

China: Land of Opportunity

*Review and update on 1981
LES publication; recommendations
for doing licensing and technology
transfer business in PRC*

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In the March 24, 1979, issue *Renmin Ribao* set forth a clear statement of policy with respect to China's future capital investments:

"The past method of buying only the 'eggs' but not the 'hens' should be changed into buying the 'hens' but not the 'eggs.' If 'hens' must be bought, be sure not to make any duplicate purchases. This is one of the important principles in introducing foreign things . . ."

This philosophy was described in some detail when the U.S. Patent/Licensing Delegation to China, led by Commissioner Sidney A. Diamond, visited the Ministry of Metallurgy (MMI) on November 15, 1980. Mr. Zhou Chuan Diam, Vice-Minister, outlined general and specific examples of the Chinese desire to improve their inherent ability to carry out their own engineering, to build their own equipment, to operate their own plants—all through the purchase of more technology and less hardware.

For example, the purchase of continuous ingot casting equipment was given in the following sequence: First, buy complete equipment from a western supplier; Second, buy only critical parts supplied by the western firm, all engineering and construction by MMI; third, and all subsequent installations 100% by MMI.

That meeting and many other similar sessions brought home to the delegation the emphasis which the Chinese have placed on the licensing and purchase of technology.

In spite of the changes still being made in China's governmental hierarchy and in spite of their announced organizational changes in the handling of foreign business, the basics and the details of this picture have remained essentially the same as those described in the Delegation report: *USA and China Technology and Patents, Sale and License*, published by the Licensing Executives Society in June 1981. It is interesting to note that other delegations to China in this field from both Japan (July 1981) and Australia (November 1981) have not uncovered any significant changes in the LES publication. While the 182-page LES book can scarcely be covered in detail in this paper, the most significant features are reviewed and special up-dating information added as appropriate. With special significance for

**KEW Associates, Chapel Hill, NC; paper presented to the International Congress on Technology and Technology Exchange, Pittsburgh, PA, May 1982.*

technology transfer, the subject of China's ability to absorb and duplicate technology is also discussed. China's announced needs and future plans are outlined to guide those who feel that this marketplace may offer significant profit opportunities.

APPROACHING THE MARKETPLACE

First, Caution

At the outset, one point must be made—and repeated with emphasis: "there are no shortcuts to a successful sale of technology in the PRC." Regardless of the subject of any proposed contract, the one commodity required in abundance is patience—the commitment of time, manpower and expense, perseverance of purpose, and knowing your own negotiating parameters are essential. A corollary to this principle is that there is probably no such thing as a "small" sale or license or contract on technology. In other words, a project for China should have a significant value in order to justify the effort necessary to achieve and accomplish it.

Whom to Contact

If your technology or your specialized machinery, equipment, process or plant design will fill one of China's announced needs—or if you feel that a joint venture of a "cooperative enterprise" in China has good export possibilities on the world market—or if you feel that there may be long-term advantages in trade with China—then you had better start to plan your program. For example, the Nike Company of Beaverton, OR., has four factories in China and a fifth planned. At some point in the future the company expects to have 25% of its world output of athletic shoes come from China.^{2a} The marketplace of China is as varied as the U.S. market, although in different ways. Therefore, it is probably not a good idea to approach only a single foreign trade office or one ministry or one particular location. With attention to the type of product or technology, initial contacts should be made as broadly as reasonably possible—such as with several of those organizations listed in Table I.

Supplementary to Table I and the organizations given in the *LES Guide to China*, it should be noted that a new ministry was established in March 1982—the Ministry of Foreign Trade and Economic Relations. According to present information, this ministry will incorporate the previous Ministry of Foreign Trade, the FICC and IECC (see Table 1), the previous Ministry of Foreign Economic Relations, and the FTCs. This reorganization move is a result of the efforts being made by China to streamline its bureaucratic organizations and make them both more efficient and more responsive to present needs and circumstances. This change is not expected to result in

changes in the approach to China's technology market. If anything, it is supposed to make the job easier.

Why So Many

In case the plethora of organizations and the obvious overlap of responsibilities seems confusing, it is. At least, it can seem so. On the other hand, it is not any worse than the prospect of many potential customer firms in the U.S., for a given technology sale or license. Many people assume that the state-controlled economy of China operates with the same monolithic structure as other socialist countries. It doesn't. For example, one Chinese official made the point quite clearly when he said, "China used to have a monopoly system, but competition today is good—today there is room for all kinds of competition in China—competition even between the provinces and the central government."

