

The Greatest Civilizing Force in Eastern Asia

Japan's Heroic Efforts to Avert War by Developing Nearby Sources of Raw Material and Food
for Her Rapidly Increasing Population

The Real Mission of the South Manchuria Railway

By Geo. Bronson Rea

FOREWARD:—Japan is now in the market for another large reconstruction loan, this time for Y.130,000,000 to enable the municipal government of Tokyo to carry through its share of the improvements. The Imperial Hotel, we are informed, is seeking a loan, the Kobe-Osaka Electric Railway has issued debentures in London, the city of Osaka will require financial assistance, the Korean railway companies are casting their eyes abroad as the only hope of obtaining the finances for carrying through their programs, while the South Manchuria Railway is embarking on schemes which will revolutionize the steel and oil industry of the Far East. Many other important schemes are held up for lack of funds. Behind all this activity, driving the Japanese unmercifully forward is the instinct of self-preservation, the heroic struggles of a peace-loving people desperately seeking a solution to the problems of existence through development of their own resources. The Japanese have been hard hit. The earthquake wiped out in a few hours the accumulated wealth of a generation of hard work. No war that Japan might have engaged in, could have inflicted such heavy monetary losses as the two days of horror which reduced their capital city and chief port to ashes. The calamity, however, did not stop the operation of nature's laws which is piling up annually a surplus population of 700,000 new children. They must live. To live they must work. They must be fed. America and Great Britain have closed their doors to the children of Nippon. They may not own or lease land in the Philippines. They may not settle in peace and own or lease lands in any part of China. The Russians will not have them in Siberia. They are now seeking an outlet in South America and even here Brazil is threatening to pass laws that will exclude them. A few thousand may find homes in Mexico. The problem, however, remains unsolved. Japan may fight for her right

to exist. Placed in her position there is no doubt of what the Anglo-Saxon would do. Japan, however, realizes that such a desperate remedy will bring no permanent relief. She intends to work out her salvation at home by bringing all her waste lands under cultivation, by building railways that will facilitate their exploitation, by electrifying her water-powers and changing over from steam to electricity in operating her railways and industries, and in every other way possible creating new sources of wealth that will enable her to survive with a noose around her neck and the rope being hauled tighter by the jingoes of other countries who see in her magnificent efforts to save herself only the evidence that she is preparing for a war of aggression.

This is not Japanese propaganda. Few indeed are the men in Japan who realize the facts of a situation which is driving them pitilessly forward in a struggle to preserve their existence. Their deepest thinkers fail to grasp the significance of the forces operating to isolate them and compel them to live apart from the rest of the world in their own restricted habitat. There are, however, a few men in Japan who understand and these men have determined that the solution must come from within. They look to America for that sympathy and support which will enable them to surmount their difficulties. Recent events have convinced them that a full and friendly understanding between the two countries and a proper conception of the load under which they are staggering can come only through closer business relations. They are sincere. We are satisfied that once the American people fully realize what Japan is doing to preserve peace they will stand by her and relieve as far as possible any further tightening of the noose that their past mistaken diplomacy has placed around her neck. It is in this spirit that the following series of articles are written.

G. B. R.



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WHILE the rest of China is passing through a state of political chaos, business depression and practical suspension of all new development work, it is refreshing to turn to the bailiwick of Marshal Chang Tso-lin and see the evidences of prosperity and progress brought to the three eastern provinces through the enterprise and initiative of the South Manchuria Railway Company, one of the few foreign controlled companies in China operating at a substantial profit. In the face of the most determined opposition and passive resistance on the part of the Chinese and the constant heckling of other powers, the Japanese in less than twenty years have converted this most backward of Chinese provinces into the most advanced and most prosperous. Their example has forced the Chinese into many lines of industrial activity and in many instances, this has taken the shape of joint Sino-Japanese companies, in which the nationals of both countries have subscribed to an equal share of the capital required. There are other instances where these undertakings have been made possible solely because the Japanese with their faith in the future of the country have provided the working funds in order to overcome the traditional Chinese opposition to foreign exploitation of their resources. The total amount of Japanese capital actually invested in Manchuria is roughly estimated at Y.3,000,000 of which one-half represents the investment value of the South Manchuria Railway and its properties. For the present, however, this confidence in China has not resulted in any appreciable profit, for outside of the S.M.R. the great majority

