonmotorized traffic, in part by designating separate streets for bicycles and for motor vehicles, while preserving access to all buildings. However, given the magnitude of expected traffic increases, TSM can only supplement other, capital-intensive improvements that will add transportation capacity.

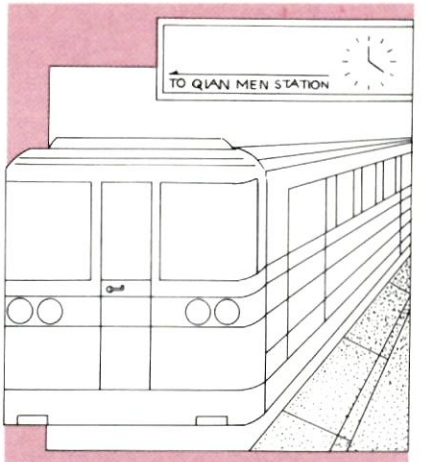
Going underground

Many of China's cities are so densely built that there is no room to fit enough motorized vehicles to meet the potential demand, even after efficiency measures are taken. Streets in China's urban centers cannot be greatly widened without destroying shops, factories, and housing, which, in the face of housing shortages, is almost unthinkable. TSM cannot improve surface public transport enough to provide the needed capacity. A subway is one promising solution, as it provides additional passenger transport capacity, reducing congestion aboveground without demolishing many existing buildings. A subway also moves quickly and safely and can carry large numbers of passengers.

The major drawback, of course, is the cost of construction. Currently only Beijing and Tianjin have subways, while a subway in Shanghai is under construction, and Harbin and Guangzhou plan to construct subway systems. The first phase of construction on Shanghai's subway, to be completed by 1992, is expected to cost ¥2 billion for 14.4 kilometers of line (*see* box). Officials hope to finance the project through a domestic bond issue, paying lower rates over a longer term than a commercial loan would require. A relative lack of domestic experience may influence China to seek foreign help in making the necessary feasibility studies.

Using price to coordinate traffic modes

As China's economy begins to reflect the marketplace more than central plans, authorities should consider how to use the fare structure of public transportation to control demand. The proportion of current travelers who will switch to a subway, for example, will depend on how quickly the subway can make the trip. But the traveler also reacts to the fare, and if the subway is expensive, he must consider whether the time saved is worth the additional cost. Very low subway fares, on the other



Nowhere are the strains on China's transportation systems more evident than on congested city streets. The country's largest city, Shanghai, which suffers most visibly from a host of traffic problems—could become a proving ground for urban transport improvements.

hand, would divert passengers from other modes of transportation and encourage them to make extra trips. Sensitivity to prices is high where wages are low, so the comparative price structure can help balance demand among all transportation modes.

New opportunities for business

After planners have determined which transportation options are cost effective for given areas, Chinese cities will have to dedicate vast infusions of capital to building new transportation facilities, and planners will certainly look to foreign sources for capital and construction aid. So far, the Chinese government has relied heavily on foreign funds for several urban construction projects planned for the coming years; organizations involved include the Asian Development Bank and Japan's Overseas Economic Cooperation Fund (OECF), which made $152.9 million in concessionary loans to Beijing to upgrade the city's subway before the 1990 Asian Games. US Trade and Development Program (TDP) grants in 1987 contributed $867,000 toward a Shanghai transportation study and a consulting project in Tianjin. The World Bank is actively promoting transportation planning as an alternative to capital-intensive transportation improvements.

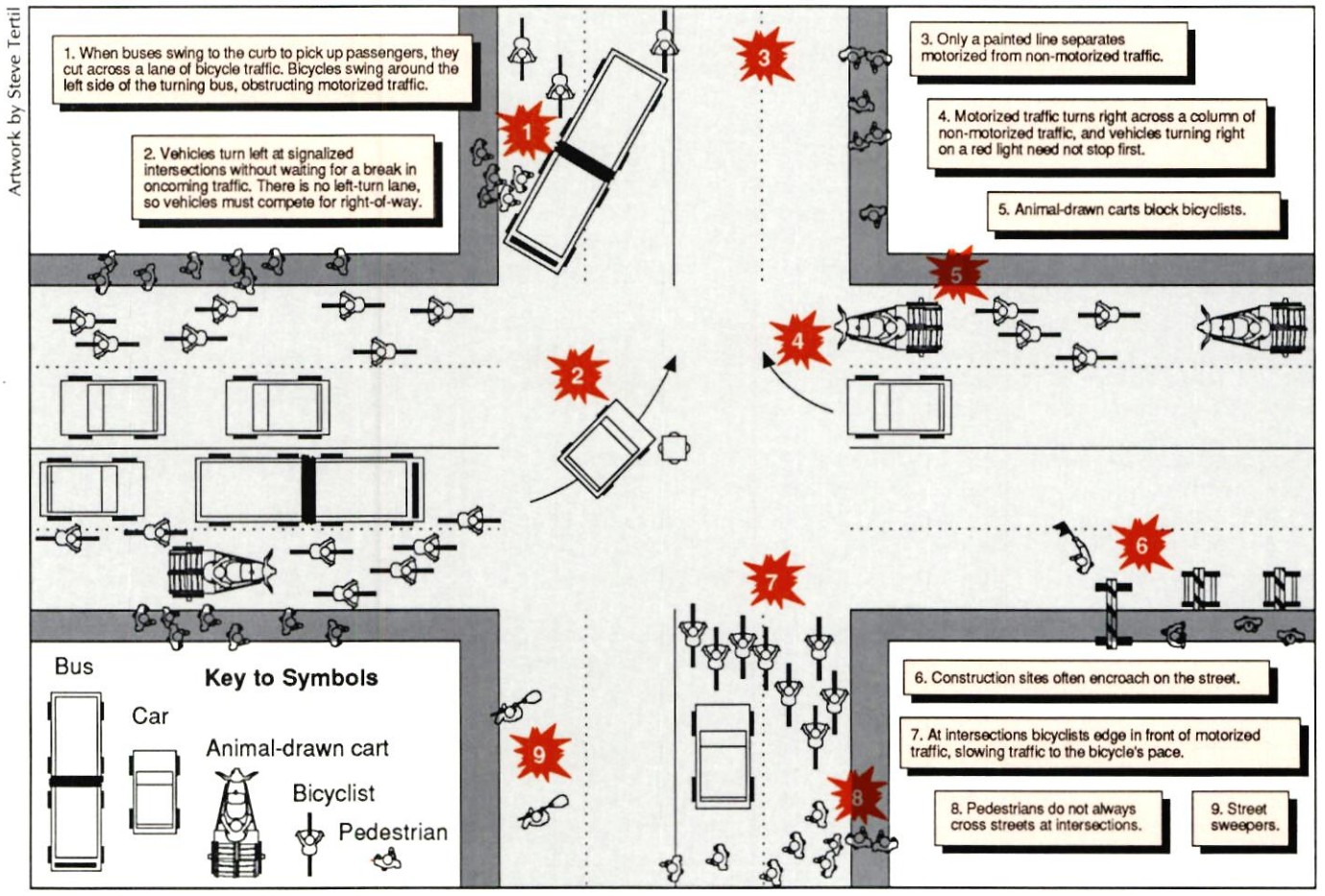
Photo courtesy of Dan Reardon

The mingling of motorized and nonmotorized traffic often slows buses to the bicycle's pace.

The design and planning of transportation systems provide a potentially large market for foreign companies. Among US companies, De Leuw, Cather & Co. won a $1.2 million contract in 1988 to assist in design and engineering work on the Shanghai subway, and Barton-Aschman Associates Inc. completed phase one of a more than $1 million study of Shanghai's transportation system. France's Society for Electrotechnical and Electronic Projects and Research (Serel) assessed Beijing's bus network and is now helping provide the city with traffic signals and road-surveillance systems. The Canadian companies Lavalin International and Metro Canada International have been hired to study extending the Beijing subway system, while H.A. Simons Ltd., also of Canada, is assisting Guangzhou in making a computerized map of the city.

Equipment supply and construction of roads and subways present even broader prospects for foreign firms. So far American companies involved in supply and construction include the RCA Corp., which is providing equipment for a traffic-monitoring system in Shanghai, and General Signal Corp., which is manufacturing traffic-control systems in a joint venture with the China Railway Signal Communication Co. in Shang-

Traffic Patterns — and Problems — in Chinese Cities



Artwork by Steve Tertil

hai. Among other foreign companies, Canada's Urban Transportation Development Corp. Ltd., with Hunan's Xiangtan Electrical Manufacturing Works, has agreed to supply 225 subway cars to Beijing, and a joint venture formed by Japan Leasing Corp. and a Tianjin company will supply underground railway equipment to Tianjin. Yugoslavia's Iskra Corp. supplied a computerized traffic-control system for 53 intersections in Beijing. In the next few years the Shanghai subway system will seek foreign bids for sophisticated tunneling equipment and a subway-control system, and officials may look abroad for help in building the ¥820 million Huangpu River Bridge.

Cities of the future

Adding a few traffic lights and installing a short subway line will not, in the end, effectively meet the demand for more, faster, and inexpensive urban transport. To meet the problem head on, planners must concern themselves first with the shape and organization of the future city. They must conceptualize settlement patterns and determine the role of satellite cities, decide whether the city will develop along transportation corridors or concentrically, how much land will be left open, and whether or not industry will concentrate in certain areas. Given a desired settlement plan for the future city, transportation policies and investments can reinforce those development goals.

If Shanghai's development proceeds across the Huangpu River, for example, bridges and tunnels will become critical targets of capital investment. If the city develops on a north–south axis, on the other hand, other facilities will have to be built. Each plan must be weighed with an eye to land-use goals, environmental impact, capital and operating costs, and other factors. Such planning requires a close coordination that China's bureaucracy often lacks. The solution may be to establish a transportation planning agency, similar to Shanghai's planning team, that would include representatives of every relevant agency. This planning agency would integrate development and transportation plans to develop long-term solutions to the major growth in traffic expected in China's urban centers. 完

Photo courtesy of Pam Baldinger

Passengers must push their way on buses that fit 13 people into each square meter, but Shanghai-area streets cannot support much more bus traffic.

ON TRACK UNDERGROUND

To date, only two of China's cities, Beijing and Tianjin, have subway systems, Tianjin's totaling a scant 7.4 km along six stops since its completion in 1985. Beijing's original 23.6 km subway was completed in 1969 with a daily capacity of 300,000 passengers, but organizational problems kept it closed until April 1973. In October 1984, the city completed a 12 km second line, carrying 128,000 passengers each day along 16 stops. A second expansion, completed in 1986 at a cost of ¥17 million, linked the two lines.

Another extension now under construction is expected to increase the Beijing subway's capacity to between 800,000 and 1 million passengers per day. The first leg of the extension should be completed this year and will run from Fuxingmen to Xidan in the city's center, while the final phase of the expansion project will add 10 km to the line and is slated for completion in 1993. Long-term plans include the addition of five new lines to the system.

Although subway fares were raised in 1987 from 10 to 20 fen, the trains run at a deficit of about ¥56 million a year, without including the costs of needed extensions and improvements. Loans from Japan's Overseas Economic Cooperation Fund have helped finance the Beijing subway, and several foreign companies have participated in construction. The French Sofretu (Societe Francaise d'Etude des Transports Urbains), Balfour Beatty Power Construction Co. of the United Kingdom, and the Canadian Lavalin International did design and construction work and supplied equipment for the expansion completed in 1986, while Japan's Hitachi and Tokyo Car Co. supplied a prototype for the system's 158 cars, which were built in China.

The first phase of subway construction in Shanghai is underway and scheduled for completion in 1992. The densely populated southern city of Guangzhou, and Harbin, in China's far north, also plan to build systems, though no firm timetables have been set.

—Paul Abrahamse

HOW PEOPLE TRAVEL IN SHANGHAI

Shanghai is overwhelmingly a city of walkers and bicyclists, who currently make fewer than a third of their weekday trips by bus or other motor vehicle—which is fortunate for the public transportation system. As it is, the minority of daily travelers who take public buses are enough to create dense, frenetic rush-hour crowds.

Shanghai residents are not expected to rely forever on their legs, however. In 1986 the city asked the Shanghai Comprehensive Transportation Planning Team to provide the raw data needed to determine future demand for transportation. The team tabulated the total number of trips that the roughly 13 million inhabitants of Shanghai and its 10 suburban counties made on an average weekday, whether on foot or by vehicle. The study yielded a vast array of detailed statistics (*see* table), depicting a city swarming with pedestrians and bicyclists who rarely travel beyond the radius of home, work, school, and shopping.

