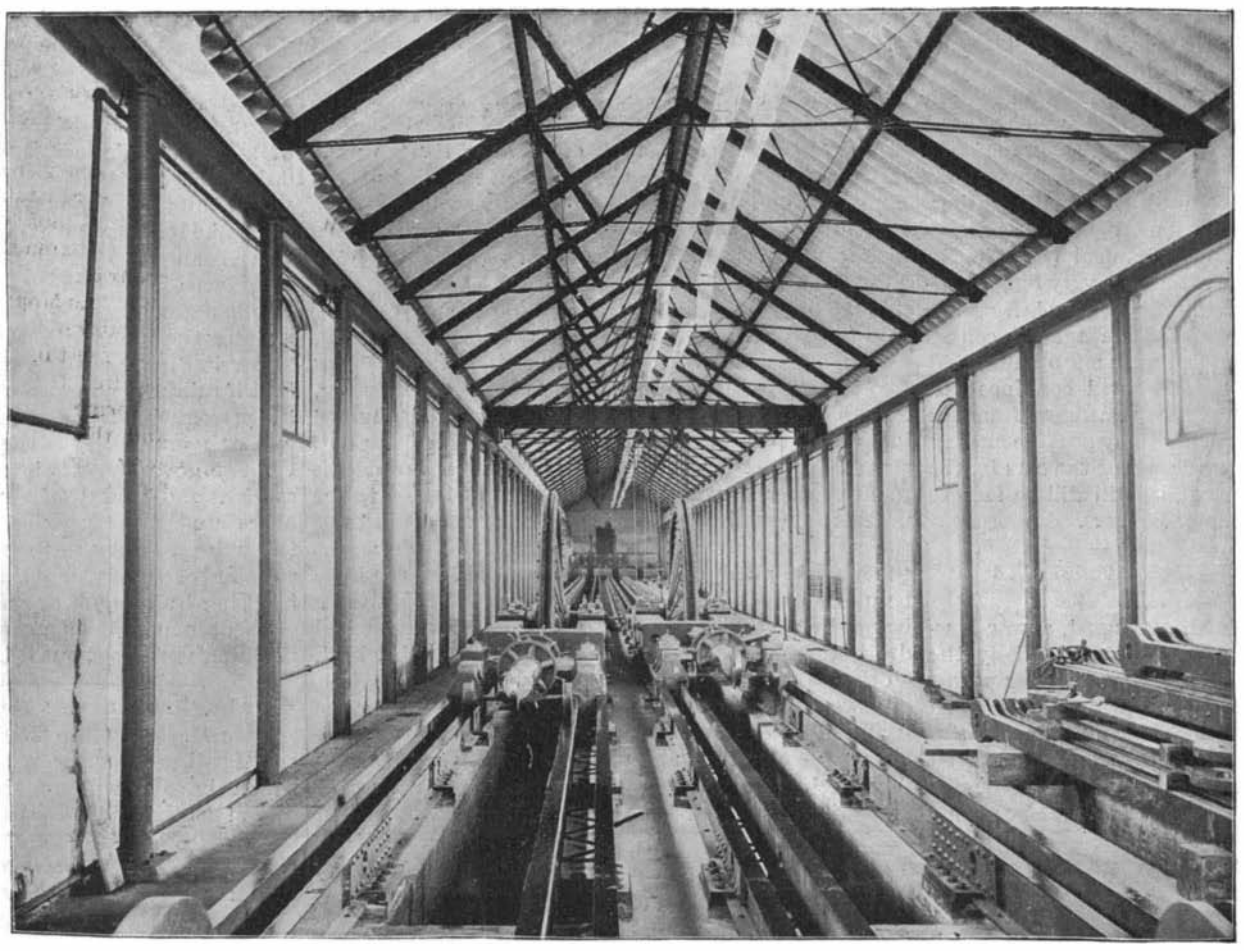
LIGHTNING EXPRESS RAILWAY SERVICE.