The Shanghai Petrochemical Complex (SPCC) was established with complete plants and technology contracts negotiated by TECHIMPORT. However, one plant official told our delegation that SPCC expected to be designated as one of the enterprises that could deal directly with foreign companies. On September 26, 1981, the China Jinshan Associated Trading Corporation was opened for import, export, and other external economic activities of the SPCC. The corporation was established by SPCC and CNTIC (TECHIMPORT).

On the other hand, the Guangzhou Radio factory indicated that although its management could deal directly with foreign partners, final commercial negotiations and contract signing would be left to an authorized Foreign Trade Corporation. Depending on the size and type of transaction, the factory would either utilize China National Light Industrial Import and Export Corporation (Ministry of Foreign Trade) or the China Electronic Technology Import and Export Corporation (Fourth Ministry of Machine Building). These different contacts demonstrate how varied the Chinese market is.

The final question of whom to contact and how to plan your approach will depend upon:

1. The produce or process involved.
2. The nature of China's need—a major industry or special technology improvement. Is it related to China's announced needs?
3. The Chinese ministry controlling.
4. The import-export organizations connected with the subject.
5. The location—city—special economic zone—or should the technology be sold for use in several places.
6. End user—industry plant or factory.

How to Reach the Customer

Concurrent with the "who," "where," and "when," plans must also be "how." Of course, the best method is by personal visit to the specific end user/customer. However, such direct contact is seldom possible. The next best choice is probably a combination of the proper industrial ministry plus CNTIC (TECHIMPORT) plus CCPIT plus Consultech, CITIC and CIEC. An early visit to the Chinese Embassy in Washington, D.C., and to the TECHIMPORT office in Washington

also might be useful.

First of all, planning should include a visit with the U.S. Department of Commerce and the National Council for U.S.-China Trade. Offices for both are in Washington, D.C., and any technology project that is substantial enough to justify an approach to the China market will surely support a visit with those two organizations. Another source of third-party information can be one of the major commercial banks working in China. While it is not appropriate to select any specific bank, it is possible to say that the Hong Kong office of the Hong Kong-Shanghai bank had a great deal of information to give and was most knowledgeable and helpful to our delegation. For a broad-brush approach, it is also possible to conduct advertising campaigns in one or more Chinese publications. Information on such activity is summarized in the *LES Guide to China*—and can be obtained through the U.S. Department of Commerce, the National Council, and CCPIT. *China Business Review*^{2h} has a particularly good summary of this subject in the September-October 1981 issue.

Eventually, it will be appropriate to visit China and present one or more exhibits and symposia on the product/process technology involved. Product/process or corporate seminars and exhibits have often been proposed with beneficial effect at the time of initial contact with the Chinese ministry or FTC. Such affairs can be arranged through the industrial ministry, CCPIT, the appropriate foreign trade corporation. The presentation material should be well planned and as explicit and thorough as reasonably possible. It should be accompanied by experts who are familiar with the technology and who also know what to say and what not to say. Properly carried out and properly directed to China's needs, a program of this type should end up in serious negotiation for a contract.

CHINA'S STATED NEEDS

The Basic Shopping List

If China does not need your technology—or if your product/process is not on the priority list, the chances of "making a sale" are not good. The February 1978 launching of Chairman Hua's ambitious expansion program was followed in December 1978 by the Third Plenum's decision to readjust the economy and to restrict the construction of major projects throughout the Chinese economy—particularly those projects which are large users of energy (Baoshan iron and steel complex, the aluminum complexes, etc.). Subsequently, the international business news has seen two separate waves of project suspensions—in 1979, and in late 1980 and early 1981. On the positive side, the present direction of China's planning gives greater priority to consumer-related industries,^{2a} agriculture, agriculture support industries, food industry, electric power generation (especially hydropower), light industry (especially textiles and electronics), development of coal resources and petroleum resources, plus transportation, telecommunication and building materials.