Shanghai's 13 million residents make about 21 million trips each day, about half of them between home and work. Forty-two percent are pedestrian trips, 31 percent bicycle trips, 24 percent made by public transportation, and a modest 3 percent made by car. Only people traveling to and from universities preferred taking public transportation to walking or bicycling, perhaps because they lived farther from campus than did schoolchildren.

The statistics clearly show that city residents need not make more trips to considerably increase bicycle and vehicular traffic. If all pedestrians began using bicycles, buses, or other vehicles instead, overall traffic would increase by more than 70 percent, and the streets would have to support 168 percent more motorized traffic. In fact, traffic would rise steeply if only a fraction of pedestrians stopped walking. For example, 75 percent of Shanghai shoppers go to market on foot. If a mere one-third of them chose another mode of transportation, the bicycle and bus lanes of the city's streets would have to support 600,000 more trips each day. And since 78 percent of trips to school are made on foot, a switch by even a small proportion of schoolchildren to school buses or bicycles would add a significant volume of new traffic to the streets. A host of trends, including rising incomes and more job and housing mobility, make this transition to motor vehicles likely.

To help meet future demand, Shanghai is considering instituting traffic-control programs to increase the efficiency of existing transport facilities. A planned bridge over the Huangpu River will also speed above-ground traffic, which now crosses the river by ferry. And since roads at the city's dense and congested center cannot accept a doubling of vehicles without serious traffic jams, the city has decided to add transport capacity underground, with a subway now under construction (*see* box, p. 35). —JH

Photo courtesy of Madelyn C. Ross

Because of confusing signaling and inadequate division of the lanes on many city streets, bicyclists and drivers must fight for right-of-way.

INDIVIDUAL TRAVEL PATTERNS IN SHANGHAI

Mode	Home to Work	Home to Shopping	Home to School	Home to University	Home to Elsewhere	Trips Not Starting/Ending at Home	Nonwork	Total
Walk	28.2%	74.6%	77.7%	14.9%	40.4%	28.3%	53.9%	41.5%
Bike	41.5%	14.8%	14.8%	22.6%	26.2%	31.5%	21.9%	31.3%
Public Transit	27.6%	9.7%	6.8%	61.5%	30.3%	27.7%	20.7%	24.0%
Other	2.8%	0.9%	0.6%	1.0%	3.1%	12.5%	3.6%	3.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: Shanghai Comprehensive Transportation Planning Team

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THE AUTOMOTIVE SECTOR

Kim Woodard

China's planning agencies have embarked on an ambitious campaign to develop a fully modern national automotive industry in the scant years remaining before the turn of the century. Flexible, fast, and cost-effective, road transport is critical to economic modernization (*see* p. 28). Producing motor vehicles also stimulates a whole range of supporting industries, prompting capital formation, management reform, and technological advances. China is keenly aware that rapid economic development in Japan, South Korea, and Taiwan was closely associated with the emergence of their automotive industries.

The most important driving force in the development of China's automotive industry, however, is the voracious domestic appetite for vehicles of all types. The size of the vehicle fleet on China's roads tripled between 1980 and 1988, and is still growing at a rate of 15–20 percent annually. The pressure of latent demand has driven car prices to dizzying levels, and led China to spend much precious foreign currency for imports in the mid-1980s.

Vehicle imports surged to $3.3 billion in 1985, before being tightly restrained by the central government. In order to prevent a renewal of large-scale automotive imports and long-term dependency on imported Japanese cars and trucks, China must sharply accelerate domestic automotive production in the coming years.

However, increasing domestic production is not the only objective of the modernization drive; improved efficiency and higher vehicle quality are also critical. China's planners want the auto industry to develop the ability to design, produce, sell, and service a basic range of vehicles at competitive international standards. Industry leaders must be able to analyze the market and determine production priorities according to demand, rather than rely on artificial production targets.

Specifically, the primary goals of modernizing the auto industry include technological transformation of the production base to achieve international quality standards; consolidation into a few, highly productive "core enterprises" (perhaps 8–12 key assembly plants); and greatly strengthening the supplier industry by introducing modern materials and production technologies as well as localizing the manufacture of vehicle components assembled in joint venture enterprises. In addition, planners want to introduce large-scale foreign investment in both vehicle assembly and component manufacture by forming jointly capitalized and managed enterprises. A final objective is to balance foreign exchange in the sector by the mid-1990s, both by restraining imports and by exporting more vehicles and automotive components.

China's quest comes at a time when no other country has developed a national automotive industry in the recent past. Other new automotive producers—such as South Korea and, increasingly, Taiwan—have sought instead to become a link in the international production and sales chains of major automotive producers based in the United States, Japan, and Western Europe.

China's goal of building a modern national automotive industry, however challenging, is not an impossible one. An array of intractable problems facing the automotive industry can be overcome if foreign participation is greatly accelerated. Foreign companies will remain tentative about large-scale automotive investment in China, however, until several key problems are solved, chief among them the difficulty of obtaining sufficient foreign exchange to make cooperation profitable. If the roadblocks are removed, US automakers may find themselves ideally placed to help build a competitive new generation of cars and trucks in China.

Where the industry stands

China has already taken the first steps toward cooperative development of its domestic auto industry with foreign companies. Three joint ventures to assemble passenger cars—Beijing Jeep, Shanghai Santana, and Guangzhou Peugeot—together produced about 20,000 vehicles in 1988, and at least two of the three ventures are already profitable. Quite a few foreign licensing agreements have also been signed.

Dr. Kim Woodard is founder and president of CEVCO, a commercial consulting firm based in Washington, DC. During 1988, he participated in an analysis of the US and Chinese automotive industries conducted for the China National Automotive Industry Corp. by the University of Michigan and supported by funding from the US Trade and Development Program. The research team for the project was directed by Dr. Kenneth Lieberthal, director of the Center for Chinese Studies, University of Michigan. The author wishes to thank Professor Lieberthal, Professor Paul McCracken, Leonard Woodcock, Dr. Michael Flynn, Harold C. MacDonald, Jack Cragen, David Andrea, and the other participants in the project. This article represents the views of the author alone and does not necessarily reflect the conclusions of the US–China Automotive Industry Cooperation Project.

Every major automotive enterprise in China is developing new production facilities and introducing new product lines. Large new plants are now under construction at First Auto Works, Second Auto Works, and in Beijing, Tianjin, Shenyang, Jinan, Nanjing, Shanghai, and elsewhere.

But even though the list of early projects is impressive, these projects alone will by no means fulfill the requirements of the expansion program planned for the automotive industry over the coming decade. Additional production capacity—over and above that which current projects will add—is needed for 300,000–450,000 passenger cars per year; 250,000–280,000 light trucks; 50,000–70,000 minivans; and 40,000–60,000 heavy trucks. The capital cost of these additional projects will be measured in billions of dollars.

Ambitious production goals

Growth rates for the number of vehicles on the road and for annual vehicle sales have averaged a staggering 15–20 percent annually since the early 1980s. Annual sales may reach 1.5–2 million vehicles per year by the end of the century, of which roughly two-thirds will be trucks, and one-third will be passenger cars (*see The CBR*, Jul–Aug 1986, p. 28). Registrations showed that China had 4.8 million trucks and cars by year-end 1987, as well as 2.4 million motorcycles and 6.4 million tractors used for rural transportation, bringing the total vehicle fleet to 13.6 million.

Annual sales of cars and trucks can be roughly calculated by adding domestic production to imports, since stocks of unsold vehicles are extremely low. Sales peaked at 800,000 vehicles in 1985, but declined following Beijing's sharp curtailment of imports. The underlying strong upward trend in sales is expected to continue throughout the 1990s.

China's national planning agencies and the China National Automotive Industry Corp. (CNAIC) want to triple production of cars and trucks to about 1.7 million vehicles per year, emphasizing passenger cars and light trucks and downplaying medium and heavy trucks. The target includes 700,000 passenger cars and jeeps, and 650,000 light trucks and minivans, by the year 2000.

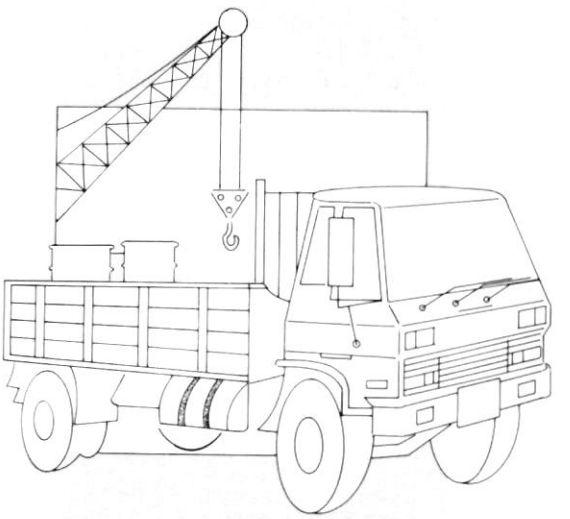
Although projected growth in production is high, the capital construction program in the auto industry is in fact an effort to catch up with existing demand. Vehicle shortages have been exacerbated by years of low production and import restraints. The need for new cars, trucks, and automotive parts in China's rapidly growing economy is pressing. The fleet of Japanese passenger cars imported in the mid-1980s, which now comprise the majority of the official cars and taxis in China's cities, are showing signs of age. These cars require increasing imports of replacement parts and components. From 1985 to 1987, China spent an average of $300 million per year on imported parts and components (including kits for cars assembled in China).

In addition, artificial import restraints, including strict import licensing and high tariffs, are creating a severe shortage of new cars and have driven prices sky-high. For example, retail prices for the Volkswagen Santanas assembled in a joint venture plant in Shanghai are the equivalent of $43,000–$48,000, while the same car would sell for about $10,000 in the United States or Europe. (The Santana's factory price is $19,000, and brokers collect the mark-ups of at least 100 percent.)

From the perspective of Chinese automotive planners, there is simply no short-term alternative to these market distortions. The cost of imports has far exceeded investment in domestic manufacturing since 1980 (*see* chart). In 1984–87, vehicle imports cost a total of $7.9 billion, or about four times the total of State investment in the auto industry during the same period. CNAIC argues that domestic production—including joint ventures that assemble vehicles from imported kits—must be protected in order to survive competition with imports.

Roadblocks ahead

There are a number of fundamental challenges to China's goal of building enough vehicles of the desired quality to satisfy demand. The most serious obstacles are fragmentation of the production base, regional protectionism within the domestic automotive market, capital shortages, and bureaucratic weakness. CNAIC is deeply conscious of these problems, and is making a concerted effort to overcome them



The automotive sector offers foreign—especially American—companies the brightest prospects for profitable cooperation. Although US companies have so far taken a back seat to foreign competitors in vehicle manufacturing, opportunities still abound for investments in cars, trucks, and components.

to faciliate expansion of the industry.

Regional protectionism aggravates the automotive industry's already fragmented production base. China currently has more than 100 separate enterprises that assemble complete vehicles, most of which are inefficient operations producing a small number of relatively low-quality vehicles at high unit production costs. Aside from the First and Second Auto Works, no Chinese plant produces more than 30,000 vehicles per year, while a typical American or Japanese plant produces 100,000–300,000 vehicles annually. Component production is similarly scattered among 4,000 separate plants, of which more than 80 percent are small machine shops serving the repair market.

This inefficient production system flourishes partly because of the strong regionalization of China's automotive market, which actually consists of about a dozen regional mini-markets, with each province and large municipality seeking to protect its own assembly and components operations from outside competition by favoring local assemblers and suppliers.

One result of the industry's fragmentation and regionalism is that available capital resources must be spread out over a number of small, inefficient operations. Chronic capital shortages mean that production facilities are usually cobbled together from domestic equipment, used imported production lines, and new imported tooling. Even the largest vehicle development projects, such as Shanghai Santana, Nanjing Iveco, or the passenger-car pilot project at the First Auto Works, are capitalized at the equivalent of only $50–$150 million, including both renminbi (RMB) and foreign exchange investments.

CNAIC, the State Planning Com-

BLAZING A TRAIL FOR FOREIGN AUTOMAKERS

After becoming the first domestic entrant into China's voracious passenger car market, the Shanghai Volkswagen Automotive Co., a joint venture between Volkswagen and Shanghai Auto and Tractor Industry Corp. (SATIC), has successfully overcome many of the obstacles that hinder foreign companies involved in China's auto industry.

