

Bridge on the Tomsk Railway Crossing the Yenisee River at Krasnoyarsk

Mechanical Equipment on the Tomsk Railway

An American's Impressions of the Locomotives.
Cars and Shops of the Trans-Siberian System

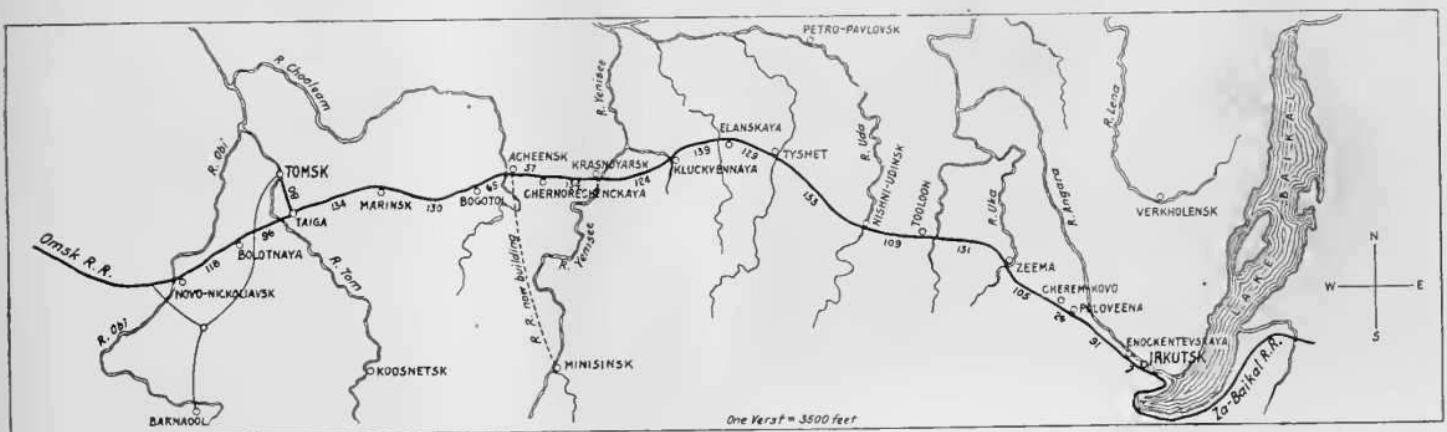
BY JAMES GRANT

Late Captain, Russian Railway Service Corps

THE Tomsk railway is that part of the Trans-Siberian system, between Irkutsk and Novo-Nickoliavsk. The main line is all double tracked, a distance of 1,734 versts. As one verst is 3,500 ft., this is, in English units, approximately 1,156 miles. There are very few branches, the most important being the branch from Tiaga to Tomsk, about 80 versts long. There is a line in course of construc-

port facilities. The road connects with the Za-Baikal at Irkutsk and the Omsk Railway at Novo-Nickoliavsk.

The section through which the Tomsk railway runs is perhaps the most fertile and productive region in all Siberia. The scenery along the road is very pretty, consisting of fine agricultural districts, coal mining concessions and dense forests. The road crosses great rivers and runs directly through



Map of the Tomsk Railway Showing Distances in Versts Between Principal Stations

tion from Achinsk to the city of Minisinsk. By glancing at the map of the railroad it will be observed that Achinsk, which is a small town, is about 170 versts west of Krasnoyarsk, while Minisinsk is an important city about 250 versts south of the railroad, on the Yenisee River. This latter city was always a Bolshevik stronghold, an army of 15,000 being stationed there all the time that the Kolchak forces controlled Siberia. The Kolchaks were never able to oust them from Minisinsk because the town was too far away from all trans-

the wealthy Yenisee province. This province was always known as one of the most independent in all the old Romanoff's broad domains. Considering the past years of revolution, the roadbed is in excellent condition; it is all ballasted and has 72 lb. rails. The section work at the time the American forces were in Siberia was done mostly by women, nearly all men of fighting age being engaged either with the old Russian army or the Bolsheviks.

This sector of the country has been the scene of much

bloody strife since 1917, the Czecho-Slovak forces and Bolsheviks having many pitched battles all along the right of way. As a result many fine bridges have been blown up, tracks torn up and many station buildings wrecked. In May, 1919, the station at Tyshet, one of the main terminals, was practically blown away after a battle between Czecho-Slovaks and Bolsheviks, approximately 200 Reds being annihilated in this struggle. While the writer was stationed at Krasnoyarsk he saw seven train wrecks between that station and the next terminal in one week of September, 1919. These wrecks were all caused by Bolsheviks pulling out rails, usually wrecking Russian military trains, resulting in much damage to the motive power and invariably causing quite a loss of life. At this time there is a sad collection of equipment in the ditch, awaiting some semblance of order so that it can be brought to the shops and be rebuilt.

The Tomsk railway has always been recognized as the banner railroad in Siberia, especially in regard to mechanical equipment. The road has seven main terminals, with seven turn-around terminals located between. The terminals and vest posts are as follows:

Irkutsk (Terminus of Za-Baikal Railway).....	0 v.
Enokhtevskaya	7 v.
Poloveina	98 v.
Zeema	235 v.
Touloun	366 v.
Nishni-Udinsk	475 v.
Tyshet	628 v.
Elanskaya	757 v.
Kluckennaya	896 v.
Krasnoyarsk	1,020 v.
Chernorechenskaya	1,154 v.
Bogotol	1,256 v.
Marinsk	1,386 v.
Taiga	1,520 v.
Bolotnaya	1,616 v.
Novo-Nickelavsk (Terminus of Omsk Railway).....	1,734 v.

The stations shown in italics are main terminals.

