

THE INDUSTRIAL FUTURE OF SHANSI PROVINCE

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The province of Shansi is in the northern tier of the original eighteen provinces of China, and lies between Latitude 35° and 41° North and Longitude 111° to 114° East. The province is bounded on the north by Mongolia, on the east by Chihli, the metropolitan province, on the south and west by the Yellow River, separating it from Honan and Shensi provinces respectively. The area of the province, not including the districts lying to the north of the Great Wall, is about 56,000 square miles. Its population has been variously estimated from 9,500,000 to 12,000,000.

The importance of the province from an industrial viewpoint lies in two facts: first, it has vast deposits of mineral wealth; second, it is, in a sense, the gateway to the north-west of China and the heart of Asia. Certain lines of travel across the province have long indicated that one of its problems when the awakening to the touch of western civilization comes will be the problem of transportation. The chief problem in its industrial development, however, concerns its mineral wealth.

Before discussing either of these problems it may be well to describe the general topography of the province. Rising from the low plain which covers the greater portion of Chihli Province are ranges of hills extending from north to south. Shansi lies amid these hills. It is made up of successive ranges, bisected by water-courses, and with three elevated plains, or basins. The greater number of streams in the mountains are, naturally, tributary to the Yellow River: the river of chief importance among these is the Fên, which drains the central, largest, and most important of the three plateaus. The lower ranges of hills are of the wonderful *loess* formation, and are tillable. The higher ranges approach to the dignity of mountains, and are, for the most part,

rocky and with scant vegetation. Broadly speaking, the ranges diminish in altitude as one travels from the north to the south.

The first investigator into the mineral resources of Shansi was a German scholar, Baron von Richthofen. In connection with extensive journeys through all China to determine the industrial possibilities, this indefatigable explorer traveled across Shansi in 1870, approaching from the south and following the great central highway of the province from Pingyangfu to Jaiyuanfu, the provincial capital. He returned some months later for a second visit, reaching on that occasion the northern districts of the province. It is certain that he did not see a great part of the bituminous coal field of Shansi, but he saw the best-known portions of the anthracite field. He also investigated some of the districts where iron is produced. He concluded that the eastern half of the province over-lay a vast bed of anthracite, while in the western half there were extensive bituminous formations, the two fields being separated by the basin of the Fên River. However, the writer has found bituminous mines in the very center of what von Richthofen described as the anthracite field, and there are other indications that the respective fields may not be as regular in outline as he thought. It is probably true, too, that von Richthofen under-estimated rather than overestimated the bituminous fields. Certain very rich districts he did not visit at all. But he was evidently very greatly impressed by what he saw, and wrote that "there is coal enough in Shansi to last the world for thousands of years at the present rate of consumption." A recent writer has said that the anthracite deposits of Shansi alone are equal to all the anthracite deposits of the United States.

The information von Richthofen gave naturally drew some attention to the mineral wealth of Shansi. For a long time, however, no effort was made either by the foreigners or by the Chinese themselves, aside from the crude methods already in vogue, to exploit this mineral wealth. The conditions of transportation, the lack of markets in north China, and the fact that China was still a sealed land, made it

impossible to act upon the information von Richthofen gave for many years. The year 1898 saw far-reaching changes imminent in north China, following the reform program of the Emperor Kuang Hsü. In that year a mining concession in Shansi was granted to the Peking Syndicate. The overthrow of the reform party, and the reactionary policy of the government which followed, culminating in the so-called "Boxer rebellion" in 1900, kept the Syndicate from beginning the development of its concession. Later, however, as the railway from Chêngtingfu to Taiyuanfu penetrated the eastern ranges of Shansi, so affording an outlet by rail to Peking and Tientsin, the Syndicate began to open up its field. Experts were sent in to make careful investigations, especially in the department of Pingting. A base was established in that department and houses erected for the foreign staff.

About this time the Chinese themselves awoke to the possibilities of the concession they had given. The terms of the concession were manifestly not liberal to the Chinese. They made it practically impossible for the native mine-owners to work their mines by modern methods, or for native capital to open up new mines. An agitation against the Syndicate was begun, given some dramatic touches by the students in the provincial capital, and carried to an issue that the people of Shansi esteemed successful when, in 1907, the Syndicate was ousted from the province. The concession was given up, but the people of the province indemnified the Peking Syndicate to the amount of 2,750,000 taels. Every sincere wellwisher of China must regret that this outcome was necessary. Had the terms of the concession been fair and liberal to the Chinese, the Peking Syndicate might today be in possession of its concession, at work in that magnificent field, and paying regular dividends to satisfied and happy stockholders.