This proposed single rail line of Mr. F. B. Behr for speeds of 150 miles per hour has been exhibited in model at Windmill Street, London, W., but we are unable to see more in it, says the Electrical Review, to which we are indebted for the cut and particulars, than we did when the subject was put prominently forward some time ago. We have no fault to find with the working out of the arrangements as shown by the model as far as they go, but, so far from being a single rail line, this is really a five rail track, and yet a sixth is needed to make it really safe. The Behr railroad consists of a single bearer placed on a series of ∧ frames. On this rail the carriage runs on a single line of wheels, bicycle fashion, and the carriage hangs from the axles of these carrier wheels on each side of the ∧ frames. The electric motor is placed as low as possible, and every effort made to keep the C.G. low. On each side of the ∧ are placed two rails on which run guide wheels. These wheels are, of course, horizontal, and serve to take lateral stresses at curves. It is clear, however, that the C.G. of the vehicle is above these wheels, so that in rounding a curve the stress will be borne by the upper guide wheel on the concave or inner side and by the lower wheel on the outside of the curve. Weight alone keeps the carriage down on the top rail, and we cannot but fear there will be great risk of the carriage rising somewhat on rounding a curve, when the guide wheels will slip off the lateral rails. In fact, we quite doubt the suitability of the line for its special purpose of high speeds, and consider it far more fitted for moderate duties. From Mr. Behr's own showing, the centrifugal force of a particle traveling round a 25 chain radius curve is, at 150 miles per hour, 1·4 times the weight of the particle. Now all this may be provided for in the vehicle, but not a word is said about passengers. Going round such a curve an average passenger of 150 pounds weight would be forced to the outside of the curve with a pressure of 210 pounds. It would be all right for the passengers on the outer side, but the inside, or, as we will term them, the concave passengers, would simply be flung across the car upon their vis-a-vis, and this, however pleasing under certain circumstances with curves of fairly flat radius, would be extremely dangerous with the sharper curves. Now Mr. Behr absolutely ignores the passengers. Superelevation of the track, or the Behr equivalent of superelevation, will not help the passengers much. Full superelevation would simply make a passenger sit tight to the tune of his own weight plus 1·4 times his weight. The present writer would weigh 360 pounds for the nonce. Our worthy editor in such a case would weigh about 520 pounds. These are serious figures. They show what great overturning efforts are made upon the structure. We think, too, that Mr. Behr is far too hopeful when he assumes that the centrifugal and wind stresses will be distributed over a length of 500 feet, or ten times the car length.

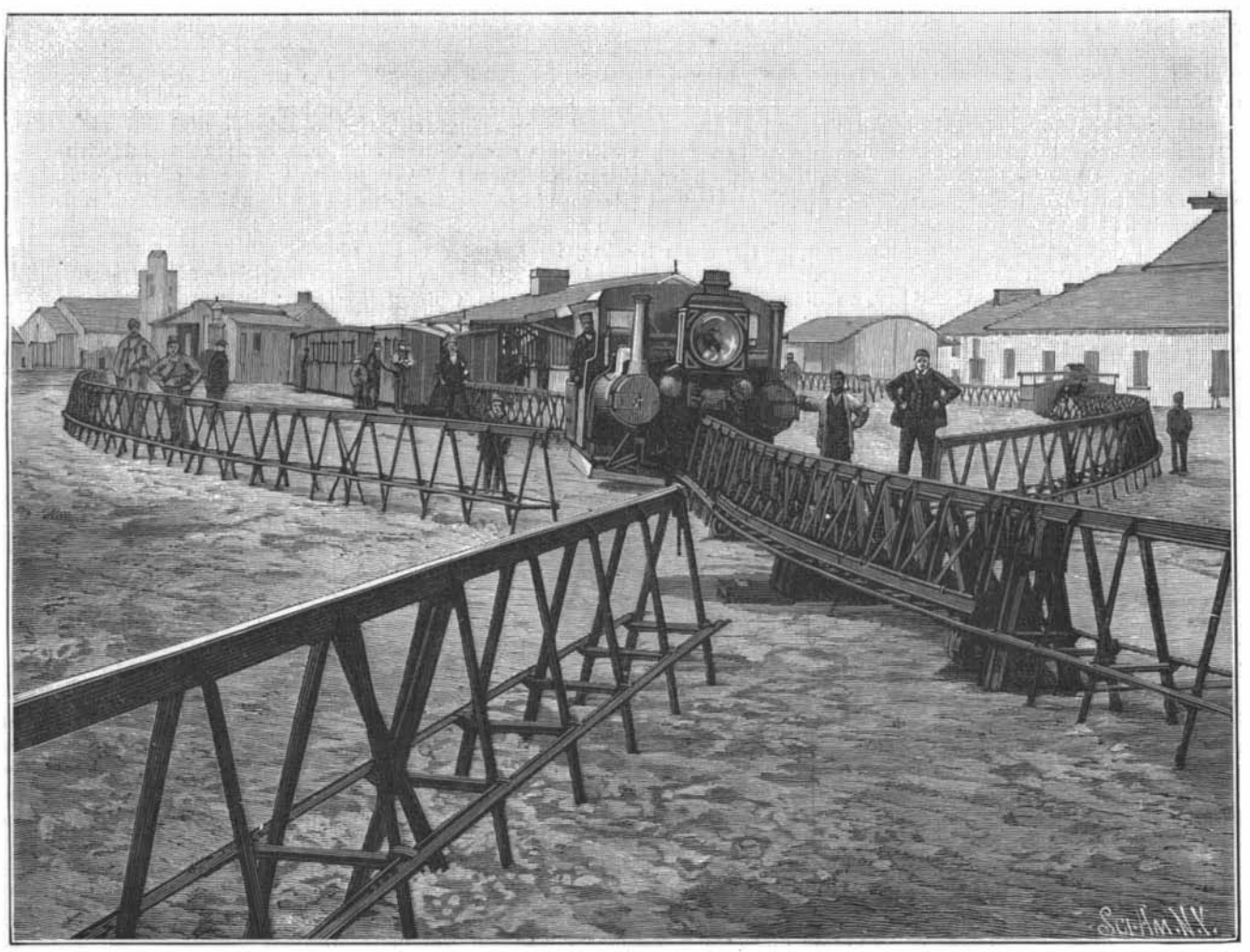
If, therefore, this system is to be of any practical use for high speeds, the curves must be of great radius and the line generally as straight as possible. But when we have got to this we find that such conditions are eminently suitable for the ordinary railway whose trains do not leave the track at high speed on straight portions, and whose simplicity and cheapness of construction far exceeds that of the Behr system. Again, as regards accident, we cannot, despite Mr. Behr's argument, admit that the risks are anything so light as he infers. We do not care to contemplate the fearful result of a failure in the continuity of the structure with the central rail running as it does through the center of the car. An accident might be productive of most serious mixing up of the iron structure, the car and the passengers. The fact is that Mr. Behr has paid so much attention to the mathematics of the mere structure, looked at as a girder, that he has overlooked that passengers are not part of the general structure and cannot be thus mathematically disposed of. As a mere question of stability and strength, such a line can be established just as easily as any other girder structure. There is no limit to speeds for Behr's system if suitably constructed to carry goods properly packed, but passengers cannot be so packed for ordinary traffic. If high speed is demanded and passengers would pay for it, they could be carried lying down, and in this way alone the stress per unit of length would be moderate, but the same outlay would build a straighter line, and the virtue of the Behr system would be gone. For a light line, winding in and out of crooked places and at moderate speeds, we think there is room for the system, electrically worked or otherwise, but more than this we do not care to say.