Elanskaya is the station at which Colonel Blunt and six other American engineers were captured by the Bolsheviks while endeavoring to evacuate eastward towards Vladivostok in January, 1920. The writer left Colonel Blunt and his party at Krasnoyarsk on December 19, 1919, and it took seven weeks to make the trip to Vladivostok, a distance



A Train at Vladivostok Station

of 4,036 versts. The remainder of the engineers started evacuation eight days later, but only got as far as Elanskaya, where they were captured. They were, however, later turned over to the Czecho-Slovaks, who had their echelons strung out all along the line, trying to get to Vladivostok.

Terminals

Each of the main terminals on the Tomsk railway is well equipped, usually having large and commodious yards. The engine houses generally consist of two rectangular sheds with capacities for about 50 locomotives, a rectangular shop for nine engines (in which all light repairing is done), machine

shop and blacksmith shop. The engine sheds are equipped with drop pits and hydraulic traversing rams for dropping wheels. One fine feature is that the drop pit rails all swing on hinges, so that when dropping wheels there is no lifting of heavy rails. All shops are equipped with electric hoists of the same type as used in the main shops and described later in this article.

Main terminals have both a turntable and a "Y," while turn around stations have a "Y" only. Turntables are operated by an ingenious air device, connected to the train line on the engine or tender. This consists of a horizontal air cylinder with a clamp attached to the piston, so designed



Station at Pograneechnaya, Showing Type of Freight and Passenger Equipment

that it seizes and releases the rail, as controlled by the operator with a three-way valve. This device, while probably not as good as some of the air driven attachments in this country, works surprisingly well and extreme cold weather causes it very little trouble.

Motive Power

The road has between 500 and 600 locomotives in operation, and these engines are composed of seven distinct types only, as follows: 1. 0-6-0 or Switcher type. This is the so-called government type of locomotive, so common in Russia. These engines were built in 1893 and 1896 by the Putilov works of Petrograd. There are only a few of this type on the road and they are used for switching service. The principal dimensions are:

Weight on drivers	34.50 tons
Total weight, engine and tender, loaded.....	60.10 tons
Diameter of drivers	1,292 m.m. (52 in.)
Length of engine and tender, overall.....	14,313 m.m. (47 ft. 0 in.)

2. 0-8-0 or Eight Wheel Switcher. The road owns about 200 of this type. Most of them, however, are stored away out of service, replaced by more modern power. They were built at different times, between the years 1895 and 1906, by seven different locomotive works in Russia. They are generally used for switching. The principal dimensions are:

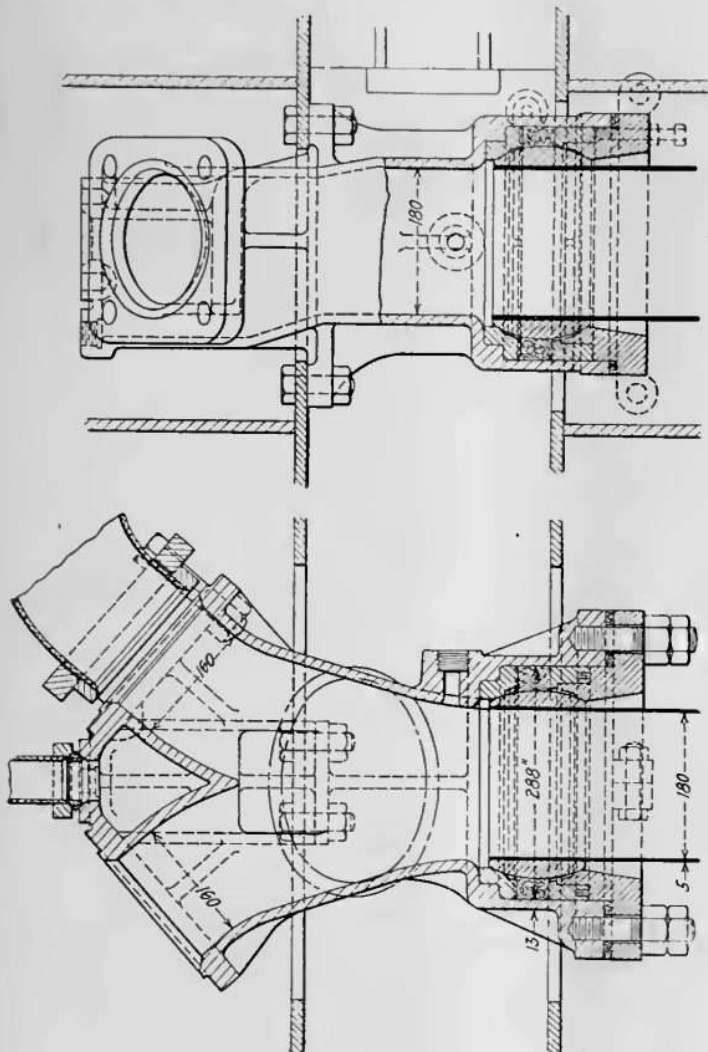
Weight on drivers.....	51.5 tons
Total weight, engine and tender, loaded.....	103.03 tons
Diameter of drivers	1,200 m.m. (47.3 in.)
Length of engine and tender, overall	18,691 m.m. (61 ft. 5 in. app.)

3. 0-6-6-0 Mallet Articulated. The road owns about 230 of this type of locomotive, which is one of the most successful for freight service on the whole Trans-Siberian system. Although not so large as our American Mallets, yet they have many noteworthy features. These engines were built between 1899 and 1906 by the Bransk, Putilov and Kolomensk locomotive works. They have slab frames (as have all Russian built locomotives) of 1¼-in. plate, and breakage is a thing unknown. The high and low pressure engines are connected by upper and lower steel castings, riveted to the frames, and hinged on two 4½-in. pins, brass bushed. The driving box jaws are bolted or riveted to the frames, so that they can be removed and machined, when the engines undergo repairs. The driving box shoes and wedges are made of steel, while

the box faces are brass lined. The receiver pipes have both ball and sleeve joints of special construction, as shown in the drawings, which are so designed that there is little trouble from steam leakage. The engines have Walschaert valve gear, piston valves, fire boxes and flue sheets all made of copper, with copper stay bolts, and a special type of Freidman injectors. The principal dimensions are:

Weight on drivers	84 tons
Weight of engine and tender, loaded	135 tons
Diameter of drivers	1,200 m.m. (47.3 in.)
Diameter of H.P. cylinder	475 m.m. (18.7 in.)
Diameter of L.P. cylinder	710 m.m. (28.0 in.)
Diameter of H.P. and L.P. piston valves, both	300 m.m. (11.8 in.)
Length of stroke	650 m.m. (25.6 in.)
Maximum steam pressure	12 atmospheres (176 lb. per sq. in.)
Length of engine and tender, overall	21,097 m.m. (69 ft. 3 in. app.)