As reported in *China Daily*, October 30, 1981, China's energy study institute has issued 13 proposals designed to ease the nation's energy shor-

CHINA'S ORGANIZATIONS INVOLVED WITH TECHNOLOGY CONTRACTS

To Be Considered for Contact in the Initiation of a Technology Sale or License

CCPIT (China Council for Promotion of International Trade)
Liaison between Chinese organizations and foreign firms. Maintains Legal Counsel's Office for western firms. Hosts commercial delegations visiting China. Hosts technical seminars from foreign firms. Maintains center for samples and literature on foreign products and technology.

CITIC (China International Trust and Investment Corporation)
State-owned corporation under the leadership of the State Council. Purpose is "to introduce, absorb and apply foreign investment, advanced technology and to import advanced equipment and to bring in advanced technology for purposes of China's national construction."

CIEC (China International Economic Consultants)
Formation announced October 31, 1981. Sponsored by CITIC, the CIEC will provide economic and legal consulting services for investment activities.

According to the statutes of the new organization, it will, on commission from domestic and foreign institutions, enterprises, other organizations and individuals provide consulting services in respect of the orientation, modes, feasibility study, production, management, financial, accounting and legal matters of investment projects.

CONSULTECH (China Trade Consultation and Technical Services Corporation)
Offices in Beijing and other principle cities. Will consult with and give advice to foreign firms wishing to engage in technology transfer. Reports to Ministry of Foreign Trade.

CNTIC - "TECHIMPORT"
(China National Technical Import Corporation)
Established in 1952 as a corporation under the Ministry of Foreign Trade. Until about 1978 CNTIC was the only organization in China dealing with the importation of technology and plants into China—and is still the largest corporation interested in importing technology in complete plants. Have established offices in the U.S., Japan, France and the Federal Republic of Germany.

FTC's (Foreign Trade Corporation)
Report to Ministry of Foreign Trade. No longer have a monopoly of all contacts with foreign firms but are still major factors in the import and export business.

Other Import-Export Corporations
Report to certain industrial ministries, and Chinese Academy of Science. In respect to these specialized corporations, there are specific interests which may be directed toward particular project areas.

Cities and Special Economic Zones (including local industries and factories)
Are set up with varying degrees of autonomy and maintain their own planning organizations, import-export offices, information bureaus, etc. Should be considered for specific projects and joint ventures.

IECC (Import-Export Control Commission)
Technology Acquisition Bureau of IECC must give prior approval to deals involving the purchase or licensing of foreign technology. Recently incorporated into the Ministry of Foreign Trade and Economic Relations.

FICC (Foreign Investment Control Commission)
Operates with much the same leadership as IECC, but has specific task of approving all foreign investments between Chinese enterprises and foreign firms. Recently incorporated into the Ministry of Foreign Trade and Economic Relations.

SPC (State Planning Commission)
The highest planning body in China. Concerned with broad plans (five-year) and all major projects.

SCCC (State Capital Construction Commission)
Involved in planning and allocation of funds for all major projects.

SSTC (State Science and Technology Commission)
Has general leadership of development for all scientific work in China.

ISTI's (Institutes of Scientific and Technical Information)
Offices in Beijing and other major cities such as Shanghai Institute of Scientific and Technical Information. Maintain active programs to promote scientific and technical information.

TABLE I

age—including giving priority to hydropower development and speeding up the development of nuclear power. The October 18, 1981 issue of *Renmin Ribao* carried a long and detailed editorial titled "Strive to Develop the Food Industry." This strongly-worded review pointed out the need for improvement and expansion in all phases of the food industry, from the farm to the processing to the packaging and to the distribution. Specific examples and mention of all the above priority industries are to be found in various statements and publications from China.

Further emphasis on China's continued interest is seen in the special meetings held by Mr. Liu of the FICC in early April 1982, in San Francisco, New York and Washington, D.C. The purpose of these meetings was to review with potential U.S. partners a list of 130 projects for which China would like to establish joint ventures. This list covers nine separate categories as listed below with projects which range from marble "mining" (quarry) to medical instruments, to

polypropylene film to microcomputers to "purple berry wine." Further details are available through the writer or Mr. D. Piggot of the U.S. Department of Commerce, Washington, D.C. Firms interested in these or other projects should also consider attending the UNIDO conference on June 7 to 11, 1982, in Guangzhou. This conference is being held to promote further direct con-

Categories for 130 Project Proposals of the PRC as Provided to U.S.D.O.C., in March 1982

- Mining
- Textile and Leather Industries
- Manufacture of Wood and Wood Products
- Manufacture of Chemicals and Plastic Products
- Manufacture of Nonmetallic Mineral Products
- Basic Metal Industries
- Manufacture of Fabricated Metal Products, Machinery and Equipment
- Other Manufacturing Industries
- Manufacture of Food and Beverages

tact between the FICC plus interested ministries and potential project joint-venture partners.