Despite a shaky start, the joint venture—China's largest in the auto sector—is now profitable. Shanghai Volkswagen produced about 15,000 Santana compact passenger cars in 1988, and capacity is targeted at 30,000 in 1989 and 60,000 per year by the early 1990s. For Volkswagen, the Santana project is a stepping stone to a contract with First Auto Works to produce the Audi 100 in Changchun. Together, the Santana and Audi projects may establish a powerful West German presence in the Chinese automotive industry in the 1990s.

The venture's success has been a long time in coming—negotiations began with Volkswagen in 1978. The final contract was signed in October 1984, but legal and funding problems delayed the start-up of assembly operations for another two years. As of mid-1988, some 10 years after the beginning of negotiations and four years after the contract was signed, local content accounted for only 16 percent of the cost of producing each vehicle. The other 84 percent was still being imported in CKD ("completely knocked-down") kits.

Ultimately, only the body and engine, comprising just 35 percent of the car's contents, are to be produced on site by Shanghai Volkswagen. The other 65 percent, including the drive train, electronic system, glass, wheels, instrumentation, interior trim, and other parts, will come from Chinese suppliers in Shanghai and elsewhere.

Local component manufacturers face a number of disincentives to supplying Shanghai Volkswagen, however. For example, enterprises providing components must invest in imported equipment and license foreign technology with no financial help from Shanghai Volkswagen, and with no guarantee that their sample components will be accepted. Several suppliers are encouraged to bid competitively for each component contract, and in some cases the procurement contracts are being split. In view of the small projected volume of Santana production, many potential suppliers refused to accept the costs and risks of this competition until pressured to do so by the Shanghai government. The increased use of local components faces further delay because the joint venture is trying to apply Volkswagen's worldwide quality standards to local Chinese suppliers.

The slow pace of localization in turn creates a foreign exchange balance problem, since many parts must now be imported in kit form. The localization issue is so sensitive that the State Planning Commission (SPC) must approve an itemized list of Santana kit imports each year. Since 1987, kit imports have been allowed to grow rapidly in an effort to substitute the Santana for imported Japanese passenger cars. But there is no guarantee that kit imports will be licensed by the SPC for more than a few years.

The small percentage of local content accounts for the Santana's astronomical retail price (¥160,000–¥180,000, or $42,000–$47,000). Imported Santana kits carry the same duty as complete cars, effectively doubling the cost of producing the vehicle. The joint venture sells the assembled cars to the Shanghai Automotive and Tractor Industry Corp. (SATIC) for ¥70,000 ($19,000) each. SATIC then sells the cars to national and local bureaus of Materials Supply for ¥140,000 each. The government of Shanghai pockets most of the markup, and redistributes part of the profit to local suppliers to cover the capital cost of components manufacture. The net result is that the Chinese customer pays more than four times the world market price for a new Santana.

Another of Shanghai Volkswagen's problems centers on its contractual obligation to balance its foreign exchange requirements through export. Volkswagen has stopped producing the Santana in West Germany and is phasing out manufacture of Santana components as well. In theory, Shanghai is to become a worldwide aftermarket supplier of Santana components, replacing Volkswagen's own production. The joint venture itself, starting in 1990, will produce 100,000 Santana engines each year and export about half of the engines.

The challenges for the Santana project—the localization process, foreign exchange balancing, and market prices—mirror those faced by the other two car-assembly joint ventures in China, Beijing Jeep and Guangzhou Peugeot, and await future foreign investors in China's auto industry. Shanghai Volkswagen's survival and prosperity testifies to the overwhelming power of the automotive market in China. The demand for vehicles, particularly for passenger cars and light trucks, is more than strong enough to sweep aside near-term imbalances and distortions in vehicle production. For those companies willing to risk the perils of manufacturing partnerships, China's automotive market will continue to offer rich opportunities during the 1990s. —KW

mission (SPC), and China's national banks have been able to make some new capital available for construction projects in the auto industry, but because the central government has lost nearly half its annual tax revenues to provincial and municipal governments as a result of economic reforms, the SPC is seeking to reduce, rather than increase, capital allocations across a wide range of industries—including the automotive industry. Foreign investment in the automotive industry, including direct investment in joint ventures and concessionary finance, totals about $350 million, or just 1 percent of the total foreign capital committed to China during the past decade.

The automotive industry also suffers from a lack of bureaucratic clout. Production of automobiles—especially passenger cars—has traditionally been viewed as less important than steel, machine tools, or energy commodities, among others. The automotive industry has never had ministerial status and still lacks powerful advocates at the highest levels of the Chinese government.

While the ongoing decentralization of authority is meant to pass power in major industries down to the enterprises, in practice authority is going down only as far as the provincial and municipal levels. This trend has reinforced municipal control of automotive enterprises in the larger cities, making interregional cooperation even more difficult.

The building of a national automotive industry requires concentration of available capital, technical, and managerial resources in a few large-volume production centers. Strong national leadership of the automotive industry is needed to phase out small, inefficient operations and coordinate the concentration of capital and resources on a few core enterprises. Simply allowing market forces to achieve such changes may take a decade or more, and scarce capital and foreign exchange will be wasted in the meantime. The industry will also continue to face the threat of resurgent vehicle imports, as the demand for road transportation expands to meet the requirements of a burgeoning economy and rising standards of living.

Light trucks give US companies a front seat

As these problems are overcome and foreign involvement in China's auto industry grows, US companies—both vehicle assemblers and components suppliers—will find themselves well equipped to enter into manufacturing partnerships in China. Unlike Japanese and European auto companies, the US "Big Three"—Chrysler, Ford, and General Motors—have traditionally approached international markets through in-country production and manufacturing partnerships rather than through direct sales and exports. US auto companies, therefore, have little vested interest in perpetuating China's dependency on vehicle imports, and stand instead for a strong tradition of working with local companies in Europe, Brazil, and elsewhere to build fully integrated national automotive industries. This tradition is highly relevant to the development needs of China's auto industry.

One of the most promising areas for US involvement is in light truck manufacture. With only about 1 million light trucks and vans now traveling China's roads, the potential market for light trucks appears to be very large, particularly in rural areas that could benefit from rugged pick-up trucks of American design. Replacing part of China's huge fleet of road tractors and 5-ton trucks with light trucks would not only result in significant capital and fuel efficiency gains, but would create a huge replacement market—perhaps several hundred thousand light trucks per year.

Total light truck production capacity, including projects that are now under construction, will be about 200,000 units per year, which is insufficient to meet the projected growth in demand and the needs of the replacement market. The market has room for at least one and perhaps several additional large-scale light truck manufacturing projects.

Traditional US pick-up truck designs should be highly competitive in China's market. Pick-up truck manufacture (including components manufacture) requires only an intermediate level of technology, so foreign designs could be localized relatively quickly. The capital costs for light truck manufacture are also lower than for passenger cars. In the near term, China is more likely to be able to export light trucks than passenger cars, particularly to markets in Southeast Asian and developing countries. In short, there is an exceptionally good fit among the needs of the Chinese market, existing Chinese manufacturing capabilities, and US light truck technology.

The door is still open for compact cars

The manufacture of compact cars is another area of potential opportunity for US companies. Although China may eventually need a domestically produced subcompact car for

Heavy trucks and tractors used for short-haul transport represent a huge replacement market for light trucks.

When a private car becomes possible for urban families, they will probably look for efficient subcompacts, like this Fiat.

The subcompact Daihatsu Charade, assembled from imported kits, is the first Japanese entrant in the passenger car market.

The Daihatsu minivan is targeted at an enormous potential market. Chinese components keep its price unusually low.

CURRENT PRODUCTION AND TARGETED CAPACITY BY VEHICLE CATEGORY (1986–2000)

	Production Capacity			
	1986	1990	1995	2000
TRUCKS				
Minivans	7,825	50,000	90,000	120,000
Light Trucks	97,698	250,000	350,000	530,000
Medium Trucks	207,229	250,000	260,000	270,000
Heavy Trucks	13,378	30,000	50,000	90,000
Total Trucks	326,130	580,000	750,000	1,010,000
PASSENGER VEHICLES				
Passenger Cars	8,000	60,000	320,000	650,000
Jeeps	24,579	40,000	60,000	60,000
Buses	11,091	20,000	20,000	730,000
TOTAL VEHICLES	369,800	700,000	1,150,000	1,740,000

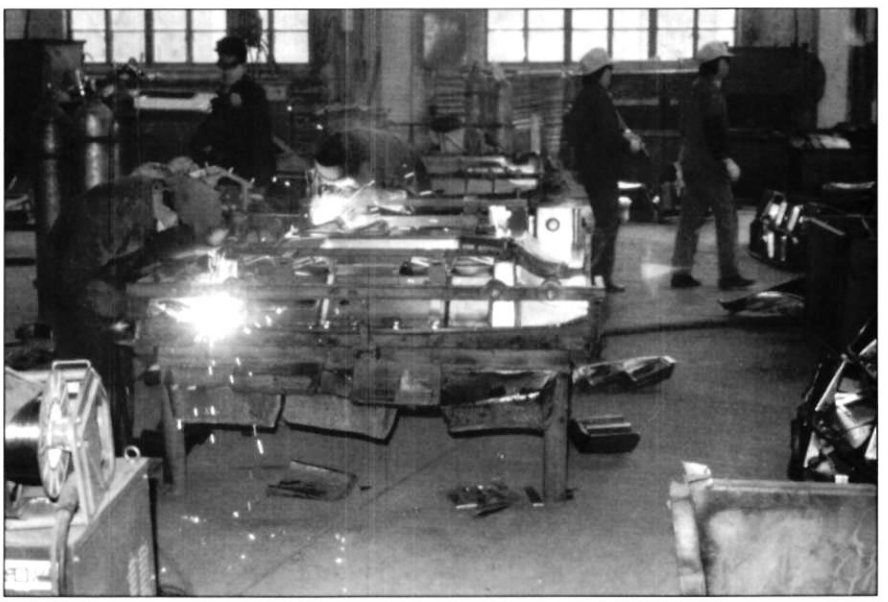
SOURCE: Data collected by Harold C. MacDonald, former VP, Ford Motor Co. and senior consultant to CNAIC. Estimates based on field surveys.

personal use, in the near term the overwhelming passenger car demand focuses on taxis and cars in the compact range for official and organizational use. American compact cars are rugged, simple enough to permit some owner maintenance, and can carry light freight (particularly in station wagon models). The same basic compact car platform (chassis and drive train) can be used to produce sedans, station wagons, minivans, and even compact pick-up trucks.

Participation by one of the Big Three in a major passenger car project (300,000 units per year) in China would stimulate more cooperative activity by major US components suppliers and would help develop spin-off materials industries in China.

Aside from the Cherokees built by Chrysler in the Beijing Jeep joint venture, however, American companies have taken a back seat in early passenger car projects in China. The requirement that passenger car joint ventures earn foreign exchange by exporting cars and components is a serious barrier for US companies because of the glut of production capacity in the United States, and is compounded by fear of the hard-currency costs of importing raw materials and components for the venture. As a result, the Big Three have moved cautiously, leaving the early passenger car projects to Volkswagen, Peugeot, and possibly Renault.

Photo courtesy of Kim Woodard



The high proportion of manual work in Chinese factories, such as the welding shown here, limits production to a fraction of that in foreign vehicle plants.

US component strengths complement China's needs

Components manufacture, a weak link in China's automotive sector, is a great strength of the US industry. Some of the nearly 40,000 US companies that produce automotive parts and components are large, diversified firms that can marshal a wide array of technical and capital resources, making them well suited to the Chinese market.

Technology licensing and joint venture manufacture of automotive components has been somewhat scattered and uncoordinated in China. Because of the regional nature of the Chinese automotive market, suppliers typically produce at unacceptably low volumes, which results in low quality, low productivity, and high per unit production costs. For example, China produces an average 208 carburetors per worker-year, while foreign companies produce 4,000, and the Chinese output of 8,000 engine valves comes nowhere close to the foreign average of 60,000 per worker-year.

Joint components manufacture is a bottom-up strategy for building cooperation between the US and Chinese auto industries. Over time, successful pursuit of joint components manufacture could build a solid foundation for joint venture assembly operations with high levels of local content, as well as for Chinese automotive exports.

