

### The Trans-Siberian Railway.

At the present time when so much interest is taken in the Asiatic question in China and northern Asia, an account of the great railway which Russia is building across Siberia to the Pacific will be especially timely. The London Engineering Review says of this railway:

One of the most important railway enterprises that have hitherto been projected is the great line now under construction across Siberia. This great work had been "in the air" for many years before it was actually begun. Surveys for such a line had been made as far back as 1857 by a Russian, Colonel Romanov. In 1858 a project was submitted by English capitalist for the construction of a railway between Moscow and the Tartar strait; and another Russian, named Sufonov, submitted a plan to build a line from Saratov across the Kirghiz plains to the Amour and Peking. In 1862 surveys were made from Perm to Tiumen in view of a scheme which proposed to unite the basins of the Volga and Obi, and in 1859 the then governor-general of Western Siberia brought forward a memorial in which he advised the Emperor of the need of a line to connect Nizhni Novgorod and Tiumen.

Up to this time the question of building a Siberian railway had settled into three sharply defined routes. All three were to begin at Perm and end, the first and third at Tiumen, and the second at Biolozersk and the Tobol river. The first of these routes were named the northern, the second the middle and the third the southern. After further consideration by the government it was deemed advisable to build only part of the line projected, namely, a road to join Kama with the Tobol river, a distance of 700 versts.

Surveys were made in 1872, 1873 and 1871 by the government, and ended in the establishment of three principal routes: (1) Kinesham, Viatka, Perm and Ekaterinburg, 933 versts; (2) Nizhni-Novgorod, Kazan, Krasnoufimsk and Ekaterinburg, 1,172 versts, and (3) Alaty, Ufa and Cheliabinsk, 1,173 versts. The committee of Imperial Ministers, after examination, decided, in 1875, to favor the Siberian Railway from Nizhni-Novgorod along the Volga to Kazan, Ekaterinburg, and Tiumen.

In 1890 a special commission was formed, under the Imperial Minister Vyshnegtadsky, looking to the construction of the railway by foreign capital. Several Americans, together with other foreigners, thought seriously of forming a company for the construction of this road, but capitalists abroad hesitated to subscribe the needful funds. A change in the Imperial Ministry soon after placed Serge Witte, former director of the department of railways, at the head of the Ministry of Finance. Minister Witte took the stand that work upon the great Siberian Railway should begin at once, and that the road should be constructed by Russian capital and Russian engineers. Accordingly, on February 21, 1891, the plan was laid before the Emperor for approval, and he, on March 17th, 1891, decided in the affirmative.

The work of construction was divided into three parts. The first, consisted of the western Siberian section, from Cheliabinsk to the River Obi (1,328 versts in length), and of the middle Siberian section, from the Obi to Irkutsk (1,751 versts), together with the completion of the Vladivostok-Grafskaya section, now nearly finished, and the building of a line to connect the Siberian Railway with the Ural mines. The second included the sections from Grafskaya to Khabarovka (847 versts), and from the station Mysovskaya, the commencement of the line on the other side of Baikal, to Sretensk (1,009 versts). The third included the building of the Circum-baikal road (292 versts), and the line from

Sretensk to Khabarovka (2,000 versts). The first is under contract to be completed not later than 1900.

The total length of the Siberian Railway from Cheliabinsk to Vladivostok is 7,083 versts (4,996 miles) on the main line alone. For purposes of superintendence, the work is divided into seven sections, viz: The Western Siberian, from Cheliabinsk to Obi (1,328 versts); the Central Siberian, from Obi to Irkutsk (1,751 versts); the Baikal circuit, from Irkutsk to the pier of Mysovsk, on Lake Bai (292 versts); the Transbaikal, from Mysovsk p. or to Sretensk (1,009 versts); the Amour section, from Sretensk to Khabarovka (2,000 versts); the North Ussuri, from Khabarovka to Grafsk (317 versts); the South Ussuri from Grafsk to Vladivostok (382 versts); total 7,112 versts (1,715 miles), including the branches to the principal rivers intersecting the main line.