Prior to the ousting of the Peking Syndicate the Chinese themselves had organized a company, called, the "Pao Chin Kung Ssu," i.e., the "Corporation for the Protection of Shansi," *Chin* being an ancient name of Shansi. This company took over the buildings erected by the Peking

Syndicate in the Pingting department and endeavored to supersede that corporation in its program for that field. It employed as its foreign engineer a young man whose chief qualifications for the office were that he had lived a good many years in China and spoke the Chinese language. That he knew nothing of mining engineering was, evidently, not considered a disability. Under the guidance of this expert (?) the corporation did not make any great progress, at least in adopting modern methods of working. The engineer traveled extensively throughout the district, but left neither maps of his journeys nor memoranda of his investigations. The company bought coal delivered by pack-animals at the railway stations, and sold it in yards opened in Peking and Tientsin. That is the method being followed today. The area from which the coal is drawn is comparatively limited, and the methods of mining employed are still of the crudest.

In the district of Hsiao-yi, 80 miles southwest of the provincial capital, a company of Chinese has installed modern machinery for pumping and hoisting. The cost of transporting the machinery from the coast was enormous and installing it was a long and expensive process. The German engineers sent to supervise the installation of the machinery were far from being experts in that line of work. In due time they turned the mines over to the Chinese again and with a result as inevitable as it was deplorable. Success in hoisting unheard of quantities of coal led to experiments in the lower levels of the mine. Props gave way, fifty or sixty lives were crushed out, the mine was flooded, and a lot of expensive machinery is rusting in and about that pit.

The natives have both surface and pit mines in Shansi. In the latter the coal is hoisted with a windlass, turned by animal power or by hand. In one mine I have visited, the only light possible in the pit is from lighted sticks of punk, giving an illumination considerably less than the glowing tip of a cigar. Labor under such conditions must be extremely difficult. In this mine the men were paid a wage 20 per cent in advance of the cost of other lines of manual labor in that region, yet an excellent quality of soft coal sold at the pit's mouth at the equivalent of 90 cents a ton. When the

competition was keener the price had been as low as 60 cents a ton.

The chief iron producing districts of the province are the prefecture of Tséhchow in the southwest, and the department of Pingting in the east, the latter tapped by the narrow-gauge Chêng-ting-Taiyuan railway. Other iron deposits are in the Yungning and Ninghsiang districts in the west of the province, where some pig-iron of poor quality is produced, and used locally, and in the Ningwu prefecture in the north of the province. The Tséhchow and Pingting fields have been quite extensively worked in the crude native fashion; its must be, however, that they are capable of great development under improved methods.

While speaking of the mineral wealth of the province we must not neglect the saline deposits. In the southwest near the walled town of Yün-chêng is a salt lake, farmed out to a large number of native companies, and from which the government derives so considerable a revenue that an official staff is stationed there to care for it. There is also a deposit of gypsum in this neighborhood. In the central plain of the province in the Taiyuan prefecture, the natives have opened numerous salt wells. The salt from these wells is very bitter and decidedly inferior in quality to that from the Yün-chêng lake. There are saline deposits, also, in Suiyuan in the extreme north of the province on the Mongolian border, and in Fêngchên in the northeast, the latter district also producing some soda.

From the above it will be seen that the mineral resources of the province are rich, especially in coal and iron. The problem is, to develop these resources by improvements in the methods and by putting them in touch with the markets. This leads us naturally to consider the problem of transportation.

In the palmy days of the Manchu dynasty Shansi reached a high degree of affluence, but it was not through the development of the natural resources of the province. Great fortunes were made by bankers and pawn-shop men in the four corners of the empire and the fruits of those fortunes were escorted into Shansi over almost impassable trails to the

accompaniment of tinkling donkey-bells. All about the mineral riches of the province nature had thrown an almost insurmountable mountain barrier. The perseverance of men has, however, succeeded in throwing roadways or trails over range after range of mountains, and in maintaining a great number of carriers upon these road-ways. It would be profitable indeed, did time permit, to describe these ancient thoroughfares. They have a charm and a romance all their own. It is more to the point, however, to consider the efforts of modern engineers to penetrate Shansi's mountain fastnesses. There is but one completed railway line into Shansi. A narrow-gauge road, with its eastern terminus at Shih Chia Chuang, near Chêngtingfu, on the Peking Hankow line in Chihli Province, runs almost due west to Taiyuanfu. The road is very crooked and the engineering difficulties have been considerable. The total length is about 151 miles. In that distance there are eighteen tunnels and a large number of bridges and culverts. It is to be regretted that the road is narrow-gauge, but such is the character of the country traversed that to have constructed a standard-gauge road would have multiplied the cost four-fold.

