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Exploring in China: The Challenges and Rewards

VOTE NOW (see page 16)

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INTRODUCTION

China is one of the world's great frontiers for mineral resources. It has an area of 9.6 Mkm^2, with extremely diverse geology. Extensive geologic surveys that commenced in the1950s resulted in the discovery of 171 mineral commodities, with reserves established for 156 commodities in different parts of the country (Chen, 1999). However, for a variety of reasons, exploration, mine development, and production have not kept up with the country's huge growth in demand. Change is inevitable and will provide exciting opportunities for companies with state-of-the-art technologies and know-how.

In the late 1980s, China emerged as a newly accessible country for foreign exploration companies. Many major explorers were active there in the early 1990s, before the global industry collapsed under the combined loads of the Asian Economic Crisis, the Busang debacle, the resulting flight of investors from mining to dot-com stocks, and global economic downturn. Now that the industry is thriving again, many companies, both major and junior, have returned to China, and others are considering its potential. It seems that many explorers are interested in opportunities in China but are unsure of what the future will bring and do not know how to work there. Based on our extensive experience, what follows is our assessment of the realities of exploration in China: the opportunities, practicalities, problems, and challenges; the joys, excitement, and frustration.

WHY SHOULD CHINA BE OF INTEREST TO EXPLORERS?

China covers 6.5% of the Earth's surface and is home to more than 20% of its population. During the past 20 years, its economy has developed at a phenomenal pace, such that it is now an economic powerhouse and has displaced Germany as the world's third biggest economy. China's demand for resources to feed that development is huge and is supplied partly by domestic production, but also substantially by imports.

Despite being a huge country with extremely diverse geology, China has few known ore deposits that are very big by world standards. Its domestic production of metals and minerals is large, but mainly from hundreds of thousands of very small, primitive mines. As China grows as a major global economy, it cannot be sustained by a backward, third-world mining industry. But can its mining industry grow to meet its needs, or will it be forever dependent on imports? Is China's geology somehow fatally flawed in not delivering the giant deposits needed to support its economy? Or are there other reasons for the lack of major mines?

As we discuss below, there is nothing wrong with the geology of China. Its geology is as favorable for giant deposits as that of Russia, Canada, the United States, Brazil, and Australia. The apparent lack of major deposits is a result of history, culture, and politics, not geology. Economic imperatives mean this situation must change; that is where explorers have great opportunities, but also where they face substantial challenges.

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THE GEOLOGY OF CHINA

China consists of a complex amalgamation of tectonic blocks, each with its own prior history, which came together in the formation of the Eurasian supercontinent (Fig. 1). In the north, the great Paleozoic Altaids fold belt, part of the Central Asian orogen, drapes across northern China. In the south is the huge Mesozoic-Cenozoic Tethysides. Between them are the Tarim, North China, and Yangtze cratons, as well as a number of smaller blocks that were mostly merged in the late Paleozoic-early Mesozoic. In eastern China, tectonism of the great Jurassic-Cretaceous (Yanshanian) Pacific margin event overprints the eastern parts of the Altaids and the North China and Yangtze cratons (Wang and Mo, 1995).

The geology of China reflects long-continued development, evolution, amalgamation, and renewed tectonism of cratonic blocks and mobile belts. From the Archean to the early Late Proterozoic, a number of discrete cratonic blocks developed (Wang and Mo, 1995). The Late Proterozoic to early Mesozoic was mainly a stage of continental margin development and then drifting of these blocks across the Tethyan Ocean (Yang, 1998). The middle Mesozoic to the Cenozoic was mainly a stage of intracontinental deformation and circum-Pacific orogeny (Shen, 2000).

Assembly of crustal blocks to produce China occurred in multiple stages, beginning in the middle Late Proterozoic with amalgamation of the Tarim and North China blocks, which then converged with the Yangtze and Cathaysia blocks. In the late Paleozoic the Siberian and Tarim-North China plates amalgamated. In the early Mesozoic, the Tarim-North China plate merged with the South China plate. In the early Cenozoic, the final closure of the Tethyan oceans occurred, bringing about suturing of the Indian and Tibet-Yunnan plates (Yang, 1998; Shen, 2000).

