

the frame, of which it is independent. It consists of a drum mounted upon two wheels. Each of its extremities is provided with a journal upon which is placed a ring that on the one hand is connected with the frame by a chain, and, on the other, with a windlass through another chain. Upon actuating the windlass by means of a lateral hand wheel, *L*, the reel is raised above or lowered to the ground. In the latter case, it is separated from the wagon for the unwinding of the hose.

The box of accumulators, *D*, is suspended from the frame by four rods provided with rollers and springs. The heads of these rods move upon knife edges, so that the suspension may be very elastic and assure a perfect verticality of the box under all circumstances. The box is of metal and contains forty-four elements of C. G. S. accumulators, weighing about 1,140 pounds and having a capacity of 150 ampere-hours at a discharge of 35 amperes. The accumulator plates are of the oxide of lead type. The technical service of the department submitted to experiment various elements furnished by different French manufacturers, but the only ones that gave satisfaction were those supplied by the Société des Voitures et Accumulateurs Electriques, of Neuilly-sur-Seine. It seems that

the good results given by these accumulators are due to an improved method of making the paste with which the plates are covered. The dimensions of the plates are $10\frac{1}{2}$ by $5\frac{1}{2}$ by $\frac{1}{2}$ inches. The motor is of the *T*₃ type of 4,500 volts. It is provided with two armatures and two collectors upon the same shaft, but there is but one inductor winding. The two armature windings are in the proportion of five to three, and may be coupled in several different manners by the controller in order to obtain different rates of speed without changing the coupling of the elements of the battery assembled in series, or without varying the excitation. The result of this arrangement is that the motor is always excited normally and that the brushes give rise only to a minimum quantity of sparks. The flat form of the battery allows of its being installed under the box. The controller lever permits of seven speeds being obtained, the greatest of which does not exceed 13 miles an hour.

In front of the box, under the eyes of the driver, are placed the following measuring and controlling apparatus:

(1) An aperiodic voltmeter, (2) an aperiodic amperemeter, (3) a fusible lead circuit breaker, (4) a

distributing box into which may be inserted a spring-jack connected with the charging cables, or a plug, of which the presence is necessary for the passage of the current from the battery into the motor, and which when withdrawn renders the vehicle immovable; (5) a series of interrupters controlling the incandescent lamps, lanterns, and a lamp for lighting the measuring ap-

$4\frac{1}{2}$ miles would be run, provided the vehicle were called out two or three times a day. This assures of a return in good condition.

The reel at the back carries 525 feet of $2\frac{3}{4}$ -inch hose, while 260 feet of a smaller diameter, along with three nozzles, are arranged in a box. The equipment is completed by a short ladder suspended at one of the sides of the wagon.

The hose carriage has received a very practical test and is now working in admirable fashion. At several fires it arrived before the engines and hose carts drawn by horses. The Fire Department of Paris has ordered six other electrically-propelled fire-extinguishing machines of different models, including a hook and ladder and steam fire engines; they will be in use at the Exposition.