In order to be competitive internationally, the Chinese automotive supply industry must expand its reach to the national and export markets, focus on Original Equipment Manufacturers (OEM) standards rather than just the aftermarket, and coordinate the development strategies of numerous small enterprises. US automotive suppliers could do much to help China attain these objectives.

So far, China has just one joint venture in automotive components, the Thomson/Second Auto Works venture for thermostat manufacture (*see* photo). But a number of other US suppliers have licensed component manufacturing technology to

Chinese plants, and several component joint venture negotiations are currently in progress. All of the Big Three are exploring opportunities for joint production of key components, including drive train assemblies.

Foreign exchange: the final obstacle

Despite the many promising openings for American involvement, US auto companies have formed relatively few cooperative projects in China compared with the number and size of contracts signed by European and Japanese companies. The disparity is even more striking considering that America's auto industry had early contact with Chinese counterparts and is still the focus of strong interest on the part of the Chinese. Negotiations between the Big Three and Chinese auto enterprises have taken place sporadically since the late 1970s—yet European companies now hold two of the three existing passenger car joint venture contracts, and four of the major licensing projects. Audi's pilot passenger car project with First Auto Works, which will produce an initial volume of 30,000 Audi-100 passenger cars per year, may lead to a large-scale (300,000 units per year) passenger car joint venture in the mid-1990s. Japanese companies have yet to form their first auto-related joint venture, but they have two of the major licensing projects.

The Big Three have all been cautious in their approach to manufacturing partnerships in China. Chrysler—which inherited the Beijing Jeep project when it acquired American Motors—and General Motors have sold used engine production lines to China, and Ford conducted a feasibility study for light truck manufacture on a project that was subsequently rejected by the State Planning Commission. None of the Big Three has committed substantial capital resources to China. Although major US components manufacturers, including Borg-Warner, Allied-Signal, TRW, and Rockwell, have licensed manufacturing technology, few have actively pursued joint venture production opportunities.

Hesitation on the part of US companies centers on concerns that joint ventures must balance their foreign exchange requirements through exports, which, while not always a serious problem for small components projects, can become an insuperable barrier to large-scale vehicle assembly operations. A joint venture producing 300,000 passenger cars per year, for example, would have to generate enough exports to amortize half a billion dollars in capital requirements, repatriate the profits of the foreign partner, pay for imported steel and raw materials, and cover the foreign share of management and operating costs.

Photo courtesy of Kim Woodard

US strength in auto components suggests possibilities for profitable joint ventures, such as this thermostat assembly plant run by the Standard-Thomson Co. and the Second Auto Works in Hubei Province. The efficient facility sells to both domestic and export markets.

Because China's automotive industry is just beginning to compete in world markets, generating enough exports to meet such high foreign exchange demands is a daunting task. Total automotive product exports reached $116 million in 1987, of which more than 80 percent was comprised of simple parts and components, such as spark plugs, fasteners, leaf springs, universal joints, and so on. About half of total exports went to aftermarkets in Southeast Asia, particularly Hong Kong. In 1987 China's total automotive exports to the United States were less than $9 million, which compares with $63 million in automotive imports from the United States in the same year. Chinese exports are growing, but remain very small by world standards. Therefore, it is by no means certain that the international market would accept a sufficient volume of Chinese vehicles or components to pay the foreign exchange costs of major joint venture projects.

European and Japanese companies are, of course, faced with the same constraints as US auto companies, but in some cases, such as the Nanjing/Iveco project, the European or Japanese partner has been able to obtain concessionary loans from the home government to finance the capital and start-up costs of a major project in China. Concessionary financing for capital equipment purchases reduces the short-term foreign exchange burden facing the project, so that a modest stream of exports can meet expenses. The US government, as a matter of both tradition and policy, offers very little concessionary financing through the US Export-Import Bank. The World Bank, limited to the role of "lender of last resort," has not been involved in the automotive industry in China.

A government-to-government initiative?

Before they will commit the needed capital, technology, and other resources to automotive ventures in China, US auto companies need assurance that they will have long-term access to the domestic Chinese market, and that they will be free to repatriate profits from joint venture operations. Earlier in the course of US–China relations, the commercial potential of offshore oil exploration and development was elevated to the level of government-to-government relations. The result was a multi-billion-dollar cooperative investment program in the petroleum industry. US automotive companies might be more likely to make the billions of dollars of investments required to modernize China's automotive industry if they were assured that high-level government bodies on both sides recognize the value of such programs. Such assurances may be particularly important in resolving the sensitive foreign exchange issue.

The Chinese government is reluctant to provide formal guarantees that foreign investors can repatriate their earnings in hard currency, and the American government is equally reluctant to "interfere" in normal bilateral commercial relations. But at the very least, recognition of the importance of cooperation in automotive manufacture by both governments could create an appropriate atmosphere for serious discussion of large-scale joint investment projects. 完

BOOKSHELF

书刊介绍

Agricultural Statistics of the People's Republic of China 1949–86, by Frederick W. Crook. Washington, DC: US Department of Agriculture, Economic Research Service, 1988 (Statistical Bulletin No. 764). Available from the Government Printing Office $8.50; on microfiche from National Technical Information Service, $6.95; diskettes with tables from ERS, $70.

This reference work compiles for the first time a wide range of official Chinese agricultural statistics spanning 1949–86. Chinese sources for the figures include the *State Statistical Yearbook, Agricultural Yearbook,* and *Almanac of China's Foreign Economic Relations and Trade*. The book's 126 tables detail the output, area, and yield of China's major crops, and include complete time series for total output of these crops for 1949–85, and provincial series given for 1979–85. Other tables include data on land use, population, procurement prices, output of items manufactured from agricultural products, such as edible oils and cigarettes, agricultural inputs, livestock production, imports and exports of selected commodities, and domestic consumption of agricultural products. Clear explanatory notes define China's agricultural and statistical terminology. The diskettes will be updated by mid-1989 to include 1987 data, and a new edition of the book is planned for mid-1990.

This volume is a resource for both the scholar and the businessperson in search of details of China's agricultural production. Although the data is available from other sources, this book's well organized tables and low price make the information more readily accessible. —JLL

China's Second Revolution: Reform After Mao, by Harry Harding. Washington, DC: The Brookings Institution, 1987, 369 pp. $32.95 hardcover, $12.95 softcover.

In this work, distinguished China scholar Harry Harding presents a comprehensive and readable analysis of China's post-Mao reforms and an outlook for the future. Although Harding breaks little new scholarly ground, he has produced an excellent three-part synthesis of current trends. This book is a valuable guide to the complex political, economic, social, and personal factors molding China's current reform policies.

In the book's first section, Harding addresses the origin of reform, and concludes that rather than being a consequence of conditions in China, reform results from "extraordinary political engineering by a coalition of reform-minded leaders led by Deng Xiaoping." Harding's descriptions of internal as well as international political, social, and economic conditions are conventional, but his concise review of political maneuvering provides a solid introduction to China's preeminent ruler—whose political acumen determined the scope, pace, and content of reform.

Harding uses the image of a wave to describe the ebb and flow of reform, which is affected by both objective conditions and differences within the reform coalition. He presents Deng as an arbitrator between the moderate and radical wings of the reform movement, and a subtle promoter of the latter's agenda.

Harding mentions the leadership's united commitment to reform, which remains an important bulwark against its destabilizing by-products, such as inflation, corruption, and regional disparities. However, the author—along with many foreign journalists, analysts, and businesspeople focusing on China's crises of the moment—tends to underemphasize this very significant factor.

In the second part of the book, Harding analyzes the substance of China's economic and political reforms, examining the rise of market forces, material incentives, and private property rights in the context of a continued commitment to socialist ideals. This section provides a useful corrective to those who believe China is evolving into a Western-style market economy.

Harding discusses how ideology has been largely replaced by pragmatism rooted in modernization and nationalism, though he further notes the self-limiting aspects of political reform that is controlled by the Chinese Communist Party and the State. He does not address, however, an additional factor that serves as a brake on democratization—namely, the intensely conservative strain in Chinese society that promotes political stability and order over the "chaos" of pluralism.

In the third part of the book, Harding examines the future of China's reforms. Although this section is the least detailed, it is the most useful for exploring the possible advances and retreats of the reform agenda in the next several years. Here too, Harding offers no unconventional wisdom, but he does carefully analyze what to expect from China's future. This analysis highlights, for instance, the current and future significance of the inflation consequent to price reform, as well as the decentralization of investment authority. The record inflation of 1988 has led to a major austerity program, investment cutbacks, and further delays in price reform. Despite the setbacks, however, a strong consensus for reform remains within the leadership, and reform is deepening. For example, the government is experimenting in new forms of stock ownership for State enterprises, and economic reforms now extend to factory management and labor, bankruptcy provisions, and an increased use of market mechanisms in the pricing and distribution of goods and

Books and business guides submitted for possible review in The China Business Review *should be sent to the Council's book editor, Jennifer Little.*

services.

China's Second Revolution is a mid-term analysis of a process that will not be completed until the next century. Harding provides the background necessary for nonspecialists to understand past events, track current trends, and judge future progress. While newspapers and magazines myopically interpret discrete incidents as dramatic policy reversals, Harding examines the reforms within the context of China's contemporary political and economic history. He has admirably clarified—but not oversimplified—the ongoing, complex process of reform.

—Richard Brecher

Truman's Two-China Policy, by June M. Grasso. Armonk, NY: M. E. Sharpe, Inc. 209 pp. $29.50 hardcover.

This uneven book attempts to lay to rest the assumption that the basis of Truman's China policy was a commitment to the Nationalist government of Chiang Kaishek. Grasso maintains that US policy instead centered around preventing Taiwan's fall to the Communists (which was thought to jeopardize Japan, Southeast Asia, and the Philippines), and that Chiang was considered an obstacle to this goal because of his reputation for corruption, inefficiency, and mismanagement. The United States cut off support to Chiang in the summer of 1949 while increasing aid to Taiwan, which ended up helping the generalissimo set up a rival government on the island. Meanwhile, the United States adopted a "wait and see" attitude toward the mainland, maintaining diplomatic and economic ties with the People's Republic and making plans for recognition through the late 1940s. Maneuvering for US recognition continued on both sides until the Korean War broke out in 1950, finally quashing any American hopes of using recognition of China to counterbalance Soviet influence there.

The book attempts to pull together the myriad factors influencing US policy toward China, including the publication of the China White Paper in August 1949; relations between the United States and its allies, who recognized the PRC immediately in order to protect their economic interests; US control of the United Nations, which prevented the seating of the Chinese Communists; and US economic interests in China. But Grasso's effort is repetitive and chronologically uneven; some chapters end with conclusions while others don't, and the final chapter, called "Conclusion," only adds to the confusion caused by continuous summarizing. —PET

Improving the Quality of Textbooks in China, by Barbara W. Searle and Michael Mertaugh with Anthony Read and Philip Cohen. Washington, DC: The World Bank, 1988. Discussion Paper 30. 82 pp. $6.50 softcover.

The education reforms of China's Seventh Five-Year Plan (1986–90) set a goal of universal basic education (grades 1–9), emphasized vocational and technical education, and strengthened educational leadership. Upgrading the quality of China's textbooks is a key step in improving all aspects of education.

China's 200 million students require about 2.6 billion textbooks a year. But while the country has succeeded in supplying each student with an average of 13 textbooks annually, comparable to the figure for developed countries, the textbooks are deficient in both content and quality. Long periods of isolation have put most Chinese textbook authors out of touch with advances in many classroom subjects, particularly in science and technology. Chinese textbooks are visually dull, with inadequate use of color and illustrations, and they are made of poor materials that deteriorate rapidly. Only 30 percent of the texts used in higher education are actually books; the rest are bound mimeographs.

In addition to upgrading content and production quality, China's ambitious reform plans call for expanding variety and increasing the number of published textbooks from 30 to 60 percent over the next decade. The study's authors rarely found more than one official textbook for each subject and grade, which they felt was excessively uniform for such a diverse country. Continued investment in libraries and imports of foreign books are also needed if China is to better incorporate new information into its educational system.

The authors, who gathered information with the cooperation of education officials during two missions to China, find China's plans both justifiable and affordable. They conclude with recommendations in several key areas: rationalizing textbook pricing and financing; adopting an appropriate implementation pace for the program; improving the effectiveness of the distribution system; and upgrading skills. Specifically, skills in writing, editing, book design, typesetting, printing, financial management, production, marketing, and inventory need improvement. The authors recommended strengthening training in publishing, and they suggest that key personnel train at overseas publishing houses.