The influence of Mesozoic subduction along China's Pacific margin went deep into the Asian continent, involving the entire eastern region of China and leading to the appearance of mainly northeast–north-northeast-trending structural belts across eastern China. At the same time, extensive Jurassic-Cretaceous continental volcanic rocks were erupted and related granitoid rocks were emplaced (Yang, 2000). The final assembly of China took place during the early

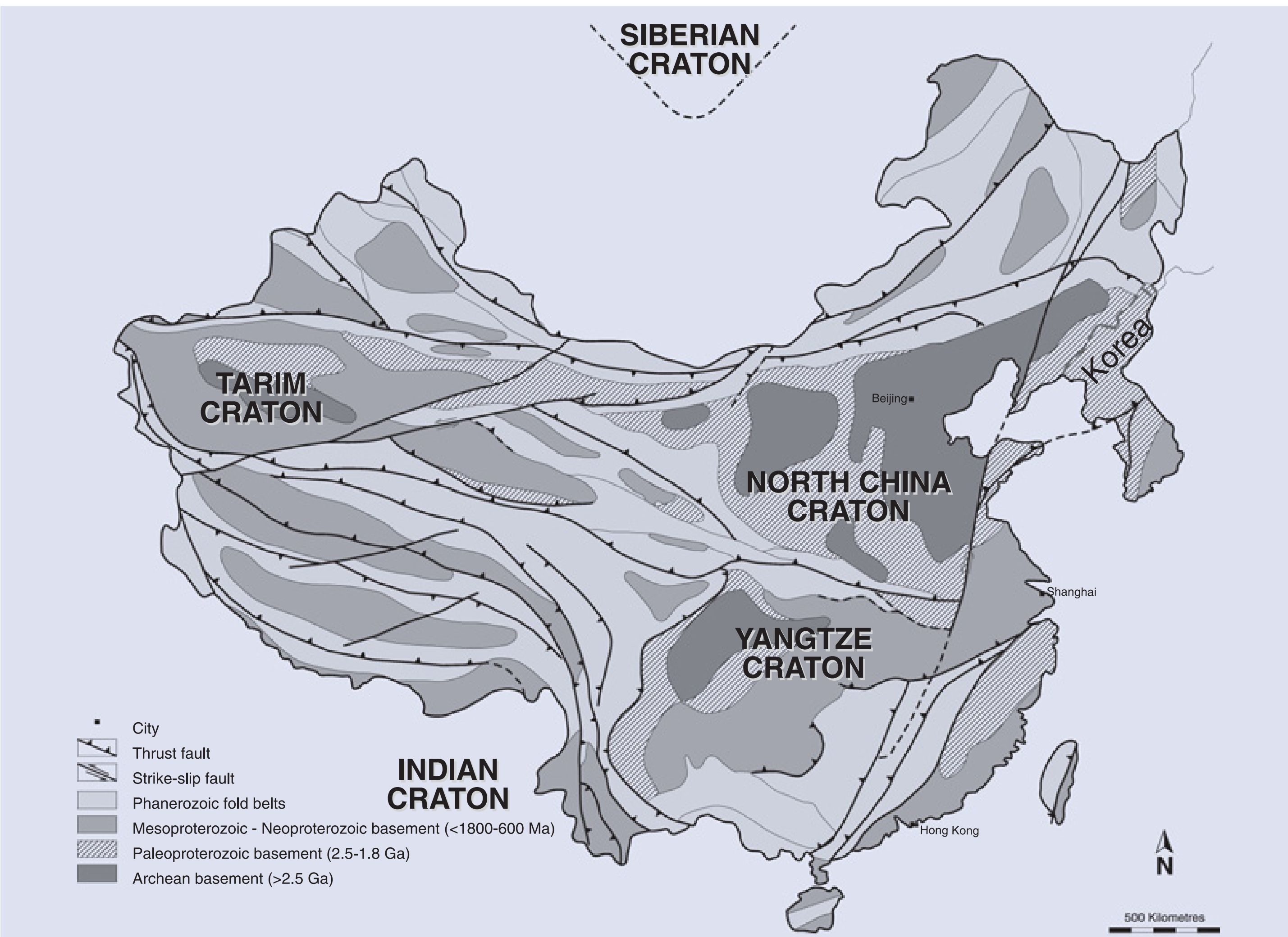

FIGURE 1. Simplified basement geology map of China modified after Zhou et al., 2002. Mesozoic volcanic and intrusive rocks, widespread in eastern China, are not shown.