4. 2-4-4-0 Mallet Articulated (used for passenger service). The road has 112 locomotives of this type built be-



Tee and Ball Joint on Receiver Pipe of Russian Mallet

tween 1903 and 1909 by the Kolomensk Locomotive Works. These engines are quite similar in design to the freight Mallets, and can get over the road with remarkable speed. The principal dimensions are:

Weight on drivers	65 tons
Weight of engine and tender, loaded	116.07 tons
Diameter of drivers	1,350 m.m. (53.2 in.)
Length of engine and tender, overall	19,723 m.m. (64 ft. 9 in. app.)

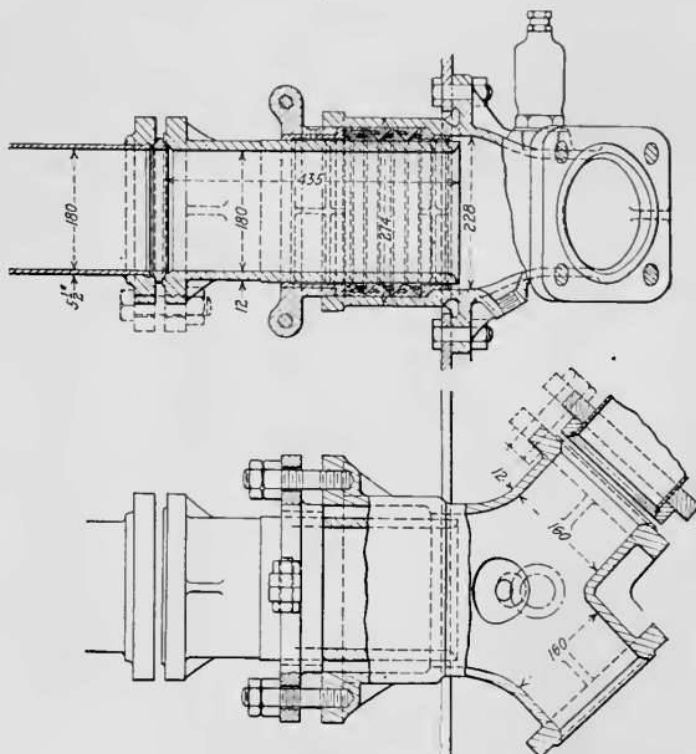
5. 2-10-0 American Decapod (built by the Baldwin and American Locomotive Works between the years 1913 and 1916). The road possesses about 50 of these engines. Their tonnage on the Tomsk railway is rated just the same as the freight Mallets. They have a Schmidt superheater and carry a steam pressure of 12.7 atmospheres (187 lb. per sq. in.). A description of these locomotives has appeared in a former issue of the *Railway Mechanical Engineer**. Many of this

type, built for the Russian government, are now operating in this country.

6. 2-6-2 or Prairie type (used in passenger service). The road has 13 of these locomotives, built in 1915 by the Sormov Locomotive Works. These are a fine passenger engine and compare favorably with any of our American power. Equipped with Walschaert valve gear, and Schmidt superheaters, carrying a steam pressure of 13 atmospheres (191 lb. per sq. in.) they are capable of great speed. They have a special design of piston rod packing, using a double packing ring. Officials claim that this packing runs from shopping to shopping, without renewing. It seldom blows even in the coldest of weather. The principal dimensions of this class are:

Weight on drivers	47.1 tons
Weight of engine and tender, loaded	126.3 tons
Diameter of drivers	1,830 m.m. (72.1 in.)
Length of engine and tender, overall	21,271 m.m. (69 ft. 11 in. app.)

7. 4-6-0 or 10 Wheel type (used in passenger service). The road has 44 of this type, built in 1910 and 1911 at the