of Japanese enterprises in Manchuria are being operated at a loss or at a profit far below the legitimate rate of interest allowed by the Japanese banks for fixed deposits. This is particularly so in the case of joint Sino-Japanese enterprises where the Chinese have contributed an equal share of the capital and enjoy corresponding equality in the appointment of directors and managers. In any fair analysis of Japan's investments in Manchuria it can be proven that far from exploiting the province, the Japanese have been the exploited. Millions have rolled into the pockets of Chinese officials for concessions that have never been worked, more millions have been invested in joint enterprises, in which the Chinese directors have made impossible the payment of dividends through overloading the payroll with relatives and salaried hangers-on. The Chinese in Manchuria, however, are prosperous; their officials are rich, Chang Tso-lin, its over-lord, has accumulated some \$30,000,000 in cash and the provincial treasury shows an annual cash balance of considerably over \$10,000,000. Much has been written about Japan's alleged exploitation of China. The other side of the story has never been told.

Manchuria, with its wonderful latent possibilities, is one of the few remaining lands of opportunity, a region in which despite all propaganda to the contrary, the principle of equal opportunity prevails for the trade and finance of all nations. That the province has gravitated under Japan's sphere of economic influence is due in part to the fact that its development has been made possible exclusively through Japanese initiative, the investment of Japanese

capital and to basic economic laws which no amount of political opposition can set aside. The fact that the territory is open for the trade of other nations is a constant reminder of the tremendous sacrifices of Japan incurred in driving out Russia after she had practically annexed and closed the province to foreign commerce. In restoring China's lost sovereignty over Manchuria, Japan provided evidence of her solicitude for the maintenance of China's integrity and a sincere desire to live on terms of amicable understanding with the nation from which she derived her culture and civilization. Manchuria to-day is an object lesson of what a public-spirited, well-organized and honestly directed corporation can accomplish in raising the living standards of the Chinese people at the same time improving their cultural status.

That Manchuria has been reclaimed from the poorest economical asset of China and elevated to its present enviable industrial position is due to the ceaseless activities and never-changing policy of the South Manchuria Railway Company which although coming under the technical classification of a commercial enterprise, is in reality the greatest civilizing force in the Far East to-day. This perhaps is a bold statement that may be challenged by those who believe that the American experiment in the Philippines is entitled to this distinction. The budget, expenditures and scope of the activities of the S.M.R. are three times greater even than the American administration in the Philippines and the ultimate working out of its mission will have a more far-reaching effect on the future of mankind than the widely advertised altruistic Philippine policy of the United States. In support of this statement it is only necessary to invite attention to the fact that last year the total revenues of the S.M.R. amounted to Y.185,000,000 as compared with the government of Korea's ordinary budget of Y.101,000,000, that of Formosa about Y.100,000,000 and that of the Philippines of Y.65,000,000. The revenues of Siam and Indo-China are about the same, Y.62,000,000 for the former and some sixty odd million for the latter. The only colonial government in the Far East which enjoys revenues exceeding those of the S.M.R. is that of the Dutch in Netherlands East Indies, where in 1923 the total receipts are estimated at 366,000,000 guilders or roughly Y.300,000,000. The budget of the S.M.R. in addition to making up the annual deficit for the administration of the Kwantung leased territory which supports many schools and two colleges, also maintains all the schools in the railway zone (nearly 100) out of its appropriation of Y.10,000,000 for administrative expenses, a heavy and increasing burden entirely out of proportion to the railway receipts.

The fundamental policy guiding this tremendous civilizing and progressive force has remained unchanged through successive administrations, the main objective being to develop the resources of the territory served and create for China, Japan and the world at large a new storehouse of much needed raw materials, at the same time originating traffic for the railway. To accomplish this laudable end, the annual profits over a legitimate ten per cent. for the shareholders have been reinvested in establishing new industries and developing new sources of wealth. Important private Japanese interests have followed this example and invested further millions in establishing new industries not only within the railway zone but in joint partnerships with the Chinese in their own territory. At all times the policy of the S.M.R. has been to

have been distributed amongst the Chinese. Manchuria as a dividend-paying proposition for Japan is a fiction existing only in the imagination of her detractors.