Cenozoic Himalayan orogenesis, with the suturing of the Indian continent and Tibet-Yunnan (Shen, 2000) as a result of the final closure of the Tethyan oceans (Yang, 1998). The advance of India towards Asia from 132 Ma (Veevers, 2001), with eventual late Eocene continent-continent collision, produced a series of fold belts that extend east-west across Tibet and Qinghai, north-south between Tibet and the western edge of the Yangtze craton, and southeast through Yunnan and Vietnam. The collision of India involved continental subduction beneath the foreland, as well as uplift of the Tibet-Qinghai plateau and formation of the Himalayas and other mountain systems. Effects of this compression include strike-slip events throughout the intracontinental region between the Indian and Siberian blocks (Yang, 2000).

THE METALLOGENY OF CHINA

There are two important elements in the geologic evolution of China that are both unique in style and magnitude, and so add complexity and diversity to the metallogeny of the country. The Yanshanian tectonism and magmatism produced vast areas covered by Jurassic-Cretaceous subaerial volcanic rocks, and a multitude of intrusions of all sizes. Related deposits include epithermal Au, Ag, and Zn deposits, including high-, intermediate- and low-sulfidation styles; many polymetallic vein deposits hosted by both volcanic rocks and Precambrian basement; porphyry Cu-Au deposits; skarn Cu-Au, Mo, Pb-Zn, W, Sn, and Fe deposits, and intrusion-related Sn, W, and Mo deposits. In addition, Early Cretaceous orogenic gold deposits are hosted by uplifted core complexes throughout the eastern Yangtze and North China cratons. Some of these Mesozoic deposits are unusual, e.g., the Caijiaying Zn-Au deposit in Hebei province (Chang et al., 2006), and the widespread orogenic gold deposits (e.g., Shandong province and Qinling belt, hosted by Precambrian high-grade metamorphic rocks but of Mesozoic age; Yang, 1996; Yang et al., 2003).

The Himalayan collision produced and/or reworked major crustal sutures and is associated with postcollisional magmatism and mineralization. Numerous porphyry Cu-Au-Mo deposits have been discovered in Tibet, Sichuan, and Yunnan provinces (Hou et al., 2003a, b; Zeng et al., 2003). Some predate the collision of India, whereas others postdate the collision and relate to magmatism generated as India continued to underthrust the Himalayas (Mo et al., 2006, 2007). Exploration of this belt is still at a very early stage and discoveries continue to be made (e.g., Harris et al., 2007; White et al., 2007). Huge Zn-Pb deposits also occur along this collisional zone, with the best-known example at Jinding, Yunnan (>15 Mt Zn+Pb; Kyle and Li, 2002), where ore occurs in siliciclastic sediments that were deposited in a rapidly subsiding Tertiary basin. There are indications that other similar base metal deposits will be found.

Over the past 30 years, many gold deposits hosted by calcareous sedimentary rocks and showing features comparable to the Carlin-type deposits in Nevada have been discovered in China. Large clusters of deposits occur in two "golden triangles," the southern one mostly in Guizhou and Guangxi provinces, the northern one mostly in northern Szechuan and southern Gansu and Shaanxi provinces. In addition to these, many other similar deposits continue to be found in other parts of China.

The complex geologic history of China involved amalgamation of diverse crustal blocks representing every conceivable geologic environment, suturing across major fault zones, and development of postorogenic basins. Many of the amalgamated blocks had their own complex history and related ore deposits. In addition, magmatic rocks are widespread, cropping out over 19% of China's land area. Magmatism occurred in 10 stages from the Archean to the Cenozoic (Shen, 2000). As a result, the metallogeny of China is both rich and diverse, with representatives of all important deposit styles; some examples are listed in Table 1.

Discoveries of potentially significant new ore deposits are reported every year. Recent exploration has identified a number of new, important metallogenic belts in western China. They include the eastern Tianshan porphyry Cu belt (e.g., Tuwu in Xinjiang) that may be an extension of the belt that hosts Oyu Tolgoi in Mongolia. Other important discoveries include the Gangdese porphyry Cu-Au belt in Tibet (Hou et al., 2003a), the Zhongdian (Pulang) porphyry Cu belt (Zeng et al., 2003), a sedimentary rock-hosted Cu-Ag-Pb-Zn belt and a volcanic rock-hosted redbed Cu belt in western Yunnan. More exploration using advanced technology is required in many metallogenic belts. The paleorift zones along the margins of the North China, Yangtze, and Tarim cratons provide potential targets for magmatic Ni-Cu-PGE deposits. Significant potential for diamonds, Fe-oxide (IOCG) and sedimentary rock-hosted base and rare metal deposits exists in the cratons. The geologic setting of the Tethysides and Altaids in western China provides particularly favorable targets for VMS, sedex, MVT, and porphyry-epithermal exploration. Most of the flysch belts in the two orogenic systems remain underexplored, and the potential to discover large orogenic deposits is high; in fact, the giant Kumtor gold deposit is located just over the border from the Chinese Tien Shan.