RED JACKET SHAFT TAIL HOUSE, CALUMET AND HECLA COPPER MINE.
412 FEET LONG BY 82 FEET WIDE.

However, Mr. Behr's method has been public property for several years, and we have pleasure in reproducing a view of the Listowel & Ballybunion Railway in Ireland, which has been constructed on the system, but has so far been worked by steam locomotives at low speeds. With a view to the system being adopted for electrical working, a trial track of three miles is to be laid down at Brussels so as to be ready for the exhibition of next year. This line will take the form of an oval with circular ends of 550 yards radius, and the speed is said to be guaranteed to 95 miles per hour. Mr. T. Parker, of Wolverhampton, is, we believe, to have the design and management of the electrical details.

As regards the general arrangement of the car, this has now been arranged so that the seats are above the apex of the rail structure, and the general center of gravity of the whole is brought low by placing the motors in the lowest part of the carriage sides, connecting them up so as to partake of the motion of the springs while maintaining a fixed distance between the center of the armature and that of the axles. From the pamphlet supplied to us, it appears that cars of 50 feet are intended, carried on bogie trucks and with motors equal to 600 horse power each car. At 2 feet 3½ inches below the surface of the apex rail of the trestle structure there is cross bracing, and on each side of the trestle guide rails, four in all. Where a road



VIEW OF LISTOWEL AND BALLYBUNION RAILWAY IRELAND—LARTIGUE SYSTEM.

or river is to be crossed the structure is suitably trussed to act as a bridge, and piers are provided where necessary. For changing over from one line to another, a piece of the structure is made to swing upon a turntable.