These findings are supplemented by organizational charts and tables on pricing, production, student enrollment projections, and capital requirements for textbook upgrading. The book will interest anyone who follows China's changing education system, and foreign companies that can supply publishing equipment and technology will find the book's descriptions of China's needs and acquisition plans extremely valuable. —PET

BOOKS RECEIVED

Maryknoll in China: A History 1918–1955, by Jean-Paul Wiest. Armonk, NY: M.E. Sharpe, 1988. 591 pp. $35 hardcover.

Quick Reference Chinese: A Practical Dictionary of Mandarin for Beginners/Travelers, by Richard L. Kimball. San Francisco, CA: China Books & Periodicals, 1988. 159 pp. $7.95 softcover.

The Third Century: America's Resurgence in the Asian Era, by Joel Kotkin and Yoriko Kishimoto. New York: Crown Publishers, 1988. 286 pp. $19.95 hardcover.

Two Years in the Melting Pot, by Liu Zongren. San Francisco, CA: China Books & Periodicals, 1988. 221 pp. $16.95 hardcover; $9.95 softcover.

China's Nuclear Weapons Strategy: Tradition Within Evolution, by Chong-Pin Lin. Lexington, MA: Lexington Books, 1988. 272 pp. $40 hardcover.

Chinese for Today, by Beijing Languages Institute. San Francisco, CA: China Books & Periodicals, 1988. 428 pp. $19.95 softcover. Supplementary exercise text, 137 pp., $10.95 softcover. Boxed set of six 60-minute cassette tapes, $70.

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Maintaining a Consistent China Strategy

Joint ventures face conflicting expectations at each level of both Chinese and corporate bureaucracies

Kenneth Lieberthal and C. K. Prahalad

Despite the extraordinary increase in the number of foreign ventures in China in the past decade, successfully operating a manufacturing venture there is still a difficult undertaking. Foreign firms attribute the difficulty to problems in the Chinese "investment climate," while Chinese complain about foreigners' "lack of strategic vision." But these complaints also arise in part because any significant manufacturing activity in China involves interaction among people at various levels of Chinese and multinational corporation (MNC) bureaucracies. Since people at different levels tend to operate with different agendas, tensions can result when they fail to recognize these differences.

To do their jobs successfully, foreign managers of China operations must become sensitive to the complex interaction of different bureaucratic layers within their own organizations, within the organizations of their Chinese associates, and between the MNC and Chinese hierarchies. For both sides, understanding these relationships is vital to avoiding conflicts and performing effectively.

Different levels, different goals

Any major cooperative manufacturing venture in China is influenced by five levels of Chinese bureaucracy: the central planning authorities, the ministerial organization that carries out the plans, the local government, the Chinese partner, and the Chinese managers and workers—each of whom may have distinctive attitudes about the purpose and operations of a foreign joint venture. Similarly, within an MNC, at least four organizational levels are typically involved in a major effort in China: the CEO and corporate headquarters staff, the worldwide product manager, the regional manager, and the joint venture manager.

For example, national Chinese leaders tend to view joint ventures as vehicles not only for obtaining new technology and capital, but also for upgrading Chinese management quality at the local level. The municipal government and the Chinese partner, however, often want chiefly to benefit from the venture's foreign technology and capital without significantly changing management methods.

In almost all of the nearly two dozen cases studied for this report, Chinese joint venture partners at the municipal and enterprise levels wanted to retain control of personnel and compensation policies, choice of domestic vendors, and product distribution. They perceived the foreign partner primarily as a window to the resources of the outside world, as well as a vehicle for increasing their prestige and leverage in the municipal, provincial, or central governments. They typically sought to minimize the foreign partner's role as an instrument of change in the firm's management capabilities—even though many foreign firms regard management reform as one of the most important contributions they can make to a joint venture.

At one pharmaceutical joint venture, for example, the Chinese partners were not very interested in learning appropriate quality control techniques, which would have required significant changes in plant operations. Supervisors also avoided assuming responsibility for maintaining manufacturing discipline. The foreign partner was denied access to domestic distribution channels, and therefore could not educate physicians on proper use of the product, which is a normal practice of Western medical retailing. The foreign company therefore had little influence on the management practices of the venture, let alone on the industry as a whole.

Conflict within the MNC

Disparities between the stated goals of leaders in Beijing and actual practice at the joint venture level can create problems within the MNC, since top corporate executives who meet with leaders in Beijing misperceive the problems of expatriate managers working in the ventures.

Indeed, the problem can be even more subtle and pernicious than this. Each level in the MNC tends to gain access to its counterpart level in the Chinese national hierarchy. Changing perspectives as one moves "down" the Chinese bureaucratic hierarchy, therefore, produces related misunderstandings within the MNC.

In one computer company, for example, the CEO was invariably received by national leaders when he visited China. The meetings focused on how this large foreign firm could best help China modernize. The senior managers who accompanied the CEO gained an image of China as a place of enormous opportunity and of pragmatic flexibility in dealing with foreign investors. But the expatriate manager, responsible for the day-to-day running of the venture, was frustrated and bitter, as he soon realized that his Chinese partner was

Kenneth Lieberthal is a professor of political science and director of the Center for Chinese Studies at the University of Michigan. C.K. Prahalad is professor of corporate strategy at the University of Michigan's School of Business Administration.

also his competitor. He could not find a way to define the respective daily management roles of the joint venture partners, nor could he count on his superiors to understand his limitations in successfully expanding the venture. This situation hurt both his professional pride and his career prospects.

Defining corporate goals

Multinational corporations with manufacturing operations in China tend to have at least one of four basic strategic goals, each of which has its own implications for the role of the China effort within the corporation's broad strategy. The goals are:

- **Participation in the emerging local market.** Many firms manufacture in China primarily to capture a share of rapidly expanding market opportunities. This strategy involves producing for local consumption, with little, if any, attempt to integrate China into the MNC's regional or global networks. Some MNCs have formed joint manufacturing ventures in China simply to sell parts and components produced elsewhere into the China market.
- **Developing a sourcing platform.** The MNC may view China primarily as a source of inexpensive labor, land, and other production inputs. In this case, the MNC wants production in China either to feed into its distribution systems elsewhere, or to serve as a parts and assembly base for more complex items produced outside the country.
- **Establishing a presence in a critical market**. For some companies, China may be a "critical market" because production volumes achievable in China may be large enough to affect global competition in that sector, such as television production. In this case, an MNC may enter China in order to deny competitors unchallenged access to these large production volumes, which are seen as a competitive weapon affecting the MNC's ability to leverage business elsewhere.
- **Establishing a resource pool**. China may possess a particular resource that the MNC seeks. Recent experiences in India—where some MNCs discovered a source of trained, inexpensive talent for software development—indicate the type of possibilities that may emerge in China during the coming years. The goal is not only to exploit immediate factor cost advantages in China, but to increase the talent pool available to the MNC.

Each of these strategies has distinctive requirements in terms of the locus of entrepreneurship; the locus of responsibility and authority for decisions on product, process, and scale of operations; control over investments and logistics; freedom of access to local distribution channels; dependence on local vendors; and opportunities for pricing and advertising, among other things.

Strategies affect managers' roles

If a firm uses a joint ventures primarily to sell to the domestic Chinese market, the joint venture manager typically enjoys significant autonomy in choosing a product to sell, building a network, and pricing. Chinese conditions often demand that managers also become proficient at foreign exchange hedging, barter, and complex deal-making.

When the China operation is intended as a sourcing platform, the expatriate manager's role changes dramatically, becoming more intimately linked with the product group sourcing from China. The quality levels, choice of local vendors, pricing, choice of technology, quality controls, and staffing decisions are imposed on the venture by the product group. In short, the product manager calls the shots, which the expatriate in China must implement.

When an MNC perceives China as a critical market, the expatriate manager must not only try to capture a share of the Chinese domestic market, but simultaneously exploit factor cost advantages to use the China venture as an export platform. Furthermore, he must use the MNC's position in China, and its links with the Chinese bureaucracy, to preempt competitors. In order to cope with these various demands, the manager must cultivate and maintain personal networks within both the Chinese bureaucracy and the MNC hierarchy—an undertaking which can consume great amounts of time and energy.

Sending mixed signals

When the understanding of the firm's strategic goals differs within the corporate hierarchy, the MNC often sends mixed signals to the China venture. The expatriate manager may believe, for example, that the purpose of the venture is to maximize production and make a profit in its own right. The MNC's regional headquarters, on the other hand, may view the operation primarily as a vehicle to acquire information and market access, and also as a conduit through which to sell the firm's other products in China. Corporate headquarters may be more concerned with the long-term goal of denying a major competitor the advantage of locking up the China market in a given product line, and less concerned with the balance sheet of the venture itself.

Compounding the misunderstandings, many large MNCs have several different product groups dealing with China simultaneously, and these groups may have disparate goals for the China effort. In one MNC, for example, four out of five product groups had quite different approaches to the China market. One group entered into several joint ventures for manufacturing and selling consumer products in China. The second group, involved in industrial instruments, worked in China out of its home office, occasionally sending sales and marketing representatives to make contacts with potential customers in China. There was no attempt to establish a relationship with the product group operating joint ventures in China. The third group sought to source low-end components from China for its global network. Its negotiating position with the Chinese was quite different from that of the consumer group. The fourth group, involved in telecommunications systems, dealt directly only with highly specialized Chinese agencies.

While the MNC made some attempt to coordinate the various China activities, the goals of the product groups were so distinct that the dynamics of each operation had little relation to the others. But the Chinese viewed all these efforts as closely related, and assumed that concessions made by any unit should apply to all the others.

Policy reforms complicate management

Given the nature of both Chinese and MNC bureaucracies, managing manufacturing joint ventures in China is clearly quite complex. Changes in the internal organiza-

tional structures, priorities, and strategies of both the MNCs and Chinese policymakers in the last five years have further complicated the picture.

China's reforms inevitably entail unsettling bureaucratic changes. Such changes in the automotive sector in China illustrate some of the problems. During 1987–88, reorganization of the State Council put the automotive industry under the Ministry of Machine Building and Electronics. As a result, the State Council Leadership Small Group for Autos was disbanded and the duties (and name) of the China National Automotive Industry Corporation (CNAIC) were significantly changed. In addition, the bureaucratic ranks of the country's two leading automotive manufacturers (First Auto Works and Second Auto Works) and their roles in the planning process were substantially altered, and a number of municipal automotive corporations were formed. Each change created uncertainties among foreign investors as to the resources and authority of the Chinese units with which they dealt.

Specific Chinese policies toward joint ventures have also changed under recent reforms, and in turn created difficulties for the joint venture manager. For example, China typically demands that firms export in order to gain the foreign exchange necessary to repatriate profits. Therefore, even though a foreign company may have entered China in order to produce for the local market, it may have to follow a sourcing platform strategy in order to meet Chinese demands. This mix can create serious management problems for the venture, which suffers from trying simultaneously to pursue different strategies.

China's complex bureaucratic structure and fast-changing economic environment demand that MNCs devote special attention to developing management talent for their China effort. MNC employees in China must keep up with the evolution of Chinese policies and bureaucratic structure in key sectors and industries in order to fully exploit emerging opportunities. Ideally, given the vital importance of personal relationships in China, expatriate managers should be thoroughly familiar with Chinese language, politics, and culture. But serious obstacles stand in the way of staffing ventures with appropriately qualified expatriates.

Finding—and keeping—the right people

Since no corporation can afford to make the substantial investment required to develop China expertise for personnel in all product groups, most large companies find that they must integrate the efforts of different groups into some type of China office, preferably with a fairly stable long-term staff base. However, many MNCs normally rotate executives to new posts every two or three years, which means that executives generally leave only shortly after becoming fully familiar with—and effective in—the Chinese system.

Keeping executives in China for much longer periods of time presents other problems, however. China is a difficult operating environment in which most companies realize returns on major investments only over the long run. This means that people with responsibility for the China office may find it hard to meet the performance criteria (rate of return on investment, growth in net profit, etc.) that competitors in other parts of the corporation can achieve (for example, those dealing with other Asian countries such as Taiwan or South Korea). Few companies find it bureaucratically feasible to modify the competitive scorecard to take into account China's special characteristics. As a result, companies often find it difficult to keep the most talented people in China.

Long periods of residence in China also tend to separate the China staff from the mainstream of MNC operations and corporate headquarters, resulting in lack of understanding between the China office and higher levels of the MNC. Separating the individual from the evolving corporate power structure also weakens his position in the corporation. There is often a perceptible sense of loneliness and isolation among expatriates who have lived in China for more than three years.