The consequence of this prolonged and diverse geologic history has important implications for exploration: any conceivable deposit types can be found in China, and there are some important types that have not been widely recognized elsewhere (e.g., postcollisional porphyry and Jinding-style Pb-Zn deposits). While there are relatively few world-class deposits currently known in China, the diversity of known deposit styles (see Zaw et al., 2007) shows that the geology is favorable, and application of modern exploration will surely find many more deposits, including those of world-class size. China is a huge, neglected frontier for modern mineral exploration.

EXPLORATION IN CHINA, PAST AND PRESENT

China has a long history of mining. Traditionally, mining has been an activity of farmers who dug for ores between the hectic seasons of planting and harvesting. It must be remembered that China has only emerged from feudal conditions in the past 100 years, and most industrial development has occurred in the past 50 years. Whereas major industries such as manufacturing, civil engineering, and even electronics and aeronautics have developed apace, the mining industry has barely changed.

Following formation of the People's Republic of China in 1949, Soviet-style exploration programs were undertaken by huge exploration teams based in the provinces. However, the falling out with the Soviet Union, economic hardship, and the onset of the Cultural Revolution in 1966 resulted in these programs being abandoned.

Throughout the country

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TABLE 1. Selected Examples of Major Metalliferous Ore Deposits in China

Deposit type	Deposit Name/ Province	Tonnes/Grade	Reference
Porphyry Cu-Mo-Au	Dexing/Jiangxi Yulong/Tibet	1500 Mt ore @ 0.43% Cu, 0.02% Mo, 0.16 g/t Au, 1.9 g/t Ag 1000 Mt ore @ 0.99% Cu, 0.06% Mo, 0.35g/t Au	Zhai et al., 1997; He et al., 1999; Hou et al., 2007
Sediment-hosted Zn	Jinding/Yunnan	200 Mt ore @ 6.8% Zn, 1.29%Pb, Ag	Kyle and Li, 2002; Xue et al., 2007; Hou et al., 2007
Sedex Zn-Pb	Fankou/Guandong	3.4 Mt Zn @ 12%; 1.7 Mt Pb @ 5.1%	Gu et al., 2007
Volcanic-hosted Cu-Zn-Pb	Ashele/Xinjiang Gacun/Sichuan	1.08 Mt Cu @ 3.42%, + Ag, Au 4 Mt combined metals @ 0.4% Cu, 3.4% Zn, 3.7% Pb, 160 g/t Ag, 0.3 g/t Au	Wang et al., 2003; Hou et al., 2007
Mississippi Valley-type Zn-Pb	Tianbaoshan/ Sichuan	11 Mt @ 10.1% Zn, 1.5% Pb, 94 g/t Ag	Cromie et al., 1996
Magmatic Ni	Jinchuan/Gansu Baimazhai/Yunnan	500 Mt ore @ 1.06% Ni, 0.7 % Cu 0.6 Mt Ni @ >4%; 1.2 Mt Cu @ 0.3-4.0%	Ripley et al., 2005; Tang, 1993; Wang and Zhou, 2004
Orogenic Au	Linglong/Shandong Jiaojia/Shandong Sanshandao/Shandong Xincheng/Shandong	480 t Au >60 t Au @ 7 g/t >60 t Au @ 7 g/t >60 t Au @ 8 g/t	Zhou and Lu, 2000; Qiu et al., 2002; Fan et al., 2003
Carlin-type Au	Jinfeng/Guizhou Zimudang/Guizhou Dongbeizhai/Sichuan	107 t Au @ 5.1 g/t 60 t Au @ 6 g/t >50 t Au @ 6.2 g/t	Peters, 2002; Sino Gold Ltd, 2004; Peters et al., 2007
Epithermal Au – high sulfidation	Zijinshan/Fujian	103 Mt ore @ 1.02% Cu, 0.14 g/t Au, 5.2 g/t Ag	Zhang et al., 1994; So et al., 1998
Epithermal Au – low sulfidation	Changkeng/Changkeng/ Axi/Xinjiang Qiyugou/Henan	32 t Au @ 7 g/t 70 t Au @ 5.8 g/t 40 t Au @ 7.4 g/t	Liang et al., 2007; Hart et al., 2003
Epithermal Ag	Fuwang/Guangdong	6000 t Ag @ 268 g/t	Liang et al., 2007
Skarn-Au	Xinqiao-B/Anhui Tomglushan/Hubei	105 t Au 6.8 t Au @ 1.15 g/t, + Cu	Chen, 1996; Chen et al., 2007
Skarn-polymetal	Kangiawan/Hunan	30 t Au @ 3.65 g/t;150 t Ag @ 87 g/t; 0.5 Mt Pb @ 3.9%; 0.5 Mt Zn @ 4.5%	Zhao, 1991; Zhang et al., 2007
Skarn–Cu-Au	Chengmenshan/Jiangxi Wushan/Jiangxi	3.07 Mt Cu @ 0.75%; 2.2 Moz Au @ 0.43 g/t 48 Mt Cu @ 1.1-1.7%; 2.2 Moz Au @ 0.5 g/t	Pan and Dong, 1999; Chen et al., 2007; Zhou et al., 2007
Skarn-Sn	Gejiu/Yunnan Dachang/Guangxi	120 Mt ore @ 1% Sn, 3-5% Cu+Zn+Pb+Sb 100 Mt ore @ 1% Sn; also Cu, Zn	Chen et al., 1992; Fu et al., 1991, 1993; Zhao and Li, 1995; Gu et al., 2007
Skarn-W	Shizhuyuan/Hunan	0.8 Mt W, 0.5 Mt Sn, 0.2 Mt Bi, 0.1 Mt Mo	Mao et al., 1996a, b; Mao and Li, 1995
REE	Bayan Obo/Inner Mongolia	>40 Mt REE @ 3-5.4%	Le Bas et al., 1992; Chao et al., 1997; Smith et al., 2000; Yang et al., 2003