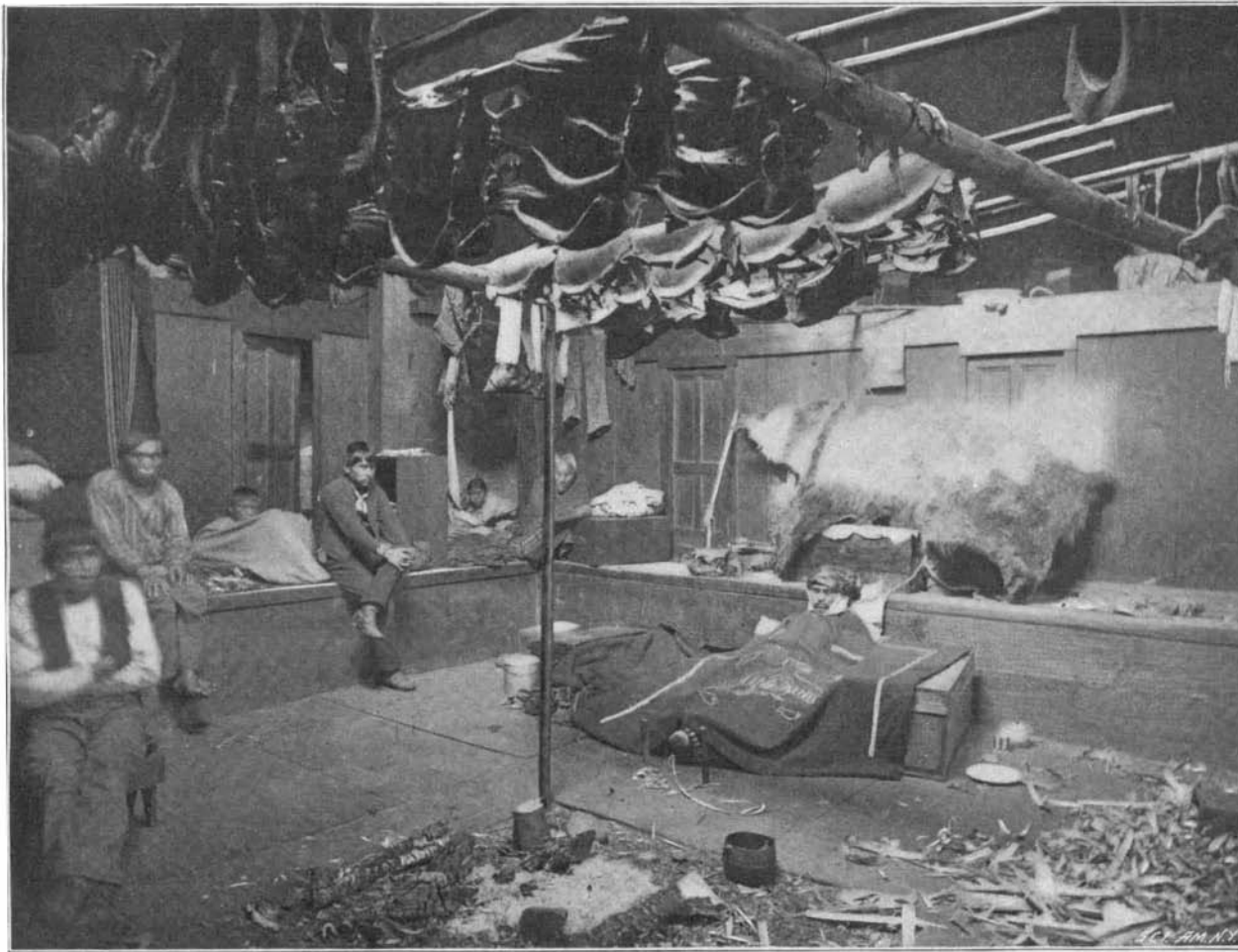
For the above particulars and the engravings, we are indebted to Le Magasin Pittoresque.

THE LATE ALASKA EARTHQUAKE.

For weeks preceding the violent volcanic eruption in the island of Hawaii, severe and monitory earthquakes were felt all along the western shores of the North American continent from the Isthmus of Panama to Puget Sound. Along the coast of California numerous shocks of uncommon severity occurred

and continued until the outbreak of Mauna Loa on the morning of July 4 last, when they appeared to subside. The quietness was only temporary, however, though the scene of disturbance was transferred from equatorial to Arctic latitudes. Alaska was the theater for a display of seismic power such as the world has seldom witnessed, which, had it happened in regions less remote or had been populated by others than a few scattered bands of aborigines, would have been a catastrophe at which the world would have grown pale at the bare recital. Fortunately the dreadful upheaval had witnesses among white men, and what would have been an incident of horror to be preserved among the traditions of a few terror-stricken Indians was carefully observed by men whose probity places their recital beyond the suspicion of a doubt. The effects of the shocks were noticed far at sea by navigators, from which the enormous extent of the disturbances can be easily calculated.