One of the most remarkable structural features of the Trans-Siberian railway is the large number of bridges that have to be provided. It first crosses the Irtysh on a bridge 2,100 feet long, and at the 1,325th verst it crosses the Obi on a bridge 2,800 feet in length. At about the 2,116th verst it crosses several tributaries of the Berezjoka and Sitik by numerous bridges, there being 82 of them in a length of 67 versts. A bridge 1,400 feet long is required across the river Kan, after passing the town of Kansku. Near the shores of Lake Baikal the line crosses the Selenga on a bridge 3,185 feet long. Another feature of the line is a tunnel 8,380 feet long at the 3,146th verst.

As far as Obi the line does not present any difficulties of an engineering character. The ground is practically level, so that gradients are not more than 0.0074 and the radii of the curves are 1,750 feet. Beyond the Obi the contour is more hilly, and from Achinsk to Irkutsk, a distance of 1,191 versts the country is more mountainous. Through this country the construction of high embankments has in many places been necessary, some of them 70 feet high. In passing through the valley of the Irkut, at the 3,112th verst, the line is mostly in cutting through overhanging granite crags. After leaving the shores of Lake Baikal, which it follows for a considerable distance, the railway passes through the valley of the Uda, and enters the Vitimsk plateau, winding along the river Dymna, one of the tributaries of the Lena System. Passing the summit level between those rivers, the line climbs the eastern slope of one of the branches of the Yablunovoi chain, which serves as the summit level of the basins of the Lena and the Amour; that is to say, of the Northern and Pacific oceans. From this point the road descends and winds round the hilly side of the town of Chita, on the bank of the river Shilka, to Sretensk. The continuation of the Siberian Railway from Sretensk will be along the valleys of the Shilka and Amour, probably crossing the latter on a bridge 8,100 feet long at the 6,950th verst. After crossing the Amour the line follows the valley of the Ussuri, a distance of 100 versts, on the border of the Russian and Chinese empires. There are several large bridges planned to cross the Khor, Bikin and Iman rivers. The road comes out of the valley of Suyfun river and passes along the shores of the Ouglov and Amour gulfs, terminating at Vladivostok, the station being on the bay of the Golden Horn.

In a distance of such enormous magnitude, the Transiberian line must, of course, pass through almost every variety of soil and climate. Until it reaches the Obi, the line generally passes through a productive soil, with a climate favorable to the growth of cereals. But the Irkutsk-Mysovsk section, on the other hand, traverses a country entirely barren except the town of Irkutsk and some settlements on the shores of Lake Baikal.

It has been pointed out in a recent report

made to the Russian Society for the Encouragement of the Mercantile Navy, 1893, that the Trans-Siberian Railway is likely to be of great value and importance to the future world's trade, and that China, Japan and Australia are therein interested to the same extent as the European countries. If through trains be started from Moscow and Vladivostok going at the rate of 85 versts per hour, the distance would be cleared in 11 days; adding 2½ days, the period necessary for making the journey between London and Moscow, and taking into account also the 600 nautical miles separating Vladivostok from Nagasaki and the 1,000 miles between the great part of the extreme east of Russia and Vassoungt, the mail and travellers will reach China by this route in 17 days, and Japan in 16. Now taking the shortest route across the Atlantic, Canada and the Pacific (12,800 nautical miles), the mail and passengers from England arrive in Japan in 28 days and in China in 31 days. From these figures it appears that the Trans-Siberian Railway will shorten by nearly one-half the journey between Europe on the one hand and China and Japan on the other. The population of these two countries, adding Corea, is 460,000,000, and the trade though undeveloped, is estimated at 500,000,000 gold roubles.

The winter excursions via the Canadian Pacific Railway will commence on the 1st December. The rate is to be \$40 as in former years.

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