In this respect Japan's mission in Manchuria resembles the philanthropic program of America in the Philippines and in other parts of China. While Americans contribute two dollars towards religious and cultural uplift work in China for every dollar they take out in legitimate trade profits, the Japanese have contributed fifty yen towards improving the material well-being of the Chinese in Manchuria for every yen returned on their investments. It is a matter of opinion which policy is doing the most to elevate the status of the Chinese. Both nations seem willing to wait for the future to bring its rewards, the difference being that the recipient of Japan's commercial altruism at least has the immediate satisfaction of possessing a fat pocket book and an overflowing rice bowl while America's beneficiaries are consoled by the hope that some day in the distant future they or their children will also be well fed and profitably employed. On the other hand, Japan's philanthropy in Manchuria has brought hundreds of millions of dollars in orders to American manufacturers and we have no just cause to condemn a policy which has such a profitable bearing on our trade with this country.

As long as Japan adheres to her present program in Manchuria other countries will benefit enormously from the prosperity of the Chinese. Japan is and must always remain a creator of wealth, pushed forward by forces she may not resist without peril to her very existence. In this instance Japan has the satisfaction of having added to her near-by sources of raw materials and food supplies and of having consolidated her strategic position in the one quarter through which her national security was constantly menaced. Although much of the fruits of her labors have gone to swell the trade returns of other countries with China, Japan rests content with the indirect benefits that have accrued to her own commerce through the increased purchasing power of the Chinese and to the permanent improvements that are steadily increasing the volume of traffic over the S.M.R. and appreciating the value of its properties and other investments.

To quote the words of Mr. H. Porter, the British consul-general at Mukden, at a dinner recently tendered to Mr. Yasuhiro, president of the S.M.R. :

"It would be hard to find anywhere in the world an enterprise combining in itself so many and such varied activities, which, nicely handled and administered by the best brains Japan has at her service, has proved an object lesson in the art of communal development and the spread of modern civilization by railway . . . To have confined the enterprise into one of mere money-making would have been to lose one of the finest opportunities ever offered for far-reaching schemes of development which, while not immediately profitable, will in the long run not fail to justify themselves and the aims of their promoters."

In these words, the British consul-general at Mukden reveals something of the great change in the attitude of the foreign community in Manchuria towards the Japanese, a public testimonial to the great debt it owes to the spirit of fair-mindedness and consideration towards foreign interests which has always characterized the policy of the S.M.R. It is regrettable that such a public

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This is a phase of Japan's activities in Manchuria little understood by those critics who view her every move with distrust. The Japanese may have, as these critics allege, exploited Manchuria, but such activities have been offset a hundredfold by the manner in which the Japanese have been exploited by the beneficiaries of their policy. The surplus profits of the S.M.R. added to the millions poured into the country by private Japanese investors have created the industries and developed the new sources of wealth which have made possible its present prosperity. For every dollar of direct profit taken out of Manchuria by the Japanese, ten dollars have found their way into Chinese pockets. Had the S.M.R. pursued a sordid money-making policy, piling up fat dividends for its shareholders, there might be some justification in the accusation that it was exploiting Manchuria for the benefit of Japan. Facts and figures, however, prove the contrary. Instead of the Japanese reaping legitimate rewards from their investments, the profits in the main

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It is not the purpose of this article to describe in detail the many and varied activities of the S.M.R. as this would require a special volume. The urgent task which confronts Japan in developing this vast virgin territory as part of her pacific program to ward off the consequences of keeping her people at home and providing them with assured sources of raw materials and food is one that should merit the cordial sympathy and financial support

of other nations, especially of the one nation whose exclusion laws have driven the Japanese into this corner of the world to make their last stand for the right to exist.