Slip Joint on Receiver Pipe of Russian Mallet Locomotives

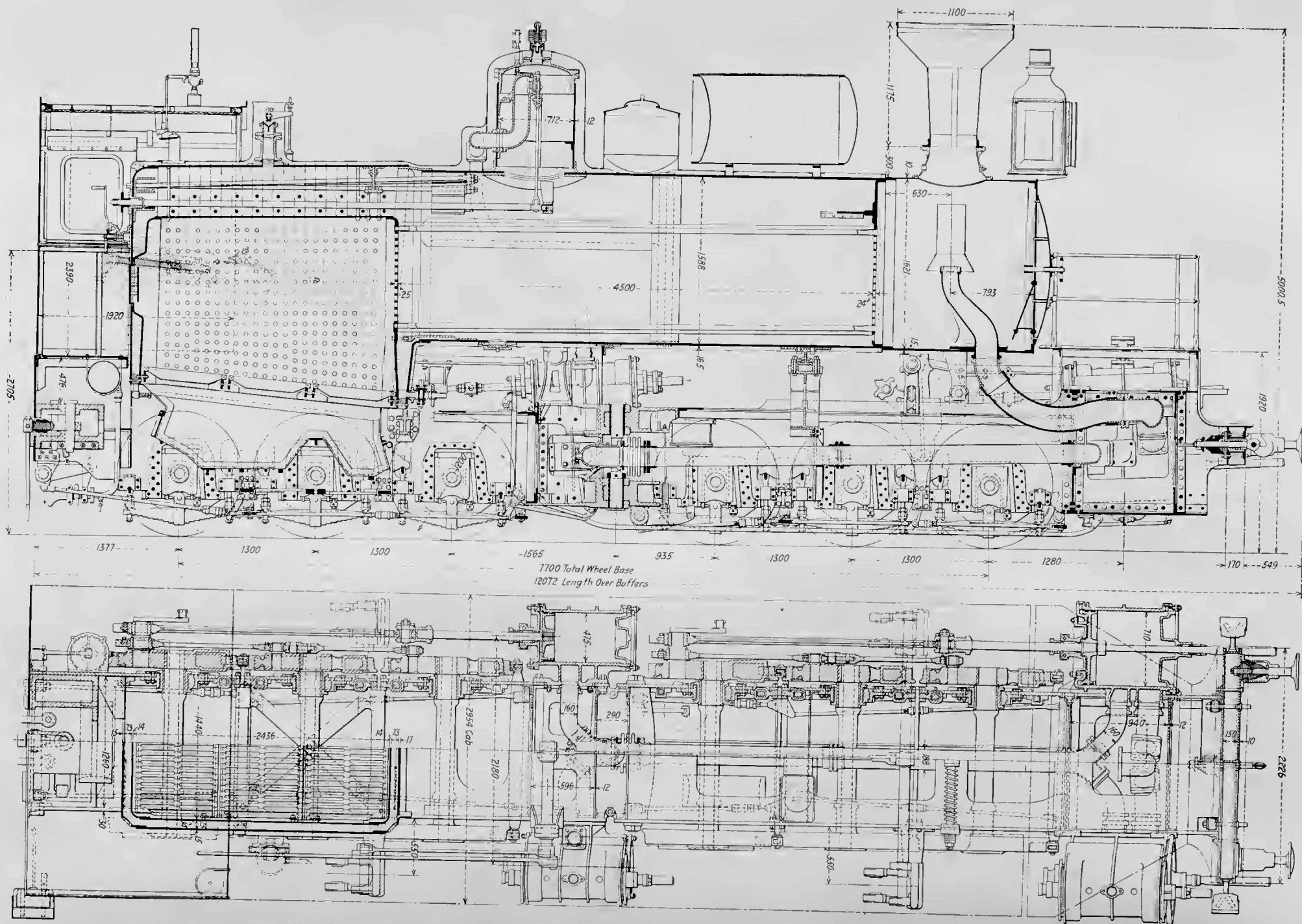
Kolomensk and Putilov works. They are quite similar in design to the Prairie type being equipped with Walschaert valve gear and Schmidt superheaters and carrying a steam pressure of 12 atmospheres (176 lb. per sq. in.). The principal dimensions are:

Weight on drivers	46.5 tons
Total weight, engine and tender, loaded	124 tons
Diameter of drivers	1,700 m.m. (67.0 in.)
Length, engine and tender, overall	19,689 m.m. (64 ft. 8 in. app.)

An engine crew consists of three, an engineer, assistant engineer and fireman. Many women now work as firemen, there is such a scarcity of able-bodied men. The engineers as a rule are bright, capable fellows, highly trained in their occupation. It is a rule that all engineers running a locomotive, must first serve an apprenticeship in the shops so they are thus taught the repairing and upkeep of locomotives. Afterwards they graduate as firemen, assistant engineers, then first engineers, an examination being necessary before being promoted to a higher grade. The statistics often given that 60 per cent of the Russian working people are illiterate certainly does not apply to the railroad workers.

A train crew usually consists of about five men, a chief

*Issue of October, 1917, page 545.



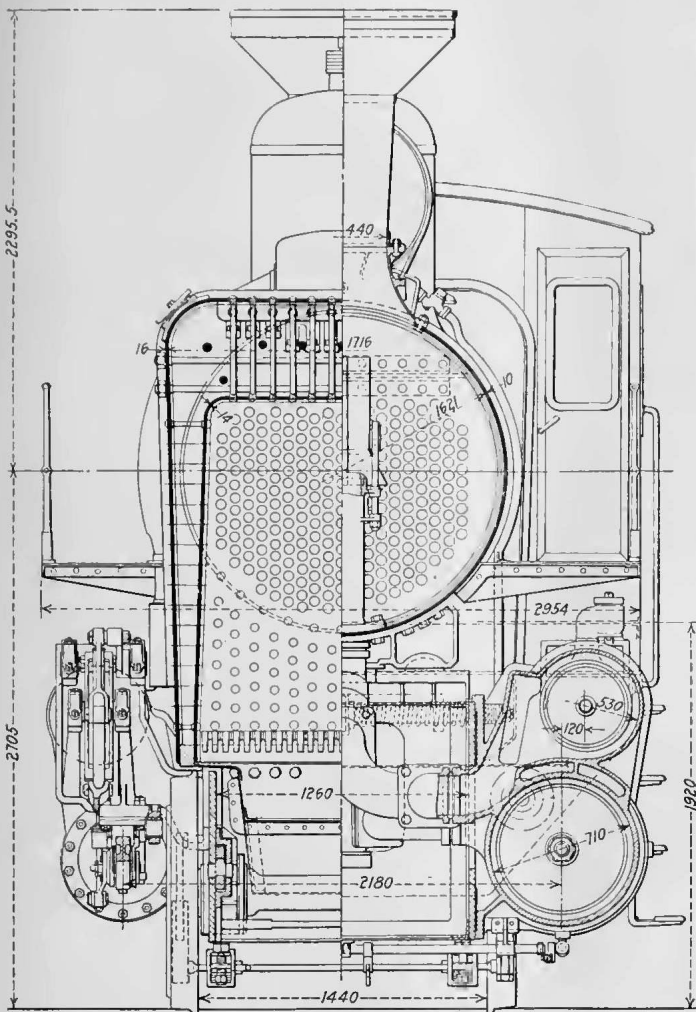
Elevation and Plan of Russian O-6-6-0 Mallet Freight Locomotive. (All Dimensions In Millimeters.)

conductor and four assistants. This number, however, varies according to the tonnage of the train. There are no air brakes on the freight cars, hence about every tenth car is required to be a brake car, and is manned by one of the assistant conductors. The tonnage of the usual train is 60,000 poods, or about 1,000 tons. On certain sections of the road helper engines are necessary, but the grades as a rule are very slight. Riding these open brake cars in winter is a strenuous occupation. Quite frequently the thermometer goes down to 60 degrees below zero and stays there for months. The road furnishes brakemen with big fur lined coats and high felt boots, which are very necessary for the Siberian winters.