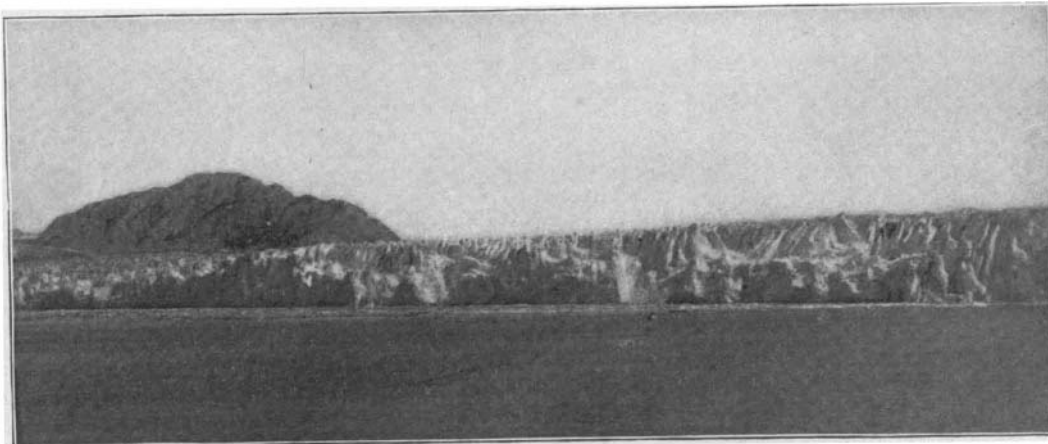
The Puget Sound country was coincidentally shaken, and from all accounts it would appear that with Mount St. Elias as a center the region affected by the shocks was fully four thousand miles in diameter.



INTERIOR OF AN INDIAN HOUSE, YAKUTAT BAY, ALASKA.

paratus; (6) an interrupter controlling a collector for supplying two arc lamps of 10 amperes, designed for lighting the field of operations.

The accumulators permit of making a run of 60 miles, without recharging, at a speed of from 7 to 9 miles an hour. Such speed can be easily increased to 13 miles an hour at night, when the way is clear. The consumption is, at a speed of 9 miles an hour, from 35 to 40 amperes at 90 volts. By consuming 50 amperes, 13 miles may be made upon a level. As the radius of the fire centers is 5,000 feet, on an average, from $3\frac{1}{2}$ to

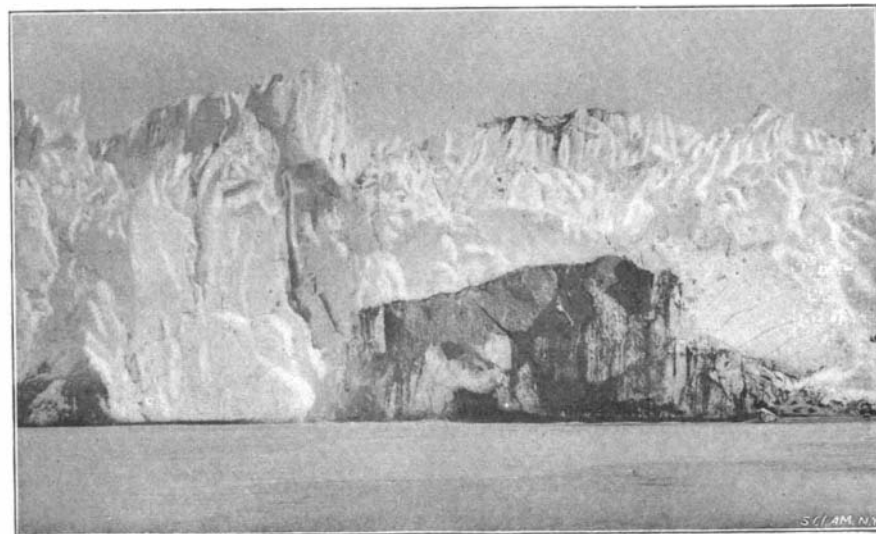


THE FRONT OF THE GREAT MUIR GLACIER, ALASKA.