there were thousands of exploration teams that received insufficient government funds and needed to support themselves economically, as managers were not allowed to reduce staff. Consequently, the imperative was to find resources of any kind and to put them into production as quickly as possible. The result was mines that differed from those of the farmers only in scale, not approach.

Since the end of the Cultural Revolution in 1976, the situation for exploration teams has not changed substantially. Government funding for exploration remains limited and is expected to continue to decline. Economic liberalization has meant that the teams have freedom to manage their affairs in different ways. Exploration teams have followed different strategies, with some becoming successful explorers and miners. Others have responded to a recent boom in interest in mining by selling exploration tenements, and some have diversified into unrelated fields.

Exploration as practiced in China today is mostly outdated by world standards. There is virtually no conceptual exploration. Basic techniques such as geologic mapping and geochemistry are readily available, but knowledge of ore deposit models is rudimentary in most teams. Ground geophysical methods are available but are expensive and commonly not used effectively. Airborne techniques are either not available or are of poor quality. In most cases, it is impractical to bring airborne systems into the country. Drilling is expensive, and with a few exceptions, the Chinese drilling teams are inferior; consequently, the good ones are in high demand.

There are now an increasing number of foreign drilling companies operating in China, but they are much more expensive than the local teams. Foreign geophysical contractors and geochemical laboratories are now operating in China. The competing Chinese chemical laboratories are generally of a quality that is equal to the western laboratories but generally slow in turnaround. Access to airborne surveys is still far off because of the legal requirement for Chinese pilots and because of military controls. Outdated security restrictions remain in place, covering access to aerial photographs and topographic maps, even though modern satellite images are freely available from international suppliers. Field geologists are often not allowed to possess topographic maps. As is true everywhere, technology changes faster than military restrictions!

THE MINING INDUSTRY IN CHINA, NOW AND IN THE FUTURE

The Chinese mining industry today is dominated by more than 300,000 small mines. Although there are some large modern mines (especially for coal), overall, the industry is characterized by small production, low-quality products, and appalling safety and environmental records. Furthermore, mining is incapable of supplying the country's needs, particularly for high-quality products, which therefore must be imported. The cost to the national economy in terms of money, environmental damage, and lives lost is huge. Furthermore, the benefits of economic development in remote areas that mining can deliver are being overlooked, even though government policy favors development in regions dominantly inhabited by minority groups, such as along China's western margins.