Selling the Technology Eggs

As budgets shrink and as the pressure increases for improved performance of existing facilities—as the Chinese put more emphasis on expanding their own capabilities—there has been greater willingness to negotiate licenses for technology. For example, Hughes Tool Company entered into a substantial contract covering oil drill tool technology. By the time the third phase of this program is complete, China will be able to build their own, complete drilling heads and cutters—in the first air-conditioned factory ever built in China! Also in the energy field, Ebasco has negotiated a contract for two coal-fired power plants. *Business China*⁹ reported on the background, the interesting contract terms and the extensive technology transfer commitment made by Ebasco in its contract. *China Business Review*^{2b} reported the Roberts and Schaefer contract for a coal washing on beneficiation plant with substantial technology and engineering—as well as giving details of the Ebasco contract. An August 27, 1981, news item of XINHUA (Beijing) reported the signing of a contract on “license and know-how for combine harvesters . . . signed . . . between the China National Technical Import Corporation on behalf of the Ministry of Agriculture Machinery of China and John Deere and Company of the United States . . . The contract stipulates that China can introduce the technical know-how about John Deere and Company’s three types of combine harvesters and relevant equipment and attachments. The company will provide the Chinese side with data on quality control, product experimentation, maintenance and management, train Chinese technicians, administrative personnel and workers and send experts to China to give technical direction . . .”

140

These examples in the fields of energy and agriculture indicate a future for other major technology-related project sales to China. China’s needs have been announced in broad terms and the means are available to determine the potential for individual technology license and sale contracts. Payment terms, arrangements, countertrade and compensation trade—a variety of imaginative approaches—hold the answer to a successful deal in China^{2a}.

THE CONTRACT

Negotiation

Assume that the technology need has been identified—the Chinese “customer” has been found: ministry, FTC, city, local enterprise, or all of the above. Now comes the time to sit down with the Chinese negotiating team to work out the contract. This session may well be the longest negotiation period the supplier has ever had. For example, the Ebasco actual negotiating sessions covered October, November, and December of 1980^{2a} after more than a year of preparatory meetings—and simultaneously the Chinese were carrying out negotiations with Ebasco’s competitors for the same project! Unless a supplier has a technology which is unique—which is unlikely—there

will always be a worldwide competitive situation for any technology that is worth considering for sale in China.

In terms of negotiation procedure, the technical side will be thoroughly reviewed, negotiated and defined first—as is the case in most project negotiations with socialist countries. Commercial terms are settled after the technical. Difficulties may arise as a result of language and/or other differences, but they are solvable with patience. Compensation arrangements may be based on cash payments—joint venture with long-term payback in the form of a share of the joint venture profits—countertrade payment—compensation trade—or payment through export profits. The arrangement which will have the greatest chance of success will include the possibility for increased Chinese participation in the world’s export market—or will assure that the technology can be used in other China locations on a favorable basis.

Terms and Approvals

In regard to contract terms and protection of the supplier, no important consideration can be left unsaid, and the contract must be carefully worded. *Les Guide to China* discusses certain provisions which are of particular interest, since the approach is somewhat different in China as compared to other parts of the world. Arbitration, *force majeure*, confidentiality, warranties and guarantees are among those terms that require fullest consideration. Competent legal counsel is essential throughout the contract drafting and negotiation in order to assure that all terms, conditions documentation and Chinese approvals are established to effect a successful technology contract.

On the subject of approvals, it must also be pointed out that the U.S. Government exercises control over the export technology and that clearance is still necessary through the Office of Export Administration, Department of Commerce—as well as approvals where required by the Office of Munitions Control, the Nuclear Regulatory Commission and the Treasury Department’s Foreign Assets Control Regulations. It is not the purpose of this paper to discuss this subject. However, it is an essential consideration for every U.S. exporter of technology.