One other road into Shansi is under construction, namely, an extension of the Peking-Kalgan line to Suiyuan and Kweihuating, important commercial centers, on the Mongolian border. Inside the province a railway line is under construction, the so-called Jung-Pu Railway, the ultimate termini of which are to be Tatungfu in the north and Puchowfu in the southwest, on the Yellow River, at the gateway to Shensi Province. At the northern terminus the road is to connect with the extension of the Peking-Kalgan line. It will run through Taiyuanfu and will follow in a general way, the great central highway that has for centuries been the connecting link between Taiyuanfu and Sianfu. Thus far grading has been done between Yützu, on the Cheng-ting-Taiyuan line, and Taiku, 25 miles to the south and west. The outbreak of the revolution in the autumn of 1911 stopped work upon this section of the road shortly before the laying of rails would have been begun.

The old trade routes followed the lines of least physical resistance through the mountain ranges, usually in or near the beds of water courses. The railways thus far constructed or under construction have, with certain modifications, followed the old trade routes. Generally speaking, this will probably be advisable in future railway construction, though thorough scientific investigation may open up some new fields for industrial development that even the ingenious Chinese have not yet discovered.

It is practically certain that with the development of Shansi's mineral wealth and industrial possibilities one narrow-gauge railway will be entirely inadequate to care for the traffic. Other outlets must, therefore, be sought. The central trunk line connecting with the extension of the Peking Kalgan line will, to a certain extent, relieve the pressure. Further than that, it will doubtless be necessary to construct a line from the rich central plain in a southeasterly direction to northern Honan, following a well-known and important trade-route, and the coal and iron fields of Luan and Tsechow might well find an outlet to Shuntéfu or Changtéfu to the east. Moreover, for the fullest industrial development it will be necessary to build a number of branch lines or "spurs," especially to tap the richer coal fields.

The Yellow River, which forms the western and southern boundaries of Shansi, cannot be considered an asset in any solution of the provinces transportation problem. Some cargo boats go down the river, but, at any rate along those reaches, none return up-stream. When the boats reach the northern border of Honan they are broken up and the lumber sold. Within the province itself there are no navigable streams. Occasionally small scows appear in the Fên, the largest of these streams, for the transport of flour and coal; but the river is frequently drained of its entire stream to supply the irrigating ditches of the fertile mid-Shansi plain. In summing up our consideration of this transportation problem we should say that the most hopeful suggestion for the industrial future of Shansi lies in the extension of the railway system.

The question of afforestation should receive some atten-

tion. It is probable that more than three-fourths of the area of the province was at one time covered with forest. The desiccation of the province in recent periods owing to deforestation has been marked, and this was to a large extent responsible for the terrible famine of 1877-78 which claimed the lives of between five and six million people in Shansi alone. Edwards of Taiyuanfu computed the rainfall for an entire year at sixteen inches. The average is probably a little higher than that. Atwood projected a theory that the rainfall increases and diminishes in a cycle covering twenty-four years, perhaps gathering data to support an idea he received from native sources. This, however, has nothing to do with the question of afforestation. An arboretum at Taikuhsien contains about twenty varieties of forest trees than can be successfully cultivated in Shansi soil. In the roofs of temples and other large buildings are found timbers that indicate something of the size and distribution of the forests in the past; while in the back blocks in both the eastern and western ranges of hills are yet to be found the disappearing remnants of the former extensive woodlands. Early and careful attention to the work of reforestation would provide needed building material for the future and would, at the same time, affect favorably the rainfall and so bear upon the problem of developing the agricultural resources. In the last years of the late dynasty certain governors of the province gave this question their attention, but the measures they proposed were never carried out.