Despite the huge economic cost of not restructuring the mining industry, restructuring has not been an urgent national priority in a time of favorable exchange rates and a vibrant economy. A flood of capital flows out of the country to buy foreign raw materials, but under current economic conditions this does not seriously slow growth. However, when economic conditions tighten at some time in the future, it will become more important that this capital could stay in the country if the domestic industry was properly developed. In more difficult times, issues of self-sufficiency and regional decentralization will also become more important. In a centrally planned economy, change can happen very fast once the government sees the benefits and begins to focus on it. Part of the current problem is that very few Chinese bureaucrats have any understanding of the modern mining industry. Few comprehend that there is a vast gulf between mining by farmers and modern high-productivity mining—between modern, profit-driven exploration and exploration for survival as has been traditionally practiced in China. Nevertheless, major changes in mining and exploration are inevitable in China. Moves to liberalize and modernize the industry are regularly made by the central government, and these can be expected to increase.

EXPLORATION OPPORTUNITIES IN CHINA

There are two inescapable conclusions for any explorer contemplating working in China: (1) the geology is extremely favorable for more large discoveries, and (2) the country is mostly underexplored and, in places, unexplored. Apart from regional geologic mapping and geochemical surveys, exploration has not been conducted in a systematic, comprehensive way. For the past 30 years, the state-run exploration teams have acted as independent, competing, underfunded junior explorers, quickly diverted by any discovery, no matter how small. Discoveries, when made, are not properly assessed; instead, they are rushed into small-scale production. Where an orebody is extensive, it is typically worked as a series of small, uncoordinated mines rather than consolidated into a single, large, efficient operation.

The opportunities for explorers in China are startling! There is abundant opportunity for new discoveries and to consolidate existing properties into larger production units. The apparent lack of major deposits in China is not caused by a failure of geologic processes. Rather, it is a result of inadequate exploration and a system that has encouraged fragmentation, not consolidation, of large deposits.

CHINA'S LEGAL SYSTEM FOR EXPLORATION

For a foreign company to conduct exploration in China, it must either form a joint venture (JV) with a Chinese company or it must establish itself as a Wholly-Owned Foreign Enterprise (WOFE). The latter is slow and leaves the foreign company with no local support, and exploration for some minerals is not permitted, so the former is the normal strategy even though the process to establish a foreign JV is complex. First, the property to be held by the JV must be identified and the JV terms negotiated. The contract becomes legal when it has been approved by the Ministry of Commerce or its authorized local departments. A separate JV company must be established by registry with the State Administration of Industry and Commerce or the Provincial Administration of Industry and Commerce, depending on the amount of foreign investment. That is not the end, though. Next, the titles need to be transferred to the JV company, and, except in Yunnan, transfer must be approved by the Ministry of Land and Resources and Ministry of Commerce, the central level competent authorities. In addition, a military examination of the JV exploration rights is a necessary step during the lengthy procedure of approval. This entire process commonly takes two or more years.

Exploration titles in China are administered by each province, and exploration is governed by national laws and provincial regulations and administrative rules. Some provinces (e.g., Yunnan) have reasonably well established regulations for exploration and mining, whereas some others have no local regulations at all. Special conditions can be imposed by the provincial government, and in some provinces they can be a substantial burden for the foreign partner. It is important to know what the related laws, rules, and local regulations are before committing to explore in

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any province. On the positive side, there are Chinese legal firms that can help with this.

Once exploration begins, companies have the option of employing their own staff or using established exploration teams as contractors. In the latter case, the contract spells out in detail what work is required and how it is to be done. The quality of work by teams varies, but in general it is possible to find teams that can handle most routine exploration activities satisfactorily, leaving a company's own staff to handle quality control.

To maintain a licence, the JV company must apply each year for renewal of their titles. This involves submitting a report to the local government where the title is held, detailing the work completed and money spent, and submitting a proposal for continuing exploration work and a budget for each exploration title for the coming year. Local governments are responsible for making certain work commitments have been met and presenting to the authority that issued the title their recommendation on whether the titles should be renewed. This is a particularly difficult part of the system, as commonly the local government is very poor and may take the opportunity to try to raise money. This could include proposing special payments to have the approvals given, or else suggesting the company relinquish part of the tenement so it can be given to a local farmer miner who commonly has good political or commercial connections with local officials. This part of the process requires a great deal of communication with the local government authorities, and preferably a serious effort to establish and maintain friendly relations with officials.

Overall, the system as it currently exists is slow, bureaucratic, and, particularly on a local level, vulnerable to abuse. Companies should obtain good legal advice when setting up their JV, and should aim to develop good relations with provincial and local governments. The active support of the JV partner can help a lot. Only in the worst cases there can be major problems with local government, but with some effort at maintaining good relations and care to meet local requirements and to understand local expectations, these issues can be handled. Ignore them at your peril!