Few people, even in Japan itself, have a full realization of the vital bearing on the future of Japan and world peace involved in the rapid economic development of Korea and Manchuria. Each year the menace to peace becomes intensified through the rising pressure of population in a country too small to hold it. As the halter around the neck of Japan is drawn tighter by the establishment of a huge British naval base at Singapore (now a certainty under the recent change of government in the country), by the prolongation of American rule in the Philippines, closing this natural outlet to her overflow and the stubborn resistance of the Chinese to leasing their lands in Manchuria or Mongolia for agricultural purposes, intensified by the reappearance of Russia in Northern Manchuria and Mongolia obsessed with its mission to dominate Asia, only the most strenuous efforts on the part of Japan and a corresponding recognition of her problems by other powers, can avert a catastrophe. The re-entrance of the Soviet in Northern Manchuria and its determination to make the situation more difficult for Japan is seen in the recent cancellation of the agreement entered into between the former management of the Chinese Eastern Railway and the South Manchuria Railway authorities through which products of northern Manchuria were routed for export via the port of Dairen. This measure is to be followed by a revival of the old working agreement between the C. E. R. and the Ussuri Railway to make Vladivostok the port for this region and a further freight agreement with some American steamship company that will have a monopoly of carrying the freight so diverted to foreign ports. This means a loss of nearly Yen 10,000,000 in freight receipts alone for the S. M. R. and the creation of a discriminating policy designed to injure the Japanese line and the value of Japanese investments.

If the present policies of the western powers are persisted in and there is an honorable desire to maintain peace, it can be attained only by aiding Japan to become self-contained. To accomplish anything along these lines, the necessities of life and the raw materials which will enable her people to work must be secured as rapidly as possible. Herein lies the importance of Manchuria and the great part played by the S.M.R. in working out the salvation of Japan and preserving world peace. Any attempt to interfere with or obstruct its program means a corresponding tightening of the rope around Japan's neck and the coming together of a heroic fighting people in one grand desperate struggle for self-preservation. On the other hand, the sympathy and support of other nations in carrying out the great task of redeeming the waste places of this region will do more to convince the Japanese of our friendship than anything else.

It is with the hope that this friendly co-operation will take the place of the present attitude of suspicion and opposition that we present in a superficial manner some new information about the many new engineering and development undertakings now being carried out under the auspices of the South Manchuria Railway and allied private Japanese concerns. A trip through Manchuria is an eye-opener to what might be accomplished in other parts of China

factories of all kinds operating within the city limits capitalized at about Y.26,000,000, the majority of these being confined to extracting the oil from the millions of tons of soya beans transported by the railway from points further north. Scurrying around the wharves are seen several of the latest electric trucks handling cargo between the steamships and the warehouses while further away in the main railway yard the work of electrifying the freight lines is in progress.

At the coal wharf where the output of the great Fushun mines is loaded into steamers for export, the ground is being prepared for the installation of special car dumping equipment that will increase the loading capacity of the pier to 4,800 tons per hour. Work at the mines is being pushed forward to give an annual output of 8,000,000 tons, the bulk of which will be exported from Dairen. To handle this enormous tonnage the S.M.R. is considering plans for the construction of a special coal port in the vicinity of Dairen, but for the present is concentrating its activities in bringing the existing pier up to its fullest loading capacity. As a part of this huge mining, transport and shipping business, the S.M.R. intends to re-equip its lines with coal cars having a capacity of 60 tons each, in itself a big undertaking. These cars are to be dumped automatically at the wharf in connection with a loading device which will deliver the coal direct into the holds of the steamers awaiting cargo. All this wharf machinery and the shunting of trains in the terminal yard will be done with electric power, calling for a corresponding increase in the present (6,000 k.v.a.) No. 1 power house of the S.M.R. located in the terminal freight yards. The head of the electricity department of the company is now on an extended tour through America and Europe investigating new appliances applicable to this scheme. It has already been decided that the Dairen power station will be equipped with a Holbeck pulverized coal plant similar to the one now in operation at Fushun and another under course of erection at Anshan. This enables the S.M.R. to utilize, for its own purposes, its dust coal from the Fushun mines for which there is no market. Expert reports on the Fushun pulverized coal plant indicate that it is the most efficient installation of its kind in the world.