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CHIEF YAN-A-TCHOO'S VILLAGE, YAKUTAT, ALASKA, SHOWING WAR CANOES.



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MOUTH OF THE SUB-GLACIAL STREAM, MUIR GLACIER, ALASKA.

The effect has been to permanently change the contour of portions of the Alaska coast. Many well-known islands have been swallowed up and others risen in their places. Landmarks well defined and known to every navigator of the coast have disappeared, and every glacier from Juneau and vicinity, including all those known to tourists in Glacier Bay and elsewhere, have suffered mutilation, which destroyed their wondrous beauty and leveled their mighty ramparts for thousands of feet back from the sea. In the Northwest Territory volcanoes are reported to have been seen in ranges where they were never before observed. Puget Sound was violently shaken, and in the distant islands of the Alaska Archipelago severe earthquake shocks excited intense alarm. Along the coast near Mount St. Elias the upheaval was accompanied by huge and devastating waterspouts, while enormous tidal waves rushed in from the sea with overwhelming power. Great rocks fell from the sides of the mountains and crashed into the valleys below. The earth moved with the awful velocity and undulation of the waves of the sea, shaking mountains from their bases and prostrating the huge forests that covered their slopes.

The date of the earthquake was September 10, though warning shocks had been felt for some time previous. Three white men were prospecting on the shores of Disenchantment Bay, which lies at the foot of Mount St. Elias and contains the great Hubbard glacier, which has been observed only by scientists and explorers, lying, as it does, far beyond the route of tourists, and about fifty miles west of Yakutat Bay. The prospectors were camped on a ridge separating a large fresh water lake from the ocean. A violent shock threw down the obstruction, and the great flood from the lake swept down the bank, carrying the three men along with it. Concurrently, a great tidal wave swept into the bay, which washed the men back again and left them high and dry upon the side of a mountain.

They describe the oscillation of the earth as terrific, and were witnesses to the destruction of the whole front of Hubbard glacier, with its face of solid ice extending several hundred feet above the tide. For a mile from the sea the glacier was fractured and thrown in the bay. The men fled to Yakutat Bay, fifty miles distant, and reached that point after a journey beset with peril. At Yakutat Bay, Rev. Sheldon Jackson, Educational Superintendent of Alaska, happened to be visiting. He graphically describes the tremendous convulsions accompanying the shocks, the undulating shores as the earth wave swept back and forth, together with the enormous tidal waves which rushed into the bay and were engulfed in the crevasses which opened along the shores. The terror inspired among the Indians at the Yakutat Mission was unspeakable, though no lives were lost.

The most disastrous and permanent effect of the earthquake is seen among the glaciers. Foster glacier, near Juneau, has had its beauty almost destroyed. All that portion of it fronting on Taku Inlet, which the sun had sculptured into wondrous and enchanting forms, has been thrown into the sea, and rumor asserts every glacier on Glacier Bay, including the Great Muir, has suffered the same catastrophe. Tourists in Alaska can never forget their first impressions of the mighty Muir glacier. It extends landward for over forty miles, a frozen river with over twenty lateral branches. It fronts upon the sea for two miles and a half, a wall of ice from two to three hundred feet in height. Soundings give it a depth of seven hundred and fifty feet below the tide, so that from base to summit it is a thousand feet high. From this wall of ice every minute there drops into the sea 45,000 tons of ice, or every day no less than 200,000,000 cubic feet. Reports are that the whole front of the Muir glacier and extending back for a mile has been cast into the sea. Occurring at a time when the coasts of Alaska were deserted, the full effects of the earthquake will not be known until next summer permits the advance of the tourist and explorer.

The Population of London.

Last year's statistics show that the population of London is 4,484,717. For every 1,000 inhabitants there were 30 births and 17.7 deaths. The number of infants who died in their first year was 158 for every 1,000 births. During the period extending from 1887 to 1896 the mortality was lower than in Paris, Brussels, Amsterdam, Berlin, and Copenhagen; but in 1897 it increased to such an extent that it is now very little lower than that of most European cities, Rome included.

The World's Corn Crop for 1899.