The rolling stock is the usual type of equipment seen in Russia. Passenger coaches are divided into first, second, third and fourth classes. Passenger coaches are much run down on account of lack of attention, the provodnicks or

there is a plentiful supply at different points along the road, although only these two sources are worked by the railway. It was at Cheromkovo that the Social Revolutionary party sprung up in December, 1919, which overthrew the Kolchak regime in Siberia.

The main office of the road is located at Tomsk, on a branch of the railroad. It seems a peculiar place for the office and the advisability of moving it to Krasnoyarsk on the main line has often been mooted. During the Bolsheviks' short tenure in 1918, the moving of the main office was one



Cross Section of Mallet Freight Locomotive, Tomsk Railway

porters being lazy and discipline lacking. Coaches are all built with coupes to accommodate two or four people, and a corridor runs along one side.

The freight equipment consists mostly of tepluskas or four wheeled box cars, with a capacity of 1,000 poods or 16 tons, all with turnbuckle couplers. However, many of the American 3,000 pood or 50 ton gondolas are now in operation on this road, and it is doubtless only a question of a few years when the small cars will be superseded by those of larger capacity.

Fuel is obtained from two different sources located near each end of the road. Large coal mines are operated at Cheromkovo, shown on the map about 100 versts west of Irkutsk and near Tiaga, about 200 versts east of Novo-Nickoliavsk. A good grade of lignite coal is obtained, and



American Car Wheels Stored at Osgulnaya, 40 Miles from Vladivostok

of the things contemplated. The office is located in two or three different buildings, with a multiplicity of employees, something over 2,000. The Russians have a splendid system of records, and to keep up this system requires countless help. They are highly technical in everything, the officials of the roads being graduates of some of the best European technical colleges. There are very few important railway positions in Russia held by anyone except graduates of some technical college.

Tomsk is the seat of learning of Siberia, and is the location of the famous Tomsk University. It is the ambition of all the better class Russians to graduate through this school.



Snow Plough Commonly Used on Russian Railroads

The university has a fine mechanical institute and many engineers graduate there. The city is one of the prettiest in Siberia, being built on the banks of one of the tributaries of the Obi river, which is navigable to the Arctic Ocean.

The Krasnoyarsk Shops

The main shops of the road are located at Krasnoyarsk and are undoubtedly the largest repair shops in Siberia. Krasnoyarsk is an important commercial city with a population of about 100,000 and is built directly on the banks of the great Yenisee river. This immense river, from its source

in Mongolia, winds its way north to the Arctic Ocean. The railway bridge across the river at this point is a magnificent structure, 400 sagues or 2,800 ft. long, built in six spans. The river is navigable by steamboat to the ocean, but only for a few months in the year.

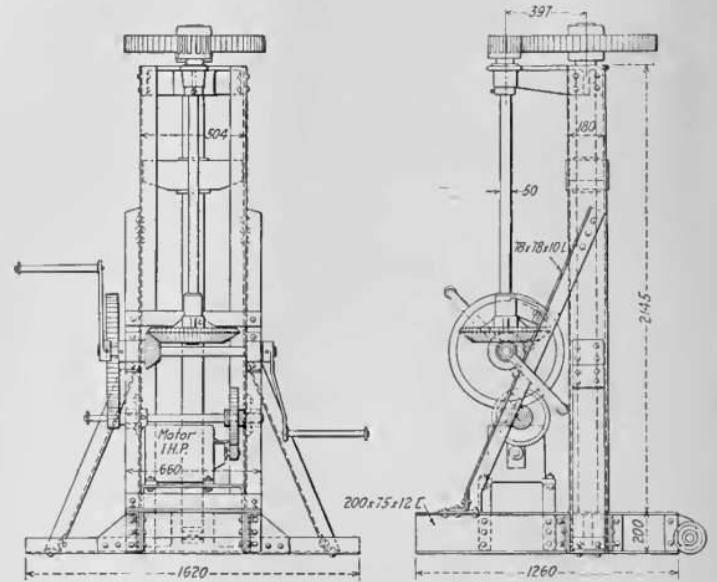
The shops have always been recognized as among the most progressive and efficient in all Russia. During the past years of revolution this plant has been the scene of much turmoil, and one really wonders how it has performed its functions so well. In 1918 the whole roof of the erecting shop was burned, supposedly by the Bolsheviki. Practically deprived of all sources of supply for the past five years, the shops have managed to keep the condition of the power about normal, and when the writer was there in 1919 their statistics showed that engines on the Tomsk railway were really up to their normal standard of peace times. The only engines clogging up the shop were those from European Russia evacuated by the Kolchak government in their retreat before the Bolsheviki.

The superintendent of shops (if he has not been removed by the Bolsheviki) is a clever Russian engineer, Mr. Korkin. A superintendent's position is no sinecure in a large plant in Russia, grievances being in front of him practically all the time. The employees have always had so many special privileges granted them by the government railways that a superintendent must be endowed with exceptional administrative abilities.