On the No. 2 wharf at Dairen the S.M.R. has just completed the erection of a cold storage plant supplied by a Danish manufacturer, the first step in the development of another great industry designed to supply Japan with fresh meats from Manchuria and Mongolia. The working out of this program will call for the building of complete trains of refrigerator cars, subsidiary cold-storage stations at the various receiving points, the installation of cold-storage facilities aboard the Japanese steamers engaged in the trade and the erection or expansion of cold-storage plants in Japan. The rapid development of this industry depends in large part on the preservation of law and order in the Mongolian border lands enabling the Mongol herdsmen to raise their cattle and sheep without fear of Hunghutze raids or the more destructive imposition of illegal taxes. Japan is turning more and more to the consumption of beef, wheat and other western foods, and with the completion of a chain of cold-storage plants and transportation facilities that will land the meat in Japan in proper condition, a profitable market will be created for the Manchurian and Mongolian cattle men. The new cold storage plant

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The first thing to attract one's attention is the handsome new landing pier with its commodious and comfortable passenger rooms and cargo handling appliances, equal if not superior to some of the more widely advertised accommodations of other ports. Facing this main pier is the handsome harbor office of steel and concrete built in a circular form and housing the many offices of the port authorities. A new addition or segment that will complete three-quarters of the building is now under erection. Down the wide streets one sees lines of electric tramcars loaded with beans and bean cakes destined for the wharves or for the many oil mills scattered around the town. This service of the Dairen tramways operated by the electricity department of the S.M.R. is of great benefit to the many manufacturing establishments of the port, transporting raw materials from the railway freight yards to the factories and the finished products to the wharves and railway. Some understanding of the importance of the manufacturing plants in Dairen are seen in the statistics which show that there are 42

in use on a big undertaking. These cars are to be dumped automatically at the wharf in connection with a loading device which will deliver the coal direct into the holds of the steamers awaiting cargo. All this wharf machinery and the shunting of trains in the terminal yard will be done with electric power, calling for a corresponding increase in the present (6,000 k.v.a.) No. 1 power house of the S.M.R. located in the terminal freight yards. The head of the electricity department of the company is now on an extended tour through America and Europe investigating new appliances applicable to this scheme. It has already been decided that the Dairen power station will be equipped with a Holbeck pulverized coal plant similar to the one now in operation at Fushun and another under course of erection at Anshan. This enables the S.M.R. to utilize, for its own purposes, its dust coal from the Fushun mines for which there is no market. Expert reports on the Fushun pulverized coal plant indicate that it is the most efficient installation of its kind in the world.

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It is well to digress from the main theme of this article for the moment in order to emphasize the really herculean efforts Japan is making not only at home but in Korea and Manchuria to solve her population problems in a peaceful manner by developing a food supply that will help to make the empire self-contained. It is not altogether sordid commercialism or aggressive political designs concealed behind peaceful penetration as some people believe which urges Japan forward in her plans to develop Manchuria. She is not so much concerned with the principles of the "open door" in that territory as she is to diminish as far possible the greater danger to international peace that may arise from her rapidly mounting population which has no outlet and no hope of sustaining life without an independent source of food supply. It will come, therefore, as a great surprise to the outside world to learn that the S.M.R. through its agricultural experiment station at Kungchiling has succeeded in cultivating rice on a large scale in a territory which before the advent of the Japanese was given over entirely to the growing of millet, the staple food of man and beast in these regions from time immemorial. Every attempt on

the part of the Chinese to grow their favorite article of food in this cold northern climate had failed.

It did not take long for the S.M.R. agricultural station to demonstrate that rice could be profitably cultivated even in Manchuria. The Chinese, as usual, scoffed at the idea. At first, the Japanese confined their cultivation to plots located within the railway zone under their own jurisdiction. It was not long before the incredulous Chinese began to sit up and take notice. Encouraged by the Japanese, the Chinese then began to plant rice in the river-bottoms in the immediate vicinity of the railway zone and little by little as success attended their efforts, extended the area by digging irrigation canals. The results are seen in the figures. The first rice crop some years ago, was about 100,000 *koku*; last year the harvest was nearly 1,500,000 *koku* and the area under cultivation is constantly being augmented.

The prospects of a heavy cultivation of rice in Inner Mongolia along the upper reaches of the Liao River are extremely promising. One of the tributaries of the Liao (the Chingshui) has an irrigable area of over 17,000,000 *tsubo* and it is in this district that Baron Okura has established a joint enterprise with the Chinese for the cultivation of rice. Because of the singular adaptability of the Chinese to supervise this particular branch of agriculture, a typical illustration of the profitable nature of the enterprise is reported where an investment of Y.5,000 brought in a crop valued at Y.35,000. The only barrier to the successful reclamation of these vast areas of waste land is the provincial law which prohibits the leasing of land to foreigners. Needless to say that although there is no discrimination, the law was specifically aimed at the Japanese, the only people interested in bringing the lands under cultivation. The situation is almost identical with that in the Philippines, where millions of acres of public land lies idle while laws have been enacted to prohibit the Japanese from purchasing or leasing them. The operation of these various land laws in near-by countries is forcing the Japanese to concentrate more and more on the development of their own narrow margin of waste lands within the empire and unless there is a solution that will enable them to have an equal chance in the struggle for existence, the result can be better imagined than depicted.