Chinese accounting and tax laws are also an important issue for foreign companies in China. Foreign JV companies are audited for tax purposes, and it is essential that Chinese accounting standards be strictly followed. In practice, this means each company should have a good accounting department, which is not difficult in China. The main problem is that the Chinese system differs from western systems, and a company's overseas auditors will find it takes time to understand what their Chinese accountants do. If proper systems are set up from the start, there are few problems, but if not, serious problems can arise both in China and in the company's home country.

Many problems reported by foreign companies operating in China are of their own making, violating legal requirements in both China and their home country, and ignoring prudent business practice anywhere. Of course, the real cause of the problems is never admitted.

THE PRACTICALITIES

Many aspects of working in China are remarkably easy. Transport systems are excellent, with an extensive airline system that runs on time, a huge motorway system, and local roads that vary from good to appalling, as in most countries. Acceptable standard accommodation is available in even small towns, and superb food is available everywhere. Foreigners are free to travel without restriction in most parts of the country, and the "security checks" that plague explorers in some parts of the world are absent. Personal security is excellent everywhere, and attitudes to foreigners are friendly.

Despite the widely held view that China is overpopulated, the high density areas are confined to cities, the southeast of the country, and the Sichuan basin. Even in populous provinces such as Fujian, high population densities are restricted to arable valleys. The adjoining hilly areas are lightly populated and exploration and mining are possible. Provinces such as Inner Mongolia, Xinjiang, Qinghai, and Tibet are sparsely populated.

The costs of operating in China vary widely. Everyday things such as food (and beer!), consumer goods, travel, and accommodation are cheap or, at most, similar in cost to that of western countries. Low-technology exploration activities are also low cost, but the costs rise rapidly with the degree of technological sophistication. Geologic mapping is cheap. It is possible to contract out the collection of huge geochemical surveys at modest cost, but the analyses are similar in cost to western laboratories, and just as good. Geophysical surveys using good equipment are expensive. Drilling is at best comparable in cost to western costs; at worst, it is exorbitantly expensive. Trenching is very cheap and adits are commonly less expensive than drilling.

Hiring good people is not difficult in China as there are many with good educations and training, and they are generally keen to improve their positions. Salaries are low by western standards, but it is important to maintain competitive salaries for people with the special skills (e.g., languages) needed to work in a foreign company. Available geologists are in short supply, and those with good technical and language skills are scarce. Most geologists work in government teams and many are not willing to give up the security of their positions, despite low wages that are partly compensated for by supplied accommodation. With the national economy booming, competition for people with skills in short supply is fierce, but for the rest, the huge workforce keeps salary costs low. Our experience is that the level of technical knowledge and skill may be low in some individuals, but their commitment and work ethic is generally outstanding. As when working with people anywhere, companies will always find frustrations and problems, but lack of dedication is seldom a difficulty and willingness to learn is outstanding. These are people who recognize that they will only advance through their own efforts.

Chinese children learn English at school, although the amount taught varies with location (the big cities are best). Despite this, English is not widely spoken or understood. It is normally possible to find an English speaker, but most people in the street know only a few words, although the Beijing Olympic Games will no doubt change that, at least in Beijing. Among geologists it is common to find that they can read technical English but are reluctant to speak the language. For native English speakers to be understood, it is important that they speak slowly and clearly, avoiding slang. Otherwise, there is but one alternative—learning Mandarin!

Chinese society runs on networks even more so than western societies do (and they do as well!). It is important to recognize that relationships developed with government officials, JV partners, and other people will be regarded as significant by them and should be treated accordingly. Company personnel must keep in touch and maintain all social courtesies. Treating people with casual disregard will not earn respect or support; treating them with sincere regard will meet with reciprocated courtesy. Apart from the business component of relationships, the Chinese are warm, friendly people, and lasting friendships are one of the great bonuses of working there.