An important problem in the industrial future of Shansi is the development of agricultural resources. In soil, climate and diversity of products the province has been singularly favored by nature. The wonderful loess formation covers the entire province, and because of that fact many of the hills are cultivable to their very summits. The climate while similar to that of the same latitude in America, is not subject to such extremes. But it is in diversity of products that Shansi's claim to agricultural wealth and importance lies. The following are some of them: field products; wheat (both spring and winter), millet (4 or 5 varieties), Kaoling, oats (both summer and autumn), rice, buckwheat,

barley, maize, and beans. Other field products are hemp, cotton, flax (in the extreme northeast), indigo, tobacco, and willows for basket weaving. The hills, especially in the northwest, yield large quantities of licorice and ginger, and a crude silk is produced in the districts bordering the Yellow River. Among the products of the gardens are potatoes (superior quality), yams, sweet potatoes, peppers, onions, melons (4 or 5 varieties), and practically all the products of American and European gardens. Among the fruits produced are apples, pears, persimmons, grapes (some six varieties), peaches, plums, dates, mulberries, cherries, walnuts (the finest in China), and strawberries, the last named introduced by foreigners.

The most important cereals produced in Shansi are wheat and millet. The normal land valuation is probably determined by wheat, just as it is fixed by rice in south China. The agricultural problem is made acute just now in Shansi by the necessity of finding the best substitute for the poppy formerly so extensively cultivated. The poppy demanded the richest irrigable lands and sapped the vitality of the soil. In the four years since its cultivation was prohibited much of the land has returned to wheat as the spring crop and millet as the autumn crop, with the result not only that the price of flour has fallen in the wheat-producing districts, but also that millions of bushels of both the above mentioned cereals have been shipped via the Chengting-Taiyuan railway to supply the markets of Chihli and Honan. Though opium is the most profitable crop, financially, the farmer of North China has ever grown, its contribution to general prosperity was negligible, and it has been interesting to observe that since the prohibition of its cultivation and the substitution of wheat and millet as staple crops, though the immediate financial return for them is much less the general prosperity, as gauged by two excellent criteria, the amount of building and repairing done, and the number of theatrical performances held in the villages, is much greater. Opium, because immediately a more profitable crop gave to the land a fictitious valuation. This was from 30 to 60 per cent above the normal valuation as fixed by wheat. The economic

readjustment necessary now that opium may no longer be produced constitutes the crux of the agricultural problem in Shansi. Careful study must be given to the question of the best substitute for the poppy.

Shansi was formerly one of the leading provinces in the production of opium. The easily irrigated fields alongside the watercourses, and where the mountain streams flowed out upon the plains, were covered with patches of poppy. The local markets cared for much of it, but a good deal was shipped out to Peking and Tientsin, or over the Luanfu road to Honan. In 1909 the edict calling for the gradual cessation of poppy growing took effect in Shansi. In the spring of that year I traveled several hundred miles in central Shansi, in five separate prefectures or departments, and along mountain streams where the year before the poppy had been extensively grown. Everywhere I made careful investigations, and I found that no opium was being planted anywhere. In the following spring, 1910, in the Chiao-Ch'êng and Wên-Shui districts, the former in the Taiyuan, the latter in the Fênchow prefectures, near the market-town of K'ai-Chia-Chên, the farmers attempted to resume the cultivation of the poppy. The then governor of the province, His Excellency Ting Pao-ch'üan, finding that the local officials were powerless to cope with the situation, sent a wellknown scholar and orator to plead with the people. This amicable method was unsuccessful, and the eloquent advocate was hustled out of the district. Then the governor sent troops to uproot the poppy plants and repress the rebellion of the people. A sharp fight followed in which about twenty farmers were killed, a good many others wounded, and several soldiers suffered severe wounds. However, the authorities triumphed, and the farmers abandoned the attempt to grow the poppy. This test case had been followed with keen interest throughout the entire province and its outcome had a salutary influence everywhere. For the sternness of his repressive measures Governor Ting lost his official head, a result that he himself probably anticipated. He has since been living in retirement in the city of Shanghai.

The influence of the K'ai-Chia-Chên affair was carried

over into the next year, 1911. The impression has been given in an earlier address in this conference (Hon. J. O. P. Bland, "The Suppression of the Opium Traffic") that the Chinese did not fully keep their agreement with Great Britain in the matter of opium growing in 1911. I can speak only for Shansi, but my personal observation there includes the valleys of the Fên, Hsaio, K'ai, Wu-na, Liu Chih, and Yü Tao Rivers, as well as the district surrounding the great spring at Chin Ssu and the fertile valleys of the Pei Chwan in the extreme west of the province. All these were districts where formerly the poppy was extensively cultivated. No poppies were grown there in 1911. Careful inquiry in all sections of the province has elicited the information that everywhere the edict was enforced in 1911 as it had been in 1909 and 1910.