Eliminating tension

The tensions within the MNC are matched by equally severe—though substantially different—tensions on the Chinese side. Maintaining operations in China can thus be a frustrating experience for both the Chinese and the foreign company. Although it is probably not possible to eliminate all tensions, they can be more broadly understood. For starters, both sides must better appreciate the complexities of their relationship.

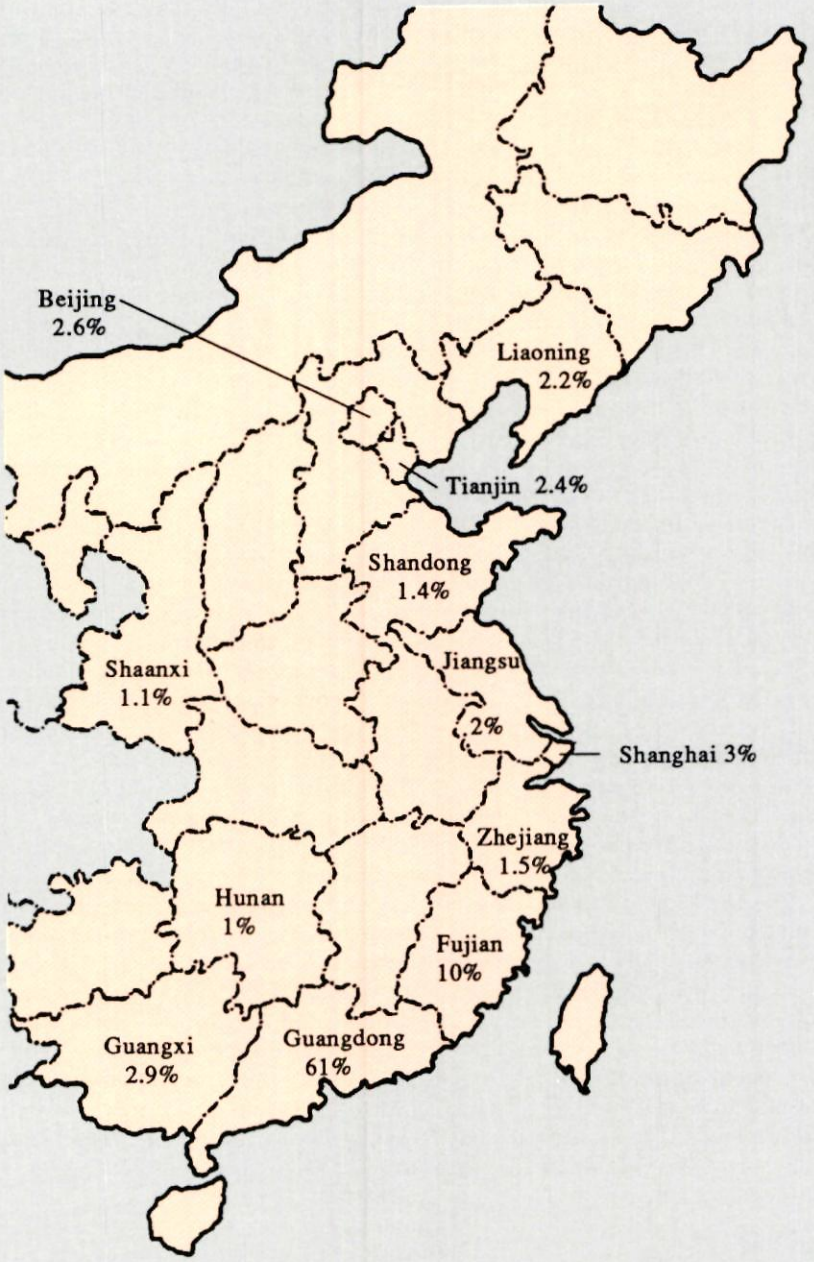
The MNCs must realize that it is naive to expect a smooth and consistent policy across various levels of the Chinese system as it is undergoing massive and uneven change. Furthermore, MNCs themselves are often not clear about the primary goals of their China operations. Most often, these goals simply evolve, creating unnecessary tension. MNCs must realistically examine their own internal organization, and the consistency of their approach to China.

Foreign companies must also build a cadre of managers who understand and work effectively in China. Most foreign firms have tended to neglect the human resource dimensions of their China operations, though they are the most vital part of a viable strategy. Developing the right staff is perhaps the most crucial step in overcoming the difficulties that arise in the myriad levels of interaction between the Chinese and corporate bureaucracies.

The Chinese, for their part, must understand that each MNC is not a monolith that acts and thinks in unison across all levels. This requires research on the internal organization and operational ideology of MNCs, since corporate ideologies and beliefs are quite different among major firms even in the same sector. Furthermore, the Chinese should take a more discriminating view toward the obligation to export. While ventures producing textiles, hand tools, and low-end consumer electronics may not have major problems exporting, businesses in such areas as telecommunications or pharmaceuticals (which require elaborate clinical trials and government approvals) cannot do so as easily. Making good policy in this area requires research on the nature of global competition in each sector before making export demands.

Indeed, the myriad internal problems of fitting a joint venture into a complex bureaucratic hierarchy—in both the MNC and the Chinese system—explain what are too often seen as signs of either a "poor investment climate" or a "lack of strategic vision." 完

GEOGRAPHIC DISTRIBUTION OF FOREIGN INVESTMENT IN CHINA, 1979-87



SOURCE: Intertrade, August 1988

COST OF LIVING INDEX

(Overall retail price and free market price indices)

Sept. 1986 - Sept. 1988

Same month last year = 100.0

1986	
September	105.2
October	104.8
November	106.3
December	106.6
1987	
January	105.1
February	105.4
March	105.8
April	106.7
May	107.6
June	107.8
July	107.8
August	108.2
September	107.7
October	107.5
November	108.3
December	108.9
1988	
January	109.4
February	110.4
March	111.3
April	112.2
May	114.2
June	116.3
July	119.2
August	123.6
September	126.4

SOURCE: China Statistics Monthly, November 1988

SELECTED US EXPORTS TO CHINA

($ millions)

Commodity	Jan-Oct 1987	Jan-Oct 1988	Percent Change
Wheat	92.0	516.6	460.0%
* Synthetic resins & plastics (*see* chart)	163.3	537.0	228.8%
Logs & lumber	134.6	405.3	201.1%
Nonferrous metals	9.2	26.5	188.0%
Organic chemicals	117.2	215.0	83.4%
Wood pulp & waste paper	44.8	76.9	71.6%
Fertilizer	197.4	320.2	62.2%
Telecommunications & sound recording equipment	68.1	87.8	28.9%
Power generating machinery	92.1	118.5	28.7%
Inorganic chemicals	62.8	60.5	-3.6%
General industrial machinery	145.1	137.5	- 5.2%

SELECTED US IMPORTS FROM CHINA

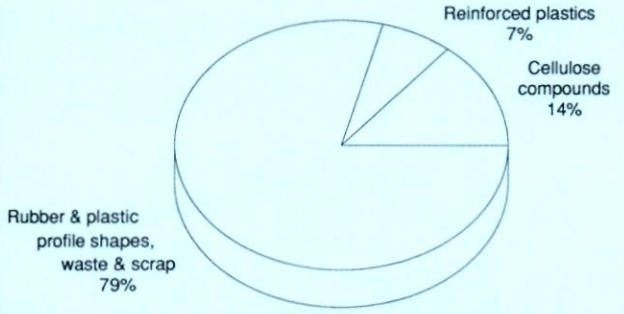
($ millions)

General industrial machinery	33.0	90.0	172.7%
Iron & steel	17.7	41.2	132.8%
Telecommunications & sound recording equipment	191.4	402.6	110.3%
Fish & shellfish	119.1	201.3	69.0%
Metal manufactures	128.8	213.2	62.5%
Toys, games, & sporting goods	642.9	951.1	47.9%
Inorganic chemicals	38.2	51.8	35.6%
Nonferrous metals	82.7	97.0	17.3%
Crude petroleum	340.6	366.0	7.5%
Textile yarns, fabrics & articles	472.0	496.4	5.2%
* Clothing & accessories (*see* chart)	2,019.1	1,873.1	- 7.2%
Petroleum products	111.3	46.1	- 58.5%

SOURCE: US Department of Commerce

SYNTHETIC RESINS & PLASTICS
1988 EXPORTS

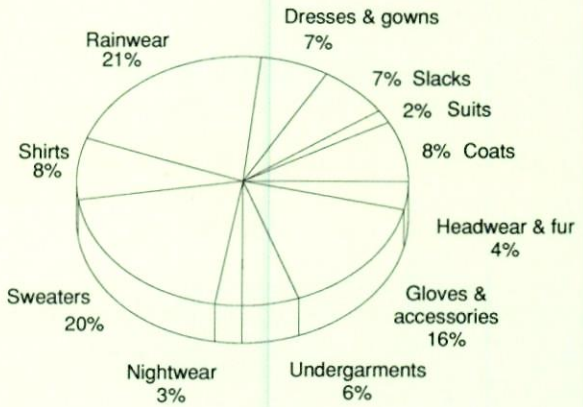
Total Value: $537 million



SOURCE: US Department of Commerce

CLOTHING & ACCESSORIES
1988 US IMPORTS

Total Value: $1.873 billion



SOURCE: US Department of Commerce

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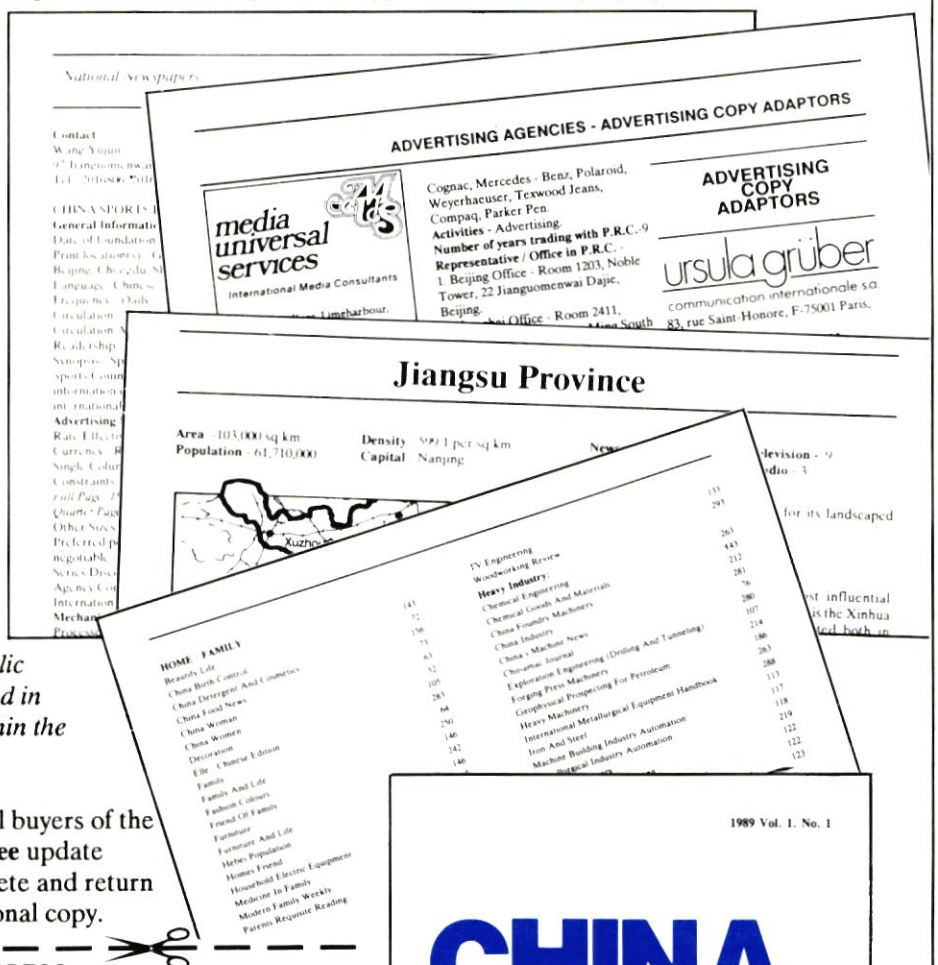

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CHINA BUSINESS

中外贸易

Jennifer Koch-Brick

The following tables contain recent press reports of business contracts and negotiations exclusive of those listed in previous issues. For the most part, the accuracy of these reports is not independently confirmed by *The CBR*. Contracts denominated in foreign currencies are converted into US dollars at the most recent monthly average rate quoted in *International Financial Statistics (IMF)*.