The drawing will give some idea of the extent of this plant. The erecting shop is a substantial brick building 464 ft. long and 154 ft. wide, with a high roof. An electrically driven transfer table runs up and down the center of the shop. There are 44 locomotive pits, 22 on each side of the transfer table. Tenders are also repaired in the erecting shop. Locomotives are raised by ingenious electric hoists, which are portable and can be moved to any pit. Four of these hoists are usually required to raise a locomotive, two at each end with structural iron beams across the pit. One of the drawings shows the general design of these hoists. They are operated by a one horse power direct current motor geared at a ratio of about

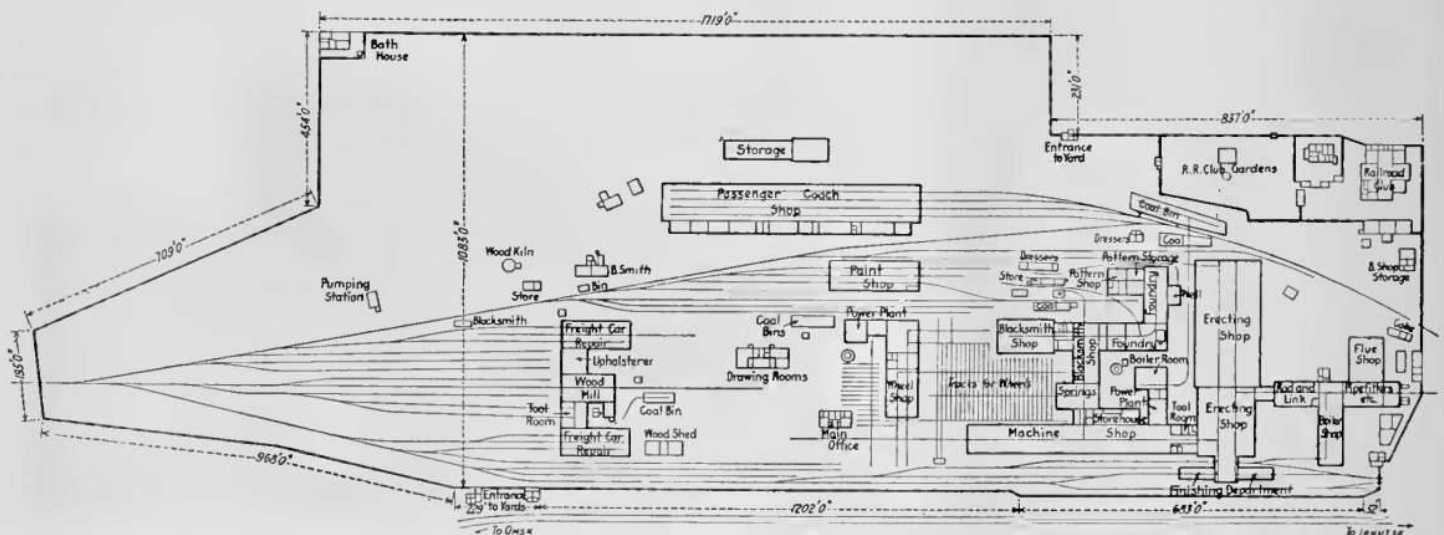
shop without going out of doors, a great advantage in the extremely cold winter weather.

The machine shop, which is located directly off the erecting shop, consists of a long narrow building 528 ft. long and 63 ft. wide. There are a great number of machines in this building, and it is very crowded, but work is taken away as soon as finished, thus relieving matters. The machines are mostly



Locomotive Hoist Used on the Tomsk Railway, Operated by Hand or by Motor

of Russian or German make; there are very few American tools in this part of the world. Two new bolt cutters arrived at the plant in December, 1919, and these were the only American machines. The machines are arranged in groups and driven by electric motors. Since the war the shops have had to make all their small tools, such as taps, dies, reamers



Arrangement of Tracks and Buildings at Krasnoyarsk Shops

20 to 1. All main terminals on the road are also furnished with these hoists, which make heavy repairs considerably easier. A locomotive can be raised high enough to take out wheels in about ten minutes. The shop is served by four 5-ton overhead electric bridge cranes, which are quite suitable for all requirements. At one end of the shop is a building known as the finishing shop, to accommodate two engines. When an engine nears completion it is taken to this shop, fired up and tested before going on its trial trip.

All necessary departments are accessible from the erecting

and drills, and this work keeps many machines busy. Tool steel was also at a premium, and in 1918 and 1919 this shop was forced to use tire steel as a substitute, in order to keep the wheels turning. Crossheads had to be forged here, as no steel castings were available. This was a costly operation, something over 80 hours' machine work being necessary on these forgings.

The blacksmith shop is located in two buildings joined to the machine shop. Both are well equipped with steam hammers, but are in great need of forging machines. They have

been forced to make nuts, bolts and rivets, which in pre-war days were bought from the factories, and there is no special machinery for this work.

The foundry, which extends out from the blacksmith shop, consists of two main buildings, one building for small work and one for large work served by a 5-ton overhead electric traveling crane. All the cylinders are cast here and all stock supplies for the road. There is also a brass foundry in connection. The pattern shop is an integral part of the foundry.

East of the erecting shop is located the rod and link department. There is a very fine type of link grinder in this department, a German invention. Rods are very thoroughly and systematically overhauled, although much unnecessary filing and polishing is performed.