The success attending Japanese agricultural activities in Manchuria is an eloquent tribute to that same enterprise and initiative which developed in fifteen years the obscure local soya bean trade to its present magnificent international proportions. The development of the rice industry in Manchuria goes hand in hand with the development of the cattle and wheat industry, all basic essentials to Japan's ability to solve her population problem by keeping her people at home and feeding them. After closing the door to the Japanese in the United States and in the Philippines, forcing them to work out their own salvation in their own way without encroaching on the sovereign rights of China, it would seem that the American people might well stand behind the Japanese financially in order that they may succeed in their peaceful efforts to survive.

Coming back to Dairen and the work of the S.M.R., it would require a special volume to describe adequately and in detail the construction program that is now being carried out for the expansion of the city and port. New blocks of residences, clean, home-like

of its fittings the Rockefeller Institute at Peking. This building was fully described in the January, 1924 number of THE FAR EASTERN REVIEW. It is regrettable to learn that due to the mounting costs of this magnificent edifice (that seems to come under the head of unforeseen extras in the original contract) the S.M.R. authorities have recently cancelled the contract with the Geo. A. Fuller Company of the Orient and suspended further work.

In its immediate building program, the S.M.R. has included the erection of a magnificent terminal railway station that will also house the operating departments of the railway, now quartered at the head office. The site for this station is to be alongside the present old wooden structure, just beyond the Nippon Bridge. Another new hotel is to be erected at Mukden superceding the present Yamato hotel on the second floor of the railway station. The cost of this edifice is estimated at Y.1,300,000 and prizes were recently awarded for the best plans submitted. Work, however, will not be commenced before 1925 while the erection of the new terminal station at Dairen will be postponed until other more essential industrial undertakings have been financed.

One of the most interesting features of the S.M.R.'s building program is the reconstruction of the entire colliery town of Fushun. The old Chinese city, offices of the company and the Japanese residential town are located in a direct line with the open cut work on the main coal seam and at the rate stripping the top soil is now progressing, it will become necessary, in a few years, to raze the old town to make room for further mining operations. The edge of the new open cut is now about a half mile from the town limits. In anticipation of this difficulty, the S.M.R. authorities some time ago selected a new site far removed from any present or future coal mining operations, located on the hills overlooking the Hun River. Here, a new town was laid out with wide streets, a spacious park and several playgrounds, sewer, water and central heating systems and other essential public utilities. Over one hundred new residences and apartments for the staff and workers have already been erected. These villas for the employees are probably the finest of their kind to be found in China, reminding the visitor of the southern California type of architecture. Outwardly, these houses follow the very best style of western architecture, though the interiors are designed to conform to the Japanese idea of comfort.

The S.M.R. authorities explain their lavishness in this matter of housing by the simple fact that it is the only way they can induce departmental heads, engineers, clerks and skilled workmen to leave their homes in Japan and settle down permanently in Manchuria. In order to get good men on the job and keep them contented it is necessary to provide good houses, the best of schools for their children, clubs, recreation grounds, libraries and the other cultural facilities that tend to make life agreeable in a foreign country. In other words, the S.M.R. finds it as difficult in Manchuria to engage and retain the services of good men as Americans have found it in the Philippines. There is no ulterior motive in expending funds for what in China might otherwise be classed as luxuries. It is simply the only policy that will attract and keep the best men on the job. American firms in Shanghai have faced the same problem and had to provide the funds out of their own pockets for erection of schools, clubs and churches in order to keep their employees satisfied.