In the spring of this year, 1912, the people of Shansi took advantage of disturbed conditions in the country at large and sought to recoup themselves for the losses of the past three years by extensively planting the poppy. When I left the province about the first of May the poppy plants were just pushing their way through the surface of the ground. The province has, since the first of November 1911, been under a military government, headed by a Tutuh, Yen Hsi-shan. This provisional government will continue until after the general elections in January 1913. Early in the year General Yen put out a mandate forbidding the planting of the poppy, and threatening with punishment according to military law those who disregarded the mandate. This manifesto was in some districts preceded, in other districts accompanied or followed by strong proclamations on the part of the local officials. The people, however, disregarded the military governor's orders and continued to water their poppy fields. In June, just before the poppy could yield its harvest, General Yen sent a special deputy, with military escort, into the Chiao-Ch'êng district, not far from where the rioting had occurred in 1910. The farmers attacked this deputy, killed him, and wounded many members of his escort, at the same time burning the deputy's official residence. Troops were sent by Governor Yen, the

incipient rebellion was crushed with some loss of life, and the fields of poppies were destroyed. It is to be regretted that in other sections of the province the crop was allowed to come to harvest. But those who best understand the purposes of the new government are most certain that this backset in the opium reform in Shansi can be but temporary. For we should remember that General Yen's strong measures were employed at a time when the republic was not firmly established, and when his own position and the position of the central government at Peking was precarious. That he was willing to take such risks at such a time is surely an earnest of the purpose of the new government to fulfil with Great Britain the compact of the old government.

After living for eight years in Shansi and carefully observing the economic, physiological, and moral results of the cultivation and use of opium, I am prepared to say without any reservations that it is an evil and only an evil so far as the Chinese are concerned. A speaker in this conference quoted certain authorities (and in the quoting left the impression that he endorsed their views) as saying that opium-smoking indicates a racial tendency of the Chinese. As we consider this statement let us briefly review the history of opium in China.

Previous to the famous T'ang dynasty the poppy was unknown to the Chinese. It is first mentioned in Chinese literature in the first half of the eighth century. At that time China had had intercourse with Arabia for about one hundred years. Its second mention in the literature of the country was by Kuo, a Shensi man, toward the end of the eighth century. The poet Yung Tao, a Szechuen man, about 900-906 wrote a poem describing the poppies growing near his home. I have mentioned the localities of these two writers because the provinces of Shensi and Szechuen later extensively cultivated the poppy.

At first the Chinese used only the seeds, but four medical writers, probably of the twelfth century, refer to the use of the seed-pods, or capsules. In the thirteenth century three and in the fourteenth century one writer on medicine tell of a drug made from the capsule. When the petals have

fallen away from the seed-pod, and before the latter begins to harden, incisions are made in the pod with some sharp instrument, and the dark, viscous juice that oozes out is carefully gathered. That is the raw opium. Cutting the capsule in this way was first described by Wang Hsi, who died in 1488. He was governor of Kansuh Province for many years. There he saw a great many Mohammedans and learned from them of Arabia. By the end of the fifteenth century the method of preparing opium was introduced to China by the Arabs. Li Ting in the middle of the sixteenth century gives an exact account of the preparation of the opium under the name *a-fu-yung*. (The Arabs took the Greek name, *σπιον*, and called it *afyun*. In China's coast provinces this was changed to *ya-p'ien*. But in Yunnan Province it is still referred to by officials as *fu-yung*, which is *a-fu-yung* without the prefix.)

All this while opium was known only as a medicine. As such it is extremely valuable and has a place in the pharmacopeia of every civilized nation. We are dealing, however, with its misuse or abuse. Early in the seventeenth century the Spaniards introduced tobacco smoking to the Chinese. About the middle of the seventeenth century the use of opium mingled with tobacco was introduced by the Dutch. Opium was first smoked by itself (by the Chinese) probably near the end of the eighteenth century. The first edict forbidding the smoking of opium was issued by the Emperor Yung Chêng in 1729. Foreign opium (the prepared drug) was first introduced by the Portuguese at the beginning of the eighteenth century. The illicit trade in the drug was taken up by the British before the end of that century. In line with the Chinese resistance before and after that date the Emperor Chia Ch'ing in 1796 put forth an edict prohibiting the importation of the foreign drug. That the shameless smuggling continued, championed at last by Great Britain, is a matter of common understanding. So China learned of the poppy from the Arabs, was given the pipe by the Spaniards, was taught to mingle opium with tobacco in the bowl of the pipe by the Dutch, had the foreign drug brought to her by the Portuguese, and had the business

in opium forced upon her by the British. Strange that so much foreign assistance should have been necessary in the discovery of a "racial tendency" in the Chinese!