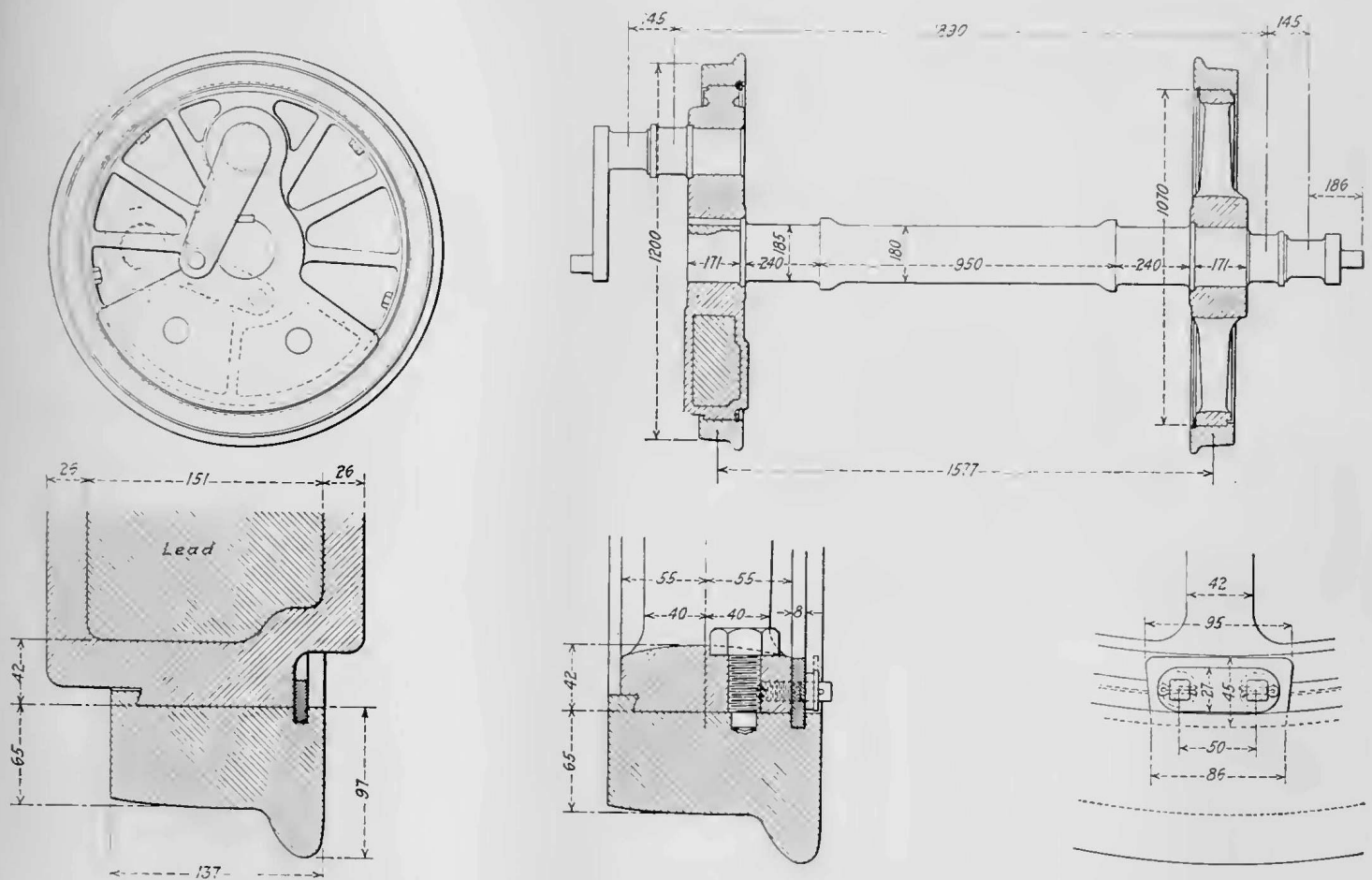
The main boiler shop is a building 200 ft. long by 56 ft. wide. It is served by a 30-ton overhead electric bridge crane, which is sufficient for lifting any of the boilers. As the building has a high roof, one boiler can easily be lifted over

leaky flues being quite a rarity. However, very good water is available over nearly the whole Trans-Siberian system.

The flue shop adjoins the boiler shop. The tubes are well taken care of, the tips being welded by power driven rollers, and the flues cut off by a friction saw. The flue rattler is a motor driven cylindrical cast iron drum, similar to many of our older types.

The wheel shop is a neatly arranged building, served with overhead electric traveling cranes. The wheel lathes, which are all Russian built, are strong, powerful machines, equipped with two back and two front compound slide rests. They have been badly handicapped, however, for the past few years for lack of tool steel. The shop has a fine type of quartering machine, specially designed for main pins on Russian locomotives. On the Siberian roads crank arms are all forged solid with the pin, so it is a difficult matter to machine these pins without special tools.

Tires are changed by up-ending the wheel centers, using



Russian Design of Driving Wheels, With One-Piece Pin and Return Crank and Tire Retaining Devices

another. They are equipped with the usual boiler shop machinery, including bending rolls, two radial drills, two lathes and double-ended punch and shears. The main deficiency is lack of air equipment, so that much of the work must be done by hand. The stay bolt drilling is efficiently taken care of by portable electric drills, and these machines can be used in almost any place around the boiler. During the stay of the American engineers, the plant was laid out for air equipment, but the compressor and tools did not arrive before the occupation by the Bolsheviks. There is a great future for air tools in Russia.

The first thing that strikes an American on entering a boiler shop in Russia is the great amount of copper used. All Russian built engines are equipped with copper fire boxes, flue sheets and stay bolts. This entails great expense, but there certainly is very little boiler trouble on the road,

coal burners for heating. Oil is too precious a thing at this time in Siberia, hence the shops are forced to use coal. Oil was formerly obtained from the south of Russia, but since the revolution this source has been shut off and oil for the road is now obtained through Japanese firms.

The paint shop is a building capable of holding about 20 passenger coaches.

The main car shop is a large building, 606 ft. long by 85 ft. wide, with four tracks running the full length of the building. This gives ample space, so that it is seldom necessary for men to work outside in severe weather. An annex runs along the whole length of this building, in which are located the different departments necessary for coach work. There is a very modern nickel plating room in this building, which takes care of all utensils for dining cars, coach trimmings and other articles.