In building this new colliery town, the S.M.R. is concerned

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The Dairen hospital of the S.M.R. when completed, will rank as the largest and best equipped in Asia, rivalling in the completeness

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In building this new colliery town, the S.M.R. is concerned only with properly housing and providing for the comforts of its own employees, leaving plenty of ground for the erection of private dwellings, stores, hotels, banks and other commercial edifices. Land for this purpose is leased by the S.M.R. to merchants and others attracted to the town because of its assured prosperity. In this connection, the Bank of Chosen and the Oriental Development Company are advancing building funds on the condition that the program of the S.M.R. is not modified or the complete removal of the old town unduly postponed.

For the water supply of the new town the S.M.R. has just completed at a cost of a million yen the installation of a water works, capable of supplying 400,000 cubic feet of sterilized and filtered water for house consumption and 200,000 cubic feet direct from the main reservoir for the use of the power houses. The Patterson system of filtering is used. A pumping station elevates the water to a reservoir for the supply of the higher levels. Another important public utility is the central steam heating plant connected by street piping with all the company's houses in the new residential district. This plant, the largest of its kind in China, is to be still further enlarged when the building program warrants it.

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Having jumped from Dairen to Fushun it may be just as well to add a few more remarks about the development work now in progress at this place. The main features of the Fushun mines, their pits, sulphate of ammonia plant, Mond-gas producer and power house, and other technical details have all been published in past numbers of THE FAR EASTERN REVIEW and new developments will be fully described in future numbers. We only wish to touch on a few of the present improvements and give some idea of the progress being made. In the first place the Fushun Coal Mines are misnamed. Properly speaking, Fushun is a gold mine, with an inexhaustible supply of cheaply mined coal that will stand a century of extraction before the operation becomes unprofitable under present mining methods. The main coal seam 80 to 480 feet thick extending for several miles, dips at a slight angle towards the river from the outcrop on the Hun river hills and is easily mined by stripping off the top soil. This top-soil (40 feet thick) consists in the main of a strata of oil-bearing shale containing an average of seven per cent. crude oil, sufficient to supply 1,500,000 tons of oil annually for two centuries. An initial dry distillation plant that will produce 50,000 tons of oil annually is to be erected next year at a cost of Y.7,000,000 and the plans provide for its expansion to a point where it will free Japan from foreign oil importations. An article on this development appeared in the October number of THE FAR EASTERN REVIEW. The next few years will probably witness the investment of Y.50,000,000 in this enterprise alone, without counting the expenditure for tank cars, storage tanks at Fushun and Dairen and the use of tank steamers to convey the product to storage tanks in Japan. The development of this one industry and its by-products may well call for the investment of Y.100,000,000 in providing for all its ramifications.

Up to the present, the coal from the open cut mine has been screened and classified by hand, but a contract has been placed in Germany for a new Rheolaveur system coal-washing and dressing plant to be erected at the head of the cable incline which hoists the loaded cars from the open pit to the ground levels. This will enable the S.M.R. to better classify its coal for the market and save the screenings and dust for its own use in the pulverized coal installations it proposes to erect in all its main power plants.

The first of these pulverized coal plants, manufactured by the Holbeck Engineering Company of Cleveland, is now in successful operation at the No. 3 power house at Fushun which furnishes current for the long-distance power transmission line to Mukden and Liaoyang. This pulverized coal plant is being duplicated at the power house attached to the Anshan Iron and Steel Works and another is to be erected in connection with the power house at Dairen. Experiments in burning pulverized coal on the Formosan government railways have been carefully followed by the S.M.R. authorities and one of the possibilities of the future is the adaptation of all their locomotives to this type of fuel. The perfection of this system of utilizing the dust from their own mines will enable the S.M.R. to market their best qualities of coal and utilize profitably a product which now has no commercial value.

In this, as in many other technical matters, the S.M.R. has been the most active agent in opening up a market in China for the most advanced types of engineering installations, in which

the manufacture of steel on a large scale at Anshan, the Fushun works will undoubtedly be confined to turning out the more complicated castings for machinery and railway equipment parts.