CHINA’S LEGAL SYSTEM

Background and Present Laws

Many people have expressed concern over the Chinese legal system—reports that lawyers are not recognized in Chinese negotiations—reports of different interpretations by the Chinese on certain standard western contract terms,—etc. Without question it should be said that lawyers are recognized in China, that there is developing a sound and recognized legal system which covers a significant body of laws, rules and decisions. As China continues to move in the direction of more commerce, and dealings with the West it is accommodating more of its systems to match with similar practices in the West. In 1979 the United States and the PRC entered into a Trade Agreement which established the fundamental principles that have fostered and guided commercial activity between the two nations. The enactment of the Peoples Courts

Code of 1979, the Lawyers Act of 1980 and the laws adopted in December of 1981 by the Fifth National Peoples Congress—all reflect the strengthening of formal legal institutions in China. Table II lists the laws and regulations issued to date which appear to have significance for those who are licensing or selling technology to China.

Incidentally, the past Chinese attitude toward laws, courts and lawyers is explained by referring to past cultural attitudes. In a recent article,⁶ Messers George, Gullo and Stein point out, "Law and legal institutions were viewed as coercive instruments that, in a society where close and continuing personal relations were unavoidable, provided an inferior method of control. Teaching by example and modification of social behavior through peer pressure were considered more effective and harmonious approaches." Recognizing this historical attitude of past centuries makes somewhat easier the understanding of the present development status of the whole Chinese Legal System and, specifically, makes their present attitude toward contract disputes and arbitration much easier to rationalize (as is explained later).

With further regard to the laws and regulations as issued (Table II), particular attention is directed toward recent law: Foreign Enterprise Income Tax Law, Detailed Regulations Implementing that Law, Economic Contract Law of the PRC, Code of Civil Procedure. The January 1982 issue of *East Asian Executive Reports* includes an analysis of the Foreign Enterprise Tax Law. It is obvious that these new laws, regulations and code should be studied in detail by

CHINA'S LAWS AND REGULATIONS ISSUED AS OF JANUARY 1, 1982, WHICH APPEAR TO HAVE SIGNIFICANCE FOR THE SALE AND LICENSING OF TECHNOLOGY

Joint Venture Law.*

Regulations on the Registration of Joint Ventures.*

Regulations on Labor Management in Joint Ventures.*

Trademark Law.*

Decision to Establish the Foreign Trade Arbitration Commission (now Foreign Economic Trade Arbitration Commission).

Rules of Procedure of the Foreign Trade Arbitration Commission.

The Organizations of the People's Court Code.*

The Lawyers Act of 1980.*

The Individual Income Tax Law.*

Joint Venture Income Tax Law.*

Regulations for Implementation of the Joint Venture Income Tax Law.*

Regulations for Implementation of the Individual Income Tax Law.

Foreign Enterprise Income Tax Law—adopted December 13, 1981, at the Fourth Session of the Fifth National Peoples Congress—Effective January 1, 1982.

Regulations for Implementation of the Foreign Enterprise Income Tax Law.

The Economic Contract Law of the PRC—adopted at the fourth session of the Fifth National Peoples Congress on December 13, 1981—to be effective January 1, 1981.

Code of Civil Procedure.

Regulations on Special Economic Zones in Guangdong Province.*

*Text is given in *LES Guide to China*

TABLE II

anyone contemplating a legal contract or any profitable business activity in China. English language texts can be obtained through Mr. Daniel D. Stein of the U.S. Department of Commerce.

Court System

With respect to the court system, there are four basic levels of courts:

1. The Supreme People's Court in Beijing.
2. The High People's Court which sits in the provinces and municipalities and prefectures.
3. The Intermediate Level Courts.
4. The Basic Level People's Court.

In addition, there are separate speciality courts, including Foreign Court, Military Court, Water Transportation Court, and Railway Transportation Court.

An economic division was established in the Intermediate Level Court which was given original jurisdiction over economic disputes—which will probably include disputes arising from contracts between foreign investors and citizens of China as well as disputes concerning industrial property such as patent rights.

As these courts and codes are considered, it is significant to realize the basic tenet of Chinese philosophy with respect to adversary proceedings: such actions are to be avoided whenever possible. For example, the Chinese are reluctant to issue written opinions because a written decision declaring one party the winner and the other party the loser could be a source of tension between the parties and hinder future friendly relations. The preservation of friendly working relationships is important to the Chinese and they have traditionally viewed the western practice of adversarial confrontation as a destructive system that should be avoided.