Two other car shops, each 161 ft. by 63 ft., serve for repairing freight cars. The planing mill is located between these two shops and is equipped with an average amount of wood working machinery.

The shops have their own power plant, which contains two d. c. generators for power and one a. c. machine for lighting. The boiler room is a poor lay out, having a mixture of locomotive type boilers and return tubular boilers. All coal and ashes are handled by hand labor, no mechanical devices being installed. There is another auxiliary plant with six return tubular boilers, used only in winter for heating. All buildings are well heated by large steam radiators.

The general stores are located close to the shops and consist mostly of brick buildings. The stock at the time the American forces were there was much depleted. Before the war there was a standing order that a three years' supply of everything must always be kept on hand, and this foresight was about all that kept them able to run during the days of chaos. During the year 1919 the Allied Technical Board helped them greatly to obtain stock through Vladivostok. In normal times all steel, copper and metal goods came from the Ural mountains, while other supplies came from the interior of Russia. The stores department has a good system of keeping records of stock on hand at all times, but employs lots of help to do this.

Engines are repaired according to a well tabulated schedule, and when a locomotive makes the stipulated verstage, it is tied up and the work done as specified in the railroad's book of rules and repair laws.

In the following table is shown the assigned mileage for shopping engines:

FREIGHT LOCOMOTIVES

30,000 versts.....	Change of wheels
60,000 versts.....	Second change of wheels
90,000 versts.....	Medium repairs
120,000 versts.....	Third change of wheels
150,000 versts.....	Fourth change of wheels
180,000 versts.....	Capital repairs

PASSENGER LOCOMOTIVES

40,000 versts.....	Change of wheels
80,000 versts.....	Second change of wheels
120,000 versts.....	Medium repairs
160,000 versts.....	Third change of wheels
200,000 versts.....	Fourth change of wheels
240,000 versts.....	Capital repairs

The main shops do only the capital or general repairs, and what is known as accidental repairs. Changing of wheels and medium repairs are taken care of at the small shops located at each main terminal. Changing of wheels means the replacement of wheels with worn tires for another set and necessary repairs to driving boxes, machinery and so forth. Each terminal has always on hand a few spare sets of driving wheels and the worn ones are all shipped to Krasnoyarsk shops, where all wheel and axle work is taken care of. The law requires in Russia that all tires must have retaining rings, hence wheel and tire work is quite a large operation. The details of the tire fastenings are shown in the drawing of the wheels and axles.

Some details from the report of work at Krasnoyarsk shops for the years 1916-17-18 and '19 will prove interesting. In 1918 the plant was under Bolshevik control, and a glance at the figures shows that year as the lowest output of the four years, with the greatest number of employees. For example, during January, 1916, there were 1,389 mechanics and laborers employed and the output was equivalent to 7.92 general repairs of four-axle locomotives. In June, 1918, the force had been increased to 2,865, but the output on the same basis was only 1.13 general repairs. The cost of general repairs to locomotives increased 808 per cent from 1916 to 1918. Probably conditions may now be different, as it is a well known fact that the workers became intoxicated with

their liberty during the early period of the Bolshevik regime in 1918.

One cannot but admire the quality of workmanship that is put on all repairs. Everything is put together to the closest possible working margin, the matter of expense not being considered. To the mind of the American engineer, too much time is wasted in ornamentation and elaboration; much unnecessary machine and finished work is put on equipment, when the rough article could just as well serve the purpose.

When an engine leaves the shops it must be able to go on the train, make the time, and pull full tonnage on the first trip, or is not accepted by the operating department. This usually necessitates quite a few trial trips before finally leaving the shops, and it is no unusual thing to see the engine raised off the wheels, boxes taken out and refitted between these trips. Diagrams and tests are also made by the mechanical engineers, to be sure that the engine can give the maximum efficiency. The locomotive must be passed as O. K. by trial and inspection before being finally turned over for service.

Taking past conditions into consideration, it is remarkable how well the motive power and rolling stock have been kept up. The next few years will undoubtedly show great changes. The 1,000 pood (16 ton) box cars will likely be replaced by the larger type of American box cars and gondolas. At Vladivostok, American cars were being assembled just as fast as the plant at First river could turn them out, and these cars were getting to be quite numerous on the Trans-Siberian.

Undoubtedly a heavier type of locomotive will also be built in the near future. The roadbed is excellent and bridges are all built with a high enough factor of safety to carry any weight of locomotive we have in America today. The wide gage of five feet is also a good argument in favor of heavier equipment.

There is great opportunity for American ideas and industry in Siberia; now that the embargo has been lifted, let us hope that soon satisfactory trade relations can be established between both countries. The Russian people have a warm feeling for the Americans and have a great craving for American goods.

The writer had 27 months' experience on the Siberian railways and during that period has met many of the leading mechanical engineers on the various systems there. They are all courteous, intelligent and highly trained men. Most of these officials talk either French or German, but it is a rarity to find one who speaks English. If we are to become connected with them commercially, we must study their language. At first it is quite difficult, there is so much difference in the alphabet, but it is absolutely phonetic and can be learned by diligent study. The Russian people have been the victims of circumstances for some years now, but we trust their dark days are nearly over, and that they may soon emerge from their chaotic condition. The rest of the world needs a real Russia; and it is to be hoped that they may not be disappointed.

ACCIDENT BULLETIN 74.—The Interstate Commerce Commission has issued Accident Bulletin No. 74 containing the record of collisions, derailments and other accidents on the railroads of the United States for the last quarter of 1919 and also the tabular statements for the twelve months ending with December. Remarkable decreases are shown in many items, as compared with 1918. In the twelve months of the year now reported, 110 passengers, 366 employees and 41 other persons were killed in train accidents, and 4,549 passengers, 3,202 employees and 124 other persons were injured; as compared with a record in the preceding year of 286 passengers, 554 employees and 156 other persons killed and 4,655 passengers, 4,250 employees and 500 other persons injured.