The development of the Fushun coal mining lease to a point where 10,000,000 tons of coal and 500,000 tons of oil will be annually produced is the pivotal point in the S.M.R.'s plans for the development of Manchuria, as it is from this goldmine that the real profits will be derived that will enable the other undertakings to be financed. Of equal importance, however, to the future of Japan and prosperity of China is the plan now under way to restore the Anshan iron mines and blast furnaces to a profitable working basis. The Anshan iron belt is estimated to hold over 300,000,000 tons of ore but this estimate is subject to considerable revision upwards or downwards after proper exploration. During the war the S.M.R. erected at this point two blast furnaces for supplying iron ore to Japan and during the period of high prices was enabled to work at a fair profit by utilizing only the higher grades of ore found in very limited quantity, the deposits being in the main of low grade non-magnetic ores averaging 40 per cent. of iron content. Last year the S.M.R. brought out a commission of American mining experts, who, after most elaborate studies on the ground submitted their report recommending amongst other things the installation of a concentrating plant and other details which would in their opinion permit of the economical mining and handling of the ore preparatory to its being fed into the blast furnaces.

Supplementing this very complete report, the S.M.R. expert and engineer at the Anshan mines (Mr. T. Umene) conducted a series of independent experiments extending over a period of three years with the gratifying result that he has perfected a furnace that will roast the hematite ores and reduce them to sixty per cent. magnetite. Without enlarging at this time on the technical features of this process it is sufficient to state that the latest type of furnace evolved as the result of Mr. Umene's experiments has conclusively proven that the low grade hematite ores can be treated economically in large quantities thus making possible the immediate exploitation of these deposits and the profitable operation of the blast furnaces. An experimental furnace of 300 tons per day capacity has been in successful operation under the watchful care of its inventor for some months and the results obtained are so satisfactory and convincing that the S.M.R. authorities have decided to erect a battery of ten of these furnaces that will give an output of 3,000 tons of reduced ore per day or roughly 1,000,000 tons per year. The preliminary work of preparing the site for this innovation in connection with the concentration plant is now in progress, covering the entire side of a hill situated in the centre of the properties.

The battery of reduction furnaces will feed the roasted ore into the supply bins that will in turn feed a concentrating plant of equal daily capacity to be erected on the opposite declivity of the same hill in order to provide the proper gravity flow from the crushers to the sintering machines. The plans for this concentrating plant with its crushers, rolls, ball mills, classifiers, magnetic separators, pulverizers and sintering machines have all been prepared and experts are now abroad submitting reports as to the best types of machinery to be purchased. The cost of the plant will approx-

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In this, as in many other technical matters, the S.M.R. has been the most active agent in opening up a market in China for the most advanced types of engineering installations, in which American manufacturers have, in the past, profited to a greater extent than their European competitors. This quasi monopoly is, however, being gradually displaced by a wider use of European machinery and in many of the new installations the S.M.R. has gone to Germany for equipment while British manufacturers will probably obtain the contract for the oil shale distillation plant.

At some distance from the main coal workings located along the main electric railway serving the entire colliery, is a group of new buildings erected during the war by the Kuhara interests as a zinc smelter and refinery, the ore being imported from South America. The sudden ending of the war caused this fine new plant to suspend operations and finally to close down. The buildings, however, of first class construction, with their power house and chimneys still stand and have been acquired by the Suzuki interests of Kobe who will refit and remodel them as a steel works. The Suzuki company owns and operates the Kobe Steel Works and will ship a part of this equipment to Fushun and engage in the manufacture of steel from iron supplied by the S.M.R. blast furnaces at Anshan. In addition, the S.M.R. will furnish coal and electric power at reduced rates and purchase the bulk of the steel output which for some time, we understand, will be confined to castings and minor products. As it is the intention of the S.M.R. to later on engage in

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Side by side with this development goes the further expenditures for developing the widely scattered Anshan iron deposits. This covers a wide range of engineering, including the construction of miles of standard gauge railway, light railway, mine cars, diamond drilling outfits for exploration work, air compressors, drill steel, machine shops, steam shovels and excavators, new water supply and the other details which go to make up the complete equipment of a modern mining enterprise. If pig iron can be produced within the present estimates the S.M.R. authorities will leave this problem behind them as a finished job and begin the erection of a steel works and rolling mill whose capacity will depend upon the requirements of the market. It is not difficult to look ahead and foresee the day in the not distant future when the industrial requirements of Manchuria, Eastern Siberia and other parts of China will be able to consume the major part of the output of such a plant. At all events the S.M.R. authorities are once more hopeful and face the future with a greater degree of security now that the problem of what to do with their Anshan properties has been so happily solved.