Arbitration

The foregoing attitude is reflected in the Chinese system for stating dispute resolution requirements in a contract. First of all, a formal arbitration proceeding is to be avoided. Initially, in case of a disagreement, there must be an informal discussion between the parties—a genuine, mutual consideration of the factors and influences on both sides. Failing success by that route, one then should practice conciliation in which a third party will usually play an active role. As a last resort, arbitration may be turned to for resolution of the dispute. In any case, arbitration is clearly preferred over any type of litigation or court action. "Joint Conciliation" is being used by economic and trade communities of many countries. Also, a new technique of "Joint Handling" of foreign trade arbitration has been used successfully since 1978. The legal branch of CCPIT includes the Foreign Economics and Trade Arbitration Commission (FETAC). The *LES Guide to China* discusses these procedures and includes a suggested draft arbitration clause.

PATENTS, KNOW-HOW AND PROTECTION

Protection

Trade secrets, know-how and proprietary informa-

tion may be protected by contract with the Chinese. The scope and period of the requirement for secrecy must be proportional to the value of the information disclosed and the terms of the transaction. If breach of secrecy occurs, the aggrieved party may resort to arbitration or to the Economic Division of the Intermediate People's Court. It should be said that a case of such a breach had not been reported to the writer's knowledge. As is generally known, the Chinese have not, at the time of this writing, adopted or published a draft of a patent law. Thus, the only valid references and applications of patents in a technology contract with the Chinese must be in respect to patents outside China and their effect upon the export of goods and machinery made according to the licensed technology. Protection within China must still be handled as trade secrets and know-how or proprietary information.

Patents

The contemplated patent law for China has already been reviewed in other publications^{1,2b,4a}. The most recent detailed discussion is in *China Under the Four Modernizations*, the 1982 Joint Economic Committee publication on China—the first part of which was scheduled for release in April. In an article titled "Recent Developments in China's Treatment of Intellectual Property" by Michael Kirk and David Denny, the comment is made, "The Chinese have completed the draft of a patent law that, if passed, will mark a bold departure from past Chinese policies. In addition to continuing to utilize a system of 'inventors rewards' Chinese socialist organizations would be permitted to patent their inventions and to charge royalties for use of their patented inventions. Moreover, private enterprises (individuals and joint ventures) would be granted the full range of patent rights..." An interesting comment is also made by Kirk and Denny with respect to trademarks (already in existence with Chinese Trademark Law): "Moreover, Chinese planners have recently promoted competition and brand name identification among Chinese enterprises and have even encouraged advertising to promote these goals."

As reported in the *LES Guide*, the Chinese will have three different types of patent protection:

1. A patent of invention with a term of 15 to 17 years from filing;
2. A patent for utility models with a term of five years from filing, possibly extendable by another five years upon application.
3. A patent of industrial design—term five years from filing, also with a possible five-year extension.

Patents for invention will not be granted on new species of chemical or pharmaceutical products (chemical or pharmaceutical processes will be patentable), animals and plants, foods, beverages, computer programs, substances derived from nuclear fission or methods of deriving substances from nuclear fission. Further details of the proposed patent law are available in the literature references. While there is no such law in existence, those interested in the business of buying, selling and licensing technology in China should be aware of the probabilities—and should be

prepared to act accordingly.

TECHNOLOGY TRANSFER—THE ACTUAL JOB

Caution

Once the China market has been successfully analyzed for technology needs—the ultimate user or the ministry has been convinced—once the contract has been negotiated and signed—are all the problems over? Chances are that difficulties have only started if the technology supplier has not made adequate preparation for the task of technology transfer. The technical negotiations of the contract should identify and iron out many of the difficulties—but there may always be stumbling blocks that have not been foreseen. Marketing and legal aspects are vital to any technology contract; however, technical questions constitute the heart of the entire project—and must be answered thoroughly and completely.

Check List and Preparation

Regardless of the technology, certain considerations must be taken, such as:

1. **System of measurement**—English vs. Metric. The U.S. still uses English measurement for the most part. China uses metric measurement, for the most part. Sometimes Chinese units of measurement are used. Who is to make the conversion, and how is it to be done—hard or soft? Will redesign be necessary to accommodate metric or Chinese building standards? Etc.
2. **Standards, codes and specifications**—What are applicable to the technology? What standards are used in the U.S.? What standards are used in China? Are these standards compatible? In referring to standards, all possible industrial standards and codes are intended—from SAE steel specifications to ASME Boiler Codes to local building codes and any other technical or engineering/scientific regulations that have a governing effect on the technology in question.
3. **Standard practices**—What are the existing Chinese norms of engineering or technical performance—and what are the Chinese standard plant practices, engineering design standards, machinery maintenance practices and standards? It is possible that certain U.S. norms or standards of performance do not exist or are different in China.
4. **Educational requirements**—What are the U.S. educational requirements for those who must perform the technology in question? Are these requirements met by the Chinese system and can a sufficiently educated manpower supply be made available? Or must basic education be accomplished in addition to the specific technology transfer?