The world's corn crop for 1899 is 2,611,000,000 bushels, of which the United States furnishes 2,200,000,000 bushels; Austria-Hungary furnishes 98,000,000 bushels, a serious falling off from the 153,000,000 bushels of last year. Argentina comes next with 72,000,000 bushels, then comes Italy with 68,000,000 bushels. The crop is about 111,000,000 bushels more than the average crop of the last four years.

RAILWAYS OF THE WORLD COMPARED.

If the railway statistics for the whole world were as accurately and conveniently tabulated as are those of this country, it would be a simple matter to compare the various foreign countries among themselves and with the United States. One has not delved very far into the accumulated mass of statistics which are necessary for such a comparison before he begins to appreciate, as he never did before, the excellence of the statistics of the United States, as drawn up in our own "Poor's Manual," from which it is needless to say our data, as far as the United States is concerned, have been derived. There is no annual publication devoted to the statistics of European and other railroads that professes to have the same scope and thoroughness as the work referred to. In some of the countries, owing to the delay occasioned chiefly by governmental red tape, it is rarely that one can find statistics that are brought up to within two or three years of those obtainable for the United States. The figures for foreign countries given in the present article are based largely upon the Universal Directory of Railway Officials, an excellent work in its way, which is published annually in London. The totals as drawn up from this work, however, have been verified or corrected by statistics which we have personally obtained from the proper authorities in the countries themselves.

It is a well-known fact that while comparison by numbers conveys a very adequate impression up to a certain limit, when we pass this limit the mere statement of numbers is not sufficient. Hence the popularity of comparisons which are made by graphical representation.

TOTAL LENGTH OF RAILROAD TRACKS.—The group of locomotives on the front page represents the relative length of the total amount of railroad track in the leading countries of the world. It will be seen that the United States stands at the head of the list and easily forms a class by itself, with a total mileage of 184,532 miles. The other five countries represented can only total among themselves about 126,000 miles, the United States, therefore, having 58,000 miles more than all the rest together. We must bear in mind, however, that a mere comparison by the length of the track alone does not give an accurate idea of the relative importance of the railroads. There are many other considerations involved, such as the amount of rolling stock, the number of trains that are run, the number of passengers carried, the total amount of equipment in the way of engines and cars, and the total amount of freight that is carried. When all these features are taken into consideration, we find that the position of the United States is not so commanding, although she still has a pronounced lead over all other countries.

LOCOMOTIVES.—In a comparison of the number of locomotives, the United States comes first with a total of 36,746. Great Britain comes next with 19,602, or a little over half as many. Then follow Germany with 16,842, France with 10,502, Russia with 8,748, and British India has a total of 4,258. Now, by dividing the total length of track by the number of locomotives, the reader can make for himself an interesting comparison tending to show the density of the traffic in each country, the same point being brought out, of course, by dividing the total length of track by the number of passengers carried and the total tons of freight that are hauled every year. It will be seen that Great Britain has the largest number of locomotives to a given length of track, while the United States and British India have the smallest proportion to the mile. Here again an important modification must be made; for all locomotives are by no means alike in size and power, the American engine being a far heavier and more capable machine than those of Europe. Not only is the American engine more powerful, but it is more heavily worked, and if we were to increase the totals of the United States by 50 per cent, we should get a figure which more correctly represents the motive power of this country as compared with that of the others mentioned in our table. There are no locomotives in Europe to compare with the giant freight locomotives lately built by the Schenectady or Brooks works, which weigh over 100 tons without the tender, and are capable of exerting a drawbar pull of 22 to 25 tons, and hauling on the level a train nearly a mile in length and weighing over 5,000 tons.