CONCLUSIONS

In an age of easy communication and travel, it is extraordinary how polarized foreign opinions are about exploration in China. Some view it with total pessimism and speak in terms reminiscent of 1960s cold war rhetoric. But when those same people are asked if they have been to China, the answer is invariably no. Others view the country with great enthusiasm, usually immediately after their first visit, when they are overwhelmed by the opportunities and the realization of how underexplored the country is. Between these extremes are the people who are more measured: enthusiastic about opportunities but conscious of the problems. They are usually those who have worked there and who know the realities. Many western companies now operate in China; Table 2 lists those that have current mining operations or that have

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TABLE 2. Mines and Resources in China Managed by Western Companies

Company	Trading symbol	Deposit/Province	Resource	Status	Website
SinoGold	SGX-ASX	Jinfeng/Guizhou	4.6 Moz Au resource, >5 g/t u/g	180,000 opa, May 2007	www.sinogold.com.au/
		White Mountain/Jilin	7.7 Mt ore @ 3.4 g/t Au	Prefeasibility	
		Jainchaling/Shaanxi	1998-2006, prodn 450,000 oz Au u/g	Sold	
Griffin Mining Ltd.	GFM-AIM	Caijiaying/Hebei	23.6 Mt ore @ 8.08% Zn, 0.68 g/t Au, 17 g/t Ag; ind. and inf., u/g	Commenced production July 2005	www.griffinmining.com/
Eldordo Gold	ELD-TSX	Tanjianshan/Qinghai	4.5 Mt ore @ 4.1 g/t Au plus oxide resource 600,000 oz Au	Commenced production late 2006	www.eldoradogold.com/
Jinshan Gold Mines	JIN-TSXV	Chang Shan Hao (217)/ Inner Mongolia	110 Mt ore @ 0.83 g/t Au; heap leach	In construction: 117,000 opa for 9 years	www.jinshanmines.com/
Silvercorp Metals	SVM-TSX	Ying/Henan	Veins, >1 Mt ore @ ~1500 g/t Ag, 25% Pb, 9% Zn	Advanced exploration/ construction	www.silvercorp.ca/
Neo Alliance Minerals Inc	NAM-TSXV	Mijiahe/Gansu	3.3 Mt ore @ 1.34 g/t Au inf.	Trial mining	www.neo-alliance.com/
Continental Minerals	KMK-TSXV	Xietongmen /Tibet	220 Mt @ 0.43% Cu, 0.61 g/t Au, 3.87 g/t Ag	Feasibility	www.hdgold.com/
Leyshon Resources	LRL-ASX	Zheng Guang/ Heilongjiang	1.21 Moz Au, 3.72 Moz Ag, 94,000 t Zn recoverable	Production planning	www.leyshon resources.com/
Mundoro Mining	MUN-TSXV	Maoling/Liaoning	>300 Mt ore @ 0.9 g/t Au	Feasibility	www.mundoro.com/
Southwestern Resources	SWG-TSX	Boka/Yunnan	~40 Mt ore @ 3 g/t Au	Advanced exploration	www.swgold.com/
Inter-Citic Minerals	ICI-TSXV	Dachang/Qinghai	16.1 Mt ore @ 3.88 g/t Au inf.	Advanced exploration	www.inter-citic.com/
Majestic Gold Corp.	MJS-TSXV	Sawayaerdun/Xinjiang	>35 Mt ore @ >1 g/t Au inf. and ind.	Advanced exploration	www.majesticgold.net/
		Song Jiaguo/Shandong	13 Mt ore @ 1 g/t	Advanced exploration	
Golden China Resources	AUC-TSXV	Nibao/Guizho	~13 Mt ore @ ~2 g/t Au meas., ind. and inf.	Advanced exploration	www.goldenchina.ca/
		Beyinhar/Inner Mongolia	25 Mt ore @ ~0.6 g/t Au	Advanced exploration	
Dynasty Gold Corp.	DYG-TSXV	Hatu/Xinjiang	16.9 Mt ore @ 1.69 g/t Au inf.	Advanced exploration	www.dynasty goldcorp.com/
Tianshan Goldfields Ltd.	TGF-ASX	Gold Mountain/ Xinjiang	95 Mt @ 0.95 g/t Au	Advanced exploration	www.tianshan goldfields.com.au/

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established resources. This list will grow rapidly as more companies' projects move from exploration to assessment.

Without doubt, the exploration opportunities in China are dazzling. The geology is superb and many great deposits remain to be discovered. However, China is a country where the phenomenal pace of economic growth and development has happened while its mining and exploration industries have languished to become at least 50 years out of date. Legal systems to manage and control the industry remain inadequate, and its administration remains tied up in bureaucracy. But the mismatch between the parlous state of a crucial industry and the needs of the society and the national economy simply cannot continue. The need for change is clearly recognized by senior government officials and change will surely come. When it does, the companies that have positioned themselves with good properties and reliable partners will reap the rewards. The momentum for growth in the Chinese economy is immense, and the explorers and miners who participate and share in the growth will be amply rewarded.

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