China's Ability to Assimilate

The answers to these and other questions related to satisfactory technology transfer are varied. One fact is clear, however—that one must investigate this subject very carefully. Writing in *China Under the Four Modernizations*, the 1982 Joint Economic Committee Report on China,^{4b} Dr. Dennis Simon points out that, "China's ability to assimilate foreign technology is severely constrained by four factors: 1) uneven perfor-

mance with respect to translating research results into the serial production process; 2) poor management capabilities, particularly in such areas as project integration and industrial organization; 3) technical backwardness, particularly in precision instrumentation and testing equipment; and 4) insufficient numbers of qualified S&T personnel to assist with the management and adaptation of imported technology.

On the other hand, the sobering words of Dr. Dennis Simon can be contrasted with the September 29, 1981, report in the Beijing publication ZHONGGUO XINWEN SHE on the completion of the Tianjin Petrochemical Fiber Plant—"The Largest Industrial Project in Tianjin Since Liberation." In this report, the chief representative of Krupp (West Germany), Mr. Zigler, is quoted regarding the time for installing and operating production facilities, "The speed was amazing. It was beyond my expectation." This same article speaks in glowing terms of the magnitude of the project and the speed and efficiency with which it was accomplished—including "more than 150,000 welds which are all up to standard." An outstanding job was apparently done in Tianjin. Our Delegation visit to Shanghai Petrochemical Complex showed us a very impressive plant facility, complete with full town and living infrastructure for 30,000 workers, their families and the necessary shops, shopkeepers, schools, school teachers, etc. This entire complex was built on a complete green field site. We were told that negotiations for the first stage started in the winter of 1972, went into 1973; construction was started in 1974; trial production began by the end of 1976, and full operation was achieved in mid-1977. It was alleged in November 1980 that they had already gotten back their investment cost in product sales. Clearly, this performance was good—first-class—by anyone's measurement.

But there is Baoshan steel works—apparently a monument to bad planning, over-commitment of funds, inadequate supply of qualified construction workers. Other stories have been told of poor performance, inefficient operations in technical, engineering, planning, skilled workers. In September 4, 1981, the publication XINHUA (Beijing) reported comments of Mr. Li Zhiwen, vice-president of the Institute of Synthetic Fibers, regarding China's chemical fiber industry and oil refining industry: "These two industrial sectors, each doing its own thing and ignoring the other, are acting like two states, except that they do not even talk to one another—whereas leaders of two countries would at least maintain a dialogue."

Summing up the reports, good and bad, carefully studying Dr. Simon's very readable and interesting article, one can only conclude that all provisions for technology transfer must be made very carefully. Language and cultural differences exist on both sides. These problems affect technical thought transfer and the degree of performance of the expatriate personnel at every level and in both countries. There are many very capable Chinese—and there may be some Americans who can speak Chinese as well as carry out technical tasks. However, a satisfactory technical transfer requires very careful establishment of personnel requirements—on both sides.

Standards, Specifications and Codes

The subject of engineering standards, specifications and codes is one which deserves attention and which must be understood for proper technology transfer. China has three levels of standards:

1. National Standards, which apply throughout China.

2. Regional or Provincial Standards, set by the regional or provincial standards bureaus and are applied as such.

3. Industry Standards, set by the industries themselves and are applied as such.

National standards are promulgated by the China National Bureau of Standards, with headquarters in Beijing. Also in Beijing and housed near China National Bureau of Standards is the China Association of Standards (CAS). CAS is a group responsible for the coordination of all standards in China. CAS cannot write standards and does not enforce standards. It does, however, coordinate and maintain records of all standards.

It is interesting to note that Underwriters Laboratories in Chicago established contact with the CAS about two or three years ago with respect to products that might be exported into the U.S. As of now it can be said that the question of standards and their use with certain products, plus the question of on-site factory inspection of products in China have been satisfactorily resolved.