US-China Business Council member firms can contact the library to obtain a copy of news sources and other available background information concerning the business arrangements appearing below. Moreover, 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 the Business Information Center at The US-China Business Council.

中外贸易

SALES AND INVESTMENT THROUGH JANUARY 15, 1989

Foreign party/Chinese party
Arrangement, value, and date reported

Advertising and Public Relations

China's Imports

Webster Marketing (US)/Ningbo, Zhejiang
Will assist in marketing products from Ningbo. 11/88.

Investments in China

Mr. and Mrs. Sidney Rittenburg (US)/Huayang Technology and Trade Corp.
Established Wide World International Advertising and Exposition Co. Ltd. 8/88.

Agricultural Commodities

China's Imports

U.S.D.A.
Sold 400,000 tonnes red winter wheat at subsidized prices. 12/88.

Other

Colombia
Signed agreement for coffee-promoting festivals to be held in Beijing and Shanghai. 11/88.

Agricultural Technology

China's Imports

Deutz HWM Far East Ltd. (FRG)
Will supply tractor parts through World Bank loan. $7,300 (DM13,300). 11/88.

Pet-Ag Inc. (US)
Will sell two animal feed products. 11/88.

Investments in China

White Oak Co. (Japan)/Ruibao Development Co., Hainan
Will set up solid feed mill. 12/88.

Chemicals, Petrochemicals, and Related Equipment

China's Imports

Technip Co. (France)/CTIEC
Will supply chemical fertilizer production equipment to Sichuan plant. $90 million (FFr560 million). 10/88.

C. Itoh & Co., America Inc. (US), subs. of C. Itoh & Co., (Japan)/CTIEC
Will supply 100 tonnes polypropylene resin through World Bank loan. $145,000. 11/88.

Nemesis Chemical International (US)
Sold 2.4 million lbs. of hexamine. 11/88.

Sumitomo Corp. (Japan)/CTIEC
Will supply 20 liters Meothrin pesticide through World Bank loan. $160,000. 11/88.

Abbreviations used throughout text: BOC: Bank of China; CAAC: Civil Aviation Administration of China; CAIEC: China National Automotive Import-Export Corp.; CCTV: China Central Television; CEIEC: China Electronic Import-Export Corp.; CEROILFOODS: China National Cereals, Oil, and Foodstuffs Import-Export Corp.; CHINATEX: China National Textiles Import-Export Corp; CITIC: China International Trust and Investment Corp.; CITS: China International Travel Service; CNCCC: China National Chemical Construction Co; CNOOC: China National Offshore Oil Corp.; CPIC: China National Corporation of Pharmaceutical Economic and Technical International Cooperation; ICBC: Industrial and Commercial Bank of China; INSTRIMPEX: China National Instruments Import-Export Corp.; MLI: Ministry of Light Industry; MOCI: Ministry of Coal Industry; MOPI: Ministry of Petroleum Industry; MPT: Ministry of Posts and Telecommunications; MWREP: Ministry of Water Resources and Electric Power; NA: Not Available; NDSTIC: National Defense, Science, Technology, and Industry Commission; NORINCO: China North Industries Corp.; SINOCHEM: China National Chemicals Import-Export Corp.; SINOPEC: China National Petrochemical Corp.; SINOTRANS: China National Foreign Trade Transportation Corp.; SITCO: Shanghai Investment and Trust Corp.; SPC: State Planning Commission.

Investments in China

Advanced Chemicals Co. (HK)/Guangzhou Lithopone Factory
Established Guangzhou Lithopone Advanced Co. Ltd. to produce lithopone. 11/88.

BASF (FRG)/Shanghai Gaoqiao Petroleum Corp.
Established Shanghai Gaoqiao BASF Co. Ltd. to produce cohesive carpet solutions, textiles, and building materials. $13.4 million (¥50 million). (50-50). 12/88.

Other

Consortium of Japanese banks/SINOPEC
Will supply 10-year, $150 million loan for second phase of Qilu Ethylene Project in Shandong. 12/88.

China's Investments Abroad

USX Corp. (US)/SINOCHEM (USA) Inc., affiliate of SINOCHEM
Signed letter of intent to purchase certain assets of USX's phosphate fertilizer business. 12/88.

Construction Materials and Equipment

China's Imports

Allgemeine Baumaschinene Gesellschaff (FRG)
Will supply spreading machine for road construction through World Bank loan. $384,300 (DM700,000). 11/88.

Balama Prima Engineering Co. (HK)
Will supply two sets dresser grades and two sets vibrating rollers through World Bank loan. $583,185. 11/88.

Cross Field & Co. Ltd. (HK)
Will supply road construction equipment through World Bank loan. 11/88.

Joseph Vogele AG (FRG)
Will supply three sets of road pavers and parts through World Bank loan. $576,450 (DM1.05 million). 11/88.

PMC Industries Inc. (US)
Will sell pipe-finishing machinery through US Export-Import Bank loan. $56.1 million. 11/88.

NA (FRG)/Jingdezhen Plaster Mould Factory, Jiangxi
Supplied mould equipment for plaster production. 11/88.

Investments in China

Daying Co. Ltd. (HK)/Jinghai Computer Corp., Beijing
Established Jingda Light Building Materials Co. Ltd. to produce 200,000 pieces bent aluminum plates annually. $7 million. 10/88.

Nichimo Corp. (Japan)
Will set up joint venture to produce housing materials. 11/88.

NA (US)
The Beijing-Oakland Waterproof Construction Materials Co. Ltd. produces 2.5 million rolls of waterproof building materials and 100,000 tonnes of asphalt felt annually. 11/88.

Zwolle DSM Resin BV (Netherlands)/Beijing Red Lion Coatings Corp.
Established Red Lion-DSM Powder Coatings Corp. to produce industrial paints. (Registered capital: $3 million). (50-50). 11/88.

Other

NA (FRG)/Shaowu Log Yard, Fujian
Signed loan for thin particle board production line. $55 million (DM100 million). 11/88.

Consumer Goods

China's Imports

Fortune Tobacco (Philippines)/Shanghai Cigarette Factory
Will license cigarette filter production. 12/88.

Molins Tobacco Machinery (UK)
Sold cigarette manufacturing equipment. $34.7 million (£20 million). 12/88.

Investments in China

Cheung Laboratories Inc. (US)
Established joint venture to produce microwave ovens. 10/88.

NA (HK)/Hongji Corp. Ltd., Guangdong

Established joint venture to produce 3.5 million watch bands annually, 70% for export. 10/88.

NA (US)
The Shenzhen Pacific Disc joint venture is producing 1.2 million stereo micro-groove records annually. 10/88.

Ace Co. and Ace Luggage Co. (Japan)/Shanghai Friendship Luggage and Bags Factory
Established Shanghai Ace Travel Goods Co. to produce luggage for export. (JP:51%-PRC:49%). 11/88.

Eastman Kodak Co. (US)
Expected to open joint venture producing photographic paper and film. 11/88.

Chiva Industrial (HK and S. Korean joint venture)
Will produce plush toys in Shenzhen. $7.8 million. (HK:45%-SK:55%). 12/88.

Singer Sewing Machine Co. Inc. (US)/Huanan Sewing Machine Industrial Co.
Will produce sewing machines in Guangzhou. (US:51%-PRC:49%). 12/88.

Electronics and Computer Software

China's Imports

JBL International (US)
Will supply and install loudspeakers and electronics in the Great Hall of the People in Beijing. 11/88.

Nippon Electric Company (Japan)/Beijing Automation and Control Equipment
Will transfer facsimile machine production technology. 11/88.

Investments in China

Seidensha Co. Ltd. (Japan)/Great Wall Scientific Instrument Factory
Established Josei Electronic System Inc. to produce sensing units, software and other electronics. 8/88.

Intel Corp. (US) and Novel Precision Machinery Co. Ltd. (HK)/CATIC
Established Intel Computer Technology Ltd. to manufacture microprocessor systems. (US:20%-HK:20%-PRC:60%). 10/88.

Communication Cable Inc. (US)/Shenzhen Zhong Qian Enterprise Corp. and Guixi Smelter Corp. Ltd.
Established joint venture to license, supply equipment, and train personnel in electronic cable manufacturing. $3 million (US:25%-PRC75%). 11/88.

IBM Corp. (US)
Considering producing microcomputers in PRC. 11/88.

Shenme Electro-machinery Co. Ltd. (Japan)/Shanghai No. 16 Radio Factory
Established Shanghai Shenme Electro-machinery Co. Ltd. to manufacture electronic components, mainly for export. $62 million (J¥800 million). 11/88.

Danbus Memory Systems Inc. (US)
Will open disk-drive manufacturing facility. 12/88.

China Development Investment Ltd. (HK)/Shanghai Hi-Tech Park Development Corp., Chiao Tung Development Co., and Shanghai Trust and Consultancy Co., subs. of BOC
Signed 30-year contract to develop micro-electronics, laser technology, and computer controlled communications. $27 million (¥100 million). 12/88.

Seiko Epson Corp. (Japan)/Tianjin Tonghuan Electronic Computer Corp.
Established Tianjin Epson Co. Ltd. to produce printer components. (50-50). 12/88.

Tomokyatto Computer Corp. (Japan)/CAS
Cooperating to develop software. 12/88.

Unihorn Inc., subs. of Unison Inc. (US)/China Great Wall Industry Corp. and six institutes of MAI
Established Astro-Unihorn Computer Technology Co. to develop software for overseas customers. 1/89.

Other

Schmidt Co. Ltd. (HK), agent for GST (US)/MACHIMPEX
Opened the GST CAD/CAM Applied Technology Service Center in Beijing. 11/88.

Electronics (Consumer)

China's Imports

Nam Tai Electronics Inc. (US)
Will supply 480,000 calculators. 12/88.

Engineering and Construction

China's Imports

NA (Austria)/Shandong
Will build water purification and treatment plants. $312 million (AS400 million). 8/88.

Wilbur Smith & Associates (US)
Assisting in construction design and bidding documents for highway connecting Chongqing and Chengdu in Sichuan. The highway is a World Bank project. (U.S. Trade and Development Program provided $320,000 grant). 11/88.

Investments in China

China Tianjin Otis Elevator Co., joint venture between Otis Elevator Co. (US) and Tianjin Elevator Co.
Will supply and install 39 elevators to the Guangdong International Building. 10/88.

Amtrol Inc. (US)
Will sign 15-year, joint venture agreement to manufacture and distribute water system control tanks. 11/88.

Other

Emery Roth & Sons (US)/Beijing Institute of Architectural Design
Announced the China-US Architectural Alliance for cooperation between the firms. 10/88.

U.S. Federal Highway Administration
Discussing construction of "demonstration" expressway between Shanghai and Nanjing to showcase U.S. highway technology. $465 million. 11/88.

Finance and Banking

Investments in China

Sanwa Bank (Japan) and Bank of East Asia (HK)/Bank of Communications, Shanghai
Will establish financial service company. 8/88.

Food and Food Processing

China's Imports

Norway/COSCO
Granted loan to purchase 185 40-ft refrigerated containers. $4.9 million. 10/88.

NA (Switzerland)/Heilongjiang
Sold a wheat flour processing line. $3.87 million. 11/88.

Leyland Daf International (UK)
Signed barter trade agreement to exchange refrigerated trucks for frozen prawns. 11/88.

Nestlé Co. (Switzerland)
Signed barter trade agreement to exchange coffee, milk powder, and coffee creamer for rabbit offal. 11/88.

Investments in China

Mali Food Co. (Australia)/Meishan Industrial Co.
Established the Meishan-Mali Yeast Co. Ltd. to produce dry yeast. 8/88.

SA Abarn V (Belgium)/Longkou Brewery, Shandong
Signed letter of intent to produce dehydrated alcohol. 10/88.

NA (Belgium) and NA (FRG)/Zhengda Imports and Exports Service Co.
Established the Beijing International Egg Products Processing Co. to process 6,900 tonnes of eggs annually. $7.86 million. 11/88.

Mars Inc. (US)
Will sponsor 11th Asian Games to be held in Beijing and will provide M & M's chocolates. 11/88.

Big Boy Co. (S. Korea)
Will build hamburger processing plant to supply fast food eateries. 12/88.