CARS.—In the table of the total number of passenger cars, it will be seen that the United States ranks as third, Great Britain coming first with the enormous number of 62,252, Germany being a poor second with 34,590, and the United States third with 33,893. Here again, as in the case of the locomotives, it must be remembered that the American eight-wheel passenger car is larger and has a greater carrying capacity than the English four or six-wheel passenger coach. In length it is approximately double and in passenger-carrying capacity it is from 30 to 50 per cent larger. The absence of any platforms or a central aisle on the typical English coach enables it to carry a larger number of passengers in proportion to its length than is

possible on the American car; but nevertheless it is certain that the average American car has considerably larger capacity than the average English or European coach. At the same time we must remember that American ideas are very rapidly being adopted in the equipment of English and Continental roads, and the eight and twelve-wheel corridor or central aisle type is gradually taking the place of the smaller and less convenient "carriage" of former days.

FREIGHT CARS.—In the comparison of the freight cars the United States has an enormous lead, not merely in numbers, but also in the capacity of individual cars. With a total of 1,284,807, she has about double as many as Great Britain and about four times as many as France or Germany; moreover, the average American freight car is a giant compared with the European "wagon" or "truck," for while the latter has a capacity of five to eight or ten tons, the average American freight car will run from ten to twenty tons; so that it is not stating the case too strongly to say that the total carrying capacity of all the freight cars of American railroads is from three to four times as great as that of the English "goods wagons," as they are called, and about 100 per cent greater than that of all the combined freight cars of the five foreign railroad systems included in this comparison.

PASSENGERS CARRIED.—When we come to the statistics of passenger cars, Great Britain holds a commanding lead over all other countries, with a total of 1,062,911,000 passengers carried in one year. The United States comes next with over 698,342,000, including over 183,000,000 carried annually by the steam railroads of the Manhattan Elevated Roads, New York; Germany is a good third with 646,461,000. Then there is a considerable drop, France carrying 382,240,316, followed by British India with over 160,000,000, and Russia with a total of over 97,000,000. At first sight these figures are somewhat staggering, especially when we compare Great Britain with this country, and it will naturally be asked how, with about one-eighth as many miles of track, Great Britain should carry forty-five per cent more passengers. Here again there is a qualifying factor to be considered. The length of the average passenger journey in this country is considerably greater than that of the average railway journey in England. This is due to the vast extent of country and the great distances that are traveled in the United States. There is, moreover, a far larger proportion of the British populace dwelling in cities, and a large percentage of the city dwellers are carried to and from their work by suburban passenger trains, the amount of suburban travel in greater London alone with its five or six million inhabitants being enormous; furthermore, the liberal provision of what are known as parliamentary and workmen's trains, and the remarkably low rent at which suburban cottages may be obtained, enables the British workman to become a suburban resident to an extent that is not possible in this country. Another explanation of the enormous passenger travel in England is to be found in the large number and great popularity of cheap excursion trains, which are run during several months in the summer. Travel of this kind, which is carried largely in the United States by the magnificent system of river and shoal-water steamers, is in England taken care of almost entirely by the railroads. The facts quoted will, in a lesser degree, explain the large totals of passenger travel in relation to length of railroad track in Germany and France.

TOTAL FREIGHT CARRIED.—As we should naturally expect in a country where the provision of freight cars is so generous, the total amount of freight carried in the United States is far in advance of that of any other country, the total given in millions being for the United States, 913; for Great Britain, 437; Germany, 276; France, 120; Russia, 97; and British India, 39 million tons. A curious fact is brought out in this comparison as between the United States and Great Britain, namely, that the British freight wagon is ordinarily loaded more nearly to its full capacity than the American freight car; for although, as we stated in a preceding paragraph, the capacity of all American cars is about four times that of all English cars, the total amount of freight carried is only double as much. Just here is to be found one reason why the large capacity of the American car is not suited to the English railroad system, where consignments to particular villages and small towns frequently have a whole car reserved to themselves, so that the car may be dropped at its destination and the train proceed without any delay of unloading. The English claim that by using a smaller car the proportion of the paying load to the dead load, that is to say, of the freight to the car, is larger than it would be if the large capacity American car were used. The truth of this contention certainly seems to be borne out by the figures referred to in our table.

THE Agricultural Department will make an interesting exhibit at the Paris Exposition covering irrigation methods in the West. A government expert will have charge of the exhibit, which will include photographs, working drawings and models of irrigation plants.