The *China Business Review*^{2c} carried an article which is still available as a reprint. While not covering any one standard in detail, this article does a good job of describing the tremendous quantity and variety of standards which are in effect in China and which are being expanded on an on-going basis. American National Standards Institute (ANSI) has also had contact with CAS and reports that it is possible to obtain copies and/or references on important Chinese standards through CAS. The CAS catalog of "National Standards of the People's Republic of China" contains some 45 to 50 pages, of names of standards (in English). Those contemplating technology contracts with the Chinese would be well advised to obtain copies of the catalog and the particular standards with which they are involved.

Expatriate Experience

For those who are concerned with expatriate training experience, the *China Business Review* put together an interesting collection of four reprints^{2d, e, f, g}. While the articles are somewhat dated—and while conditions and circumstances have indeed changed in many Chinese locations, the collection makes interesting and useful background reading. It should be considered carefully by those contemplating a project in China.

CONCLUSIONS

Where do we go from here?

The largest communist market for American goods in 1980 was the Peoples Republic of China^{6a} with a total of \$3.8 billion. Sales for 1985 are predicted to be

between \$7 and \$10 billion. Chinese demand for textile fibers—cotton and synthetics—paper products, and agricultural chemicals emphasizes more than the short-run sales of materials. It also points to the demand for up-to-date technology and facilities for the Chinese manufacture of these products. In addition, substantial demand is on record for oil field technology, increased coal output, construction of new hydro facilities, methods and equipment for energy conservation. Premier Zhao Ziyang has emphasized need for improved transportation and consumer products.^{2a} These demands represent an opportunity for those U.S. firms who have something to offer and are smart enough to know it.

The China market can be approached many ways—initially at reasonable cost.^{6b} First, by letters, properly directed; then, through expressions of willingness to put on a technical seminar; also, personal, prearranged visits to selected officials; participation in the Commerce Department's technical sales seminar program—all of these approaches are effective ways of establishing whether there is a significant market for a specific technology or machinery plus technology. In addition to the U.S. Department of Commerce, the National Council for U.S.-China Trade, international banks with offices in China and individuals with background experience can be very helpful in establishing the first market penetration.

In regard to U.S. Export Controls, the new policy^{1,6c} has been one of significant liberalization toward China, permitting the sale of items which represent a considerably higher level of technology than previously permitted. There is a rumor that the China Import-Export Control Commission is working on new regulations regarding the acquisition of technology. It is assumed that any such regulations will now come from the new Ministry of Foreign Trade and Economic Relations.

While standards and codes are clearly different between the U.S. and China, compromises and adaptations are always possible. For instance, it is reported that some U.S.-made mining equipment was delivered to China before it was found to be not in accord with certain Chinese mining standards. What at first was a crisis turned out happily when the requirement was properly analyzed—and an equipment modification made with relative ease. The supply of properly trained Chinese engineers and technicians is variable, depending on locale. Nevertheless, there are still ongoing instances of fully satisfactory technical contracts. McDonald-Douglas is apparently well satisfied with the DC-9 landing gear door assemblies being made for it by the Chinese. A Texas firm is buying ceiling fans from a Chinese manufacturer. Other examples of Chinese capabilities are found in the manufacture of radios and tape recorders in Guangzhou and the cooperative joint venture making transport con-

tainers, also in Guangzhou. The only conclusion can be that the Chinese can and will work effectively on projects requiring technical knowledge. One must simply write a contract that foresees the possibility of extra training.

Contract writing itself carries some extra responsibilities when working with the Chinese. The greatest concern of many firms and potential technology suppliers seems to be the protection of the technology itself. Can one prevent the duplication of technology in other locations without permission? The answer to this question is, "Yes, it is possible." Such assurance was given to our delegation in November 1980—and has been repeated on other occasions. But the contract language must be specific and clear on this point. Given the Chinese desire to make as much as possible for themselves—to expand their industries and technology as much as possible, it is obvious that a technology contract is to be preferred if it permits replication on certain terms of continued remuneration to the technology supplier.

Given the resources of China—given their expressed needs for development of China's industries—given a potential market of two billion people—U.S. business and industry can scarcely afford to disregard the opportunities. The only question is: Who is going to recognize these opportunities first—and profit from them?

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