China-Middle East-Europe Trading Co. Ltd. (Austria)/International Culture Exchange Center Building Co. Ltd.
Will open the Beijing Austria Restaurant Co. Ltd. 12/88.

Pepsico (US)/Beijing Bei Bing Yang Foodstuffs Co.
Formed Beijing Jing Mei Beverage Co. Ltd. to operate a bottling and canning facility. $14 million. 12/88.

Leasing and Insurance

Investments in China

Mitsui Leasing and Development (Japan)/Liaoning
Agreed to set up joint leasing company to assist in development of medium-sized Japanese companies in Liaoning Province. 10/88.

Machinery and Machine Tools

China's Imports

Modern Plants & Machineries Ltd. (HK)
Will supply engineering components through World Bank loan. 11/88.

Investments in China

Diamond Power Specialty Co. (US)/Hubei Boiler Aided Machine Factory
Established Diamond Power-Hubei Machine Co. Ltd. to manufacture sootblowers and sootblower control systems. $5 million. (50-50). 10/88.

China's Investments Abroad

Zhengda Corp. (Thailand)/Shanghai Tool Plant
Will build a tool manufacturing plant in Bangkok. 11/88.

Media

China's Imports

New World International (US)
Sold several television series. $300,000. 11/88.

Other

Burnham Broadcasting Co. (US)
Signed agreement to exchange television programming. 10/88.

Nagoya Television Station (Japan)/Nanjing Television Station
Signed mutual broadcast cooperation agreement. 11/88.

Tokyo Broadcast System (Japan)/China Central Television
Signed cooperation agreement to produce television series on the Great Wall. 12/88.

Medical Equipment and Devices

China's Imports

Innotech Inc. (Canada)
Completing outfitting of Canadair Challenger as emergency medical transport system. 10/88.

Investments in China

Tele-Art International Latex Ltd., subs. of Tele-Art Inc. (US)
Will establish Sunarrow Latex joint venture to produce latex gloves. (US:40%-PRC:60%). 11/88.

GoCo Industrial Co. (HK)/Beijing Glass Industry Distribution Co.
Formed Beijing GoCo Optical Spectacles Co. to produce 100,000 pairs of spectacles annually. $537,300 (¥2 million). 12/88.

Metals, Minerals, and Processing Technology

China's Imports

Gove Aluminum Ltd. (Australia)/CNIEC
Will sell 100,000 tonnes alumina each year, for three years. 11/88.

US/China Resources Metals and Minerals Co.
Sold three obsolete ships for scrap. 11/88.

Kobe Steel Inc. (Japan)
Received orders for two aluminum foil rolling mills. 12/88.

Investments in China

Hardy Turquoise Co., subs. of Sterling Products Inc. (US)
Signed 10 year, joint operating agreement for turquoise mining. $1 million annually. 10/88.

Tridus International Inc. (US)/CAS and Ningbo ETDZ Industrial Co.
Formed Ningbo Konit Industries to produce neodymium iron boron. 11/88.

Malaysia Mining Corp./CNIEC
Will form joint venture to mine tin. 1/89.

China's Investments Abroad

Perdama International Trade Corp. (Malaysia)/China Metallurgical Construction Corp.
Will jointly build stainless steel wire plant. $12 million. (ML:70%-PRC:30%). 12/88.

Military Equipment

China's Imports

Rockwell International Corp. (US)
Will supply advanced avionics for upgrade of F-7M fighter. 11/88.

Mining Equipment

NA (USSR)/Heilongjiang Province Gold Co.
Will supply vibratory spin drill for gold mining in frozen ground. $772,000 (SFr1.2 million). 12/88.

Investments in China

Nordberg Inc. (US)/Shenyang Heavy Machinery Plant
Negotiating joint venture to produce crushing equipment used in mining. 12/88.

Packaging and Pulp and Paper Equipment

China's Imports

Sweden and Norway/Kaifeng Paper Machine Sieve Factory, Henan
Will grant loan to import polyester sieve production equipment. $3.5 million. 10/88.

Tampella (Finland)
Sold complete packaging board mill. $23.4 million. 10/88.

City of Los Angeles (US)
Signed agreement to sell 15,000 tonnes used paper for recycling in PRC. $50 million. 12/88.

Investments in China

Nippon Fruit (Japan) and NA (Singapore)/Jiangyin Construction Engineering Technology Bureau
Established joint venture to produce bag-making machines. (JP:36%-SP:13%-PRC:51%). 11/88.

SINOCHEM (USA) Inc., affiliate of SINOCHEM/Hunan Xiangtan Plastic Factory
Established Fengrun Plastic Products Co. Ltd. to produce plastic square-bottom valve bags. (Registered capital:$4.9 million). 11/88.

Petroleum, Natural Gas, and Related Equipment

China's Imports

Atlantic Richfield Co. (US)/CNOOC
Signed agreement to develop natural gas field in South China Sea. 11/88.

Occidental Petroleum Corp. (US)/CNOOC
Signed agreement to build exploratory well in Pearl River. 11/88.

Sun Orient Exploration Group and Petro-Canada Resources (Canada)/CNOOC
Signed contract for oil exploration in the South China Sea. 11/88.

Mitsubishi Heavy Industries (Japan)/Bohai Platform Engineering Corp.
Will supply floating platform petroleum processing plant. $20 million. 12/88.

Pharmaceuticals

Investments in China

Cell Technology (US)/Chinese Academy of Medical Science
Established China Cell Technology Co. to produce cancer treatment drugs. 11/88.

Ports

Investments in China

MGM Development Co. (US)/Tianjin
Will develop 1,400 acre industrial complex at Xingang port. $1 billion. 11/88.

Power and Power Related Equipment

China's Imports

NA (Canada)/CTIEC
Will supply two turbogenerators. 11/88.

United Technology and Industry Exports Corp. (USSR)/Huaneng International Power Development Corp.
Signed barter trade agreement to exchange two thermal generating units for ship repair work and light industrial goods. 12/88.

Other

Norway/Huaneng International Power Development Corp.
Will grant loan to develop Yueyang Power Plant. 11/88.

Property Management and Development

Investments in China

NA (Japan)
Will build 23-story hotel joint venture; term of cooperation is 25 years. 10/88.

Scientific Instruments

China's Imports

Applied Automation (US)/MOP
Will supply seismic equipment. $14.9 million. 11/88.

Ships and Shipping

China's Imports

Bank of Kreditanstaldt fur Wiederaufbau and Howaldtswerke Deutsche Werfte (FRG)/COSCO
The bank will provide a loan to purchase a container ship from the German shipbuilder. $55 million (DM100 million). 11/88.

Investments in China

Howard Corp. Ltd. (UK)/COSCO
Formed joint venture to act as London agent for Sino-European Container Link Service. 9/88.

NA (HK)/Xiamen Steamship Co.
Established Xiamen Tongyi Dock Co. to manage small-vessel dock. 11/88.

Telecommunications

China's Imports

Pacific Development Group (US)
Will supply digital switching system. $8 million. 11/88.

NA (France)/Xian, Shanxi
Will supply equipment for microwave communications tower. 11/88.

Investments in China

NA (FRG)/Xinhua
Jointly developed message transmission system for news handling in Chinese and English. 12/88.

Other

United States
Signed agreement to allow for export of certain satellites for launch by China. 12/88.

Textiles

China's Imports

Technip Co. (France) and Kanebo Corp. (Japan)/Urumqi General Petrochemical Works
The French company will set up the polyester producing project and the Japanese company will provide the technology. 12/88.

China's Investments Abroad

NA (Pakistan)/China Textile Industrial Corp.
Formed silk cultivation and manufacturing venture. 1/89.

Transportation Equipment

China's Imports

Paccar Inc. (US)
Sold 48 heavy trucks. $27 million. 11/88.

Boeing Co. (US)/Shanghai Airlines
Sold three 757-200s. $135 million. 12/88.

Kia Motors (S. Korea)
Sold 1,000 minibuses and pick-up trucks. 12/88.

Mikuni Corp. (Japan)/CATIC
Will supply parts for the production of carburetors. 12/88.

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Research: DAVID L. DENNY

Address
1818 N Street, NW, Suite 500
Washington, DC 20036 USA
(202) 429–0340
Telex: 64517 NCUSCTUW
Telefax: (202) 775-2476

BEIJING OFFICE
Director for China Operations: JOHN FRISBIE
Deputy Representatives: ZHENG XIAO, MAUREEN BROWN
CITIC Building, Suite 22C
Telephone: 5002255, ext. 2263, 2266
Cable: USCHINTRAD
Telex: 22637 NCPEKCN

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Economic Counselor: JAMES LAROCCO
3 Xiushui Bei Jie
Jianguomenwai, Beijing
Telephone: 532–3831
Telex: 22701 AMEMB CN

CHENGDU CONSULATE
Consul General: JAN DEWILDE
Deputy Principal Officer: SCOTT BELLARD
Jinjiang Hotel
180 Renmin Road
Chengdu, Sichuan
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Visas: (713) 524–4311
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LOS ANGELES CONSULATE GENERAL
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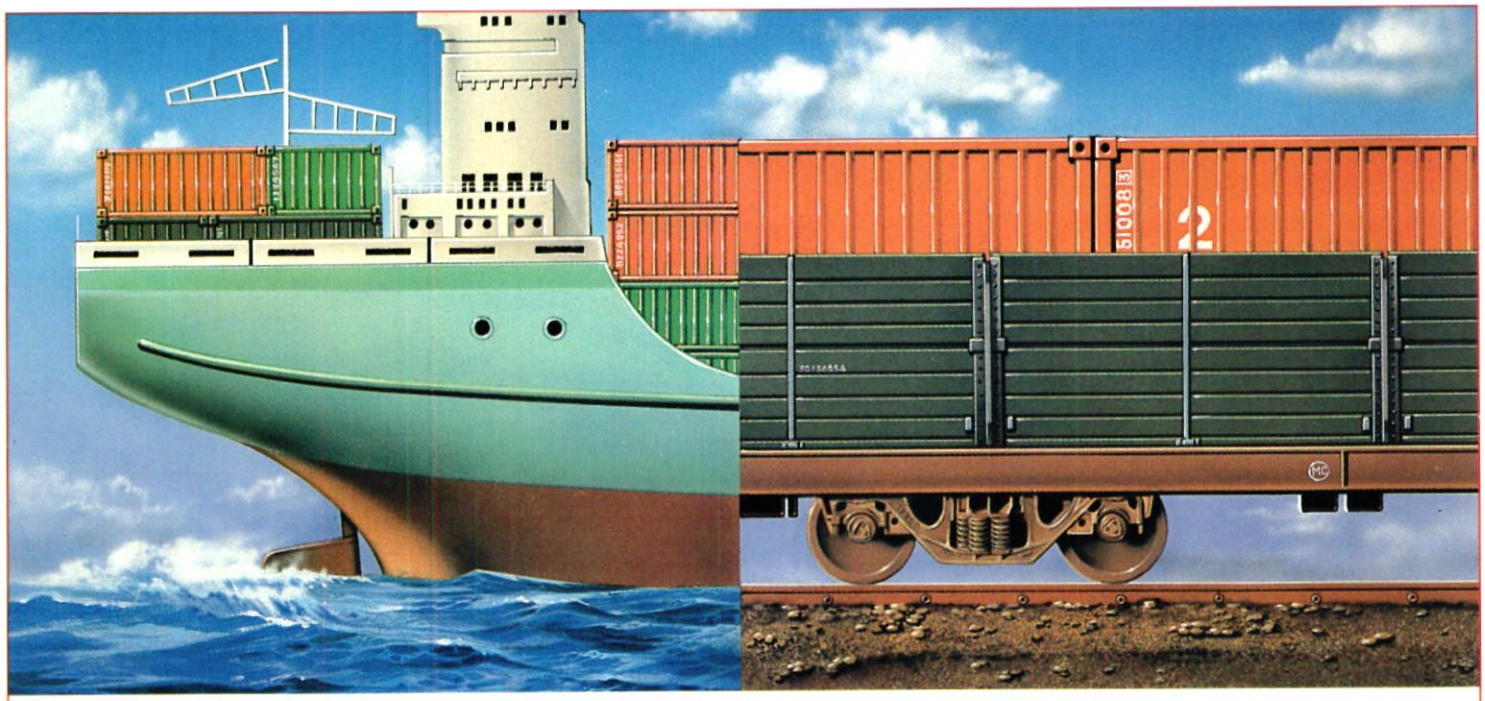

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