To recapitulate: the Chinese have known of the poppy for twelve centuries, have used opium as a medicine for nine centuries, have known of the method of securing raw opium from the capsule, or seed-pod, for six centuries, and have known of and practised smoking for considerably less than three centuries. China is an old country. She points with pride to an unbroken history of four thousand six hundred years. For three thousand four hundred years of that time she existed in blissful ignorance of the fact that there was any such thing as opium. For more than four thousand three hundred years she failed utterly to reveal what Mr. Bland would have us believe is a "racial tendency." Surely in the light of such facts we may at least assume an attitude of what that gentleman describes as "suspended judgment" before accepting the suggestion that opium smoking indicates a "racial tendency" of the Chinese.

Other lines along which help is needed are, instruction in seed selection, and in the problem of irrigation. The spring-fed mountain streams reaching the plains are diverted into ingenious and truly admirable systems of irrigating ditches. However, the mountains denuded of their forests frequently allow these streams to become, in the time of the summer rains, uncontrollable torrents that carry destruction instead of blessing to the villages of the plains. Reforestation will help in this matter, but there should also be an improvement in the system of irrigating canals, possibly through the construction of reservoirs, that will conserve the gifts of the summer rains and not allow them to rush into the lower reaches of the Yellow River carrying a wealth of loess soil as they go and leaving destruction in their train. Improvements are possible in the crops now produced in Shansi, both in kind and quality. There should be an extension of sericulture, for thousands of acres in the hills bordering the Yellow River are adapted to the production of the mulberry. The hemp, potatoes, and walnuts of the province should find ready markets at the coast were the problems of transporta-

tion not so great. The fundamental question, therefore, in the development of agriculture as of mineral resources is one of transportation.

We take up now the manufacturing possibilities of the province. They may be suggested as we recapitulate some products of the region and mention a few others that have not yet been named. The existence of iron and coal fields side by side suggests the development of iron and steel foundries. Cotton and silk are both produced, and are now woven in primitive fashion in the homes of the peasants. Cotton mills and silk filatures are a possibility of the future. A large amount of excellent earthen and stone ware is turned out in simple kilns in several districts. This industry is capable of great expansion as the markets of the coast are brought nearer through improvements in transportation. The uplands, with their excellent oat straw, suggest possibilities in braid and paper, especially since there is an abundance of water power available. In Tan Ts'un in the Taiyuan prefecture are kilns where glass is produced, some bottles of small size being blown, but the chief products being fragile toys and flimsy ornaments. With modern machinery and methods this industry should be capable of development to commercial importance. Crude presses in many sections produce bean and hemp oil. Sheep and goat-skins and other hides are shipped in large quantities to America and Europe, especially France, but it surely will be possible, in the presence of a plentiful coal supply, abundant water power and cheap labor, to handle this raw product at home and export the manufactured article. Cordage, and willow and wicker ware, now manufactured in crude fashion and for local markets, give promise of great expansion, as there is an abundance of raw material and efficient labor. The vineyards of the Taiyuan prefecture already produce an excellent quality of wine and this industry is capable of great growth as it shall receive intelligent and adequate attention. Other possible lines of manufacture will readily occur to one who is acquainted with the raw products of the province. We have not mentioned flour-milling, nor a score of other industries now carried on by the Chinese. After all, we must

hark back to the question of transportation. Without cheap and adequate transportation none of these industries can be developed much beyond the point demanded by the necessities of the people of Shansi itself. With cheap and adequate transportation the possibilities stagger the imagination.

In closing a word should be said as to the possibilities in water-power in the mountains of the province. Numerous sparkling, spring-fed brooks and rivers of good volume invite the attention of the expert in hydraulics and suggest possibilities of industrial development even in districts where the coal supply is inadequate or inconvenient. This, in common, with the other possibilities mentioned above, sounds a challenge to the engineer, native and foreign, whose spirit of adventure responds to nature's call to unlock the doors of her treasure-houses and release the pent-up forces of her hills and valleys.