The latest suggested vehicle is one of which the body is articulated to enable it to travel easily on curved portions of the line. It would run on 12 bearing wheels and seat 135 passengers, with space for their luggage, and would weigh in full working order 60 tons, including 10 tons of passengers, each articulated length weighing 20 tons and being 25 feet long. The speed is moderated to 110 miles per hour and the curve radius is made 35 chains. Evidently the odd figures of 150 miles and 25 chains radius are being found wanting. In Mr. Behr's model the various details are nicely worked out, and there is no mechanical objection to the running of such a railway, but the very figures advanced by him and his care in putting the C.G. as low as possible, and generally his provision against centrifugally produced stresses confirm us in our opinion that further consideration of the same will convince Mr. Behr that he cannot separate the passengers from the vehicle, and that however much he may provide against the stresses set up in the structure or the cars by the use of high speed round curves, he will still be face to face with the difficulty of the passengers.

THE BICYCLE RELAY RACE ACROSS THE CONTINENT.

At noon on the twenty-fifth of August, a war message and a post office dispatch were intrusted by the government authorities to a bicycle relay for transmission across the great American continent. Thirteen days later the last of the 220 couriers reached New York, the eastern terminus of the trip and unslung the scarred and weather beaten wallet from his shoulders, the distance of 3,400 miles having been covered at the average speed of about 11 miles an hour.

The relay race, by far the greatest thing of its kind ever undertaken, was organized by the San Francisco Examiner and the New York Journal. It was also aided by the co-operation of the war and post office departments, and by the great railroad systems which extend along the route followed by the relay. These were the Southern Pacific Railroad, from San Francisco to Ogden; the Union Pacific, from Ogden to Council Bluffs; the Chicago and Northwestern, from Council Bluffs to Chicago; the Lake Shore and Michigan Southern, from Chicago to Buffalo; and the New York Central, from Buffalo to New York.

The management of these roads instructed their station agents and operators to report the passage of the relay both to this city and to San Francisco. The work of organizing the relay, which occupied three months, was carried out by Mr. A. R. Grant and Mr. Henry Doyle, who twice made the trip across the continent for this purpose. The route, 3,400 miles long, was divided into 220 relays of an average length of about 15½ miles. Two riders were assigned to each section: a courier, who carried the package, and a "trailer," who followed close behind him, to render assistance, and carry the dispatch forward in case he should be disabled. Four hundred wheels were furnished by the Stearns Company, and were distributed at different points along the route. The postmaster of each town and the governor of each State through which it passed were notified of the probable time of arrival of the relays: so that they might be on hand to affix their signatures and official stamps to the two messages. As far as possible, the posts were located in towns and hamlets; but in the nature of the case it often happened, as in the passes of the Rocky Mountains and on the broad deserts of the West, that the posts had to be established far from any habitation. In this case the relay men were furnished with blankets and provisions and dispatched to their solitary posts to await the flying dispatch.

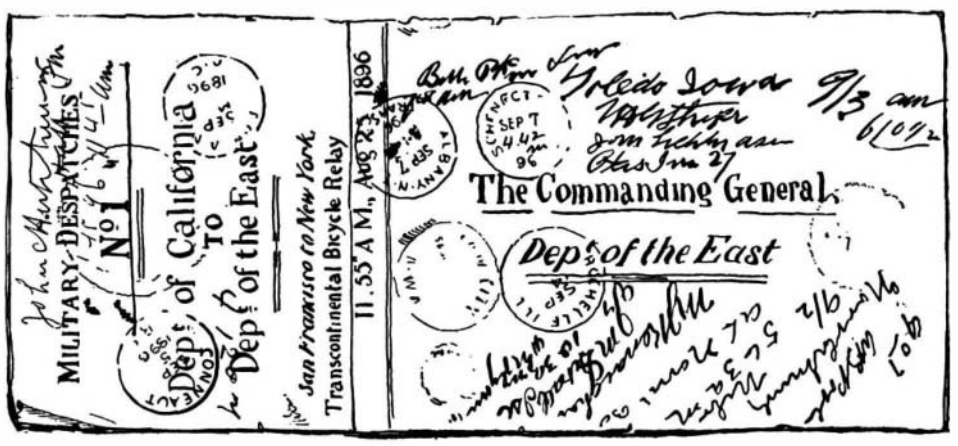
The stout leather wallet, which was slung by a strap across the shoulders of the riders, contained a sealskin case, within which was a sealed envelope containing a gold plate, engraved with a war message from the commandant at the Presidio, a military post at San Francisco, California, to the commandant at Governor's Island, New York. On one side of the case was a strip of ruled parchment, for the signatures of the governors of the various States through which the relay passed. The post office department also instructed the postmaster at San Francisco to forward a special message by the bicycle relay to the postmaster at New York, and gave instructions to the local postmasters at the various towns to place their signatures and stamps upon the letter.

Our illustration, for which we are indebted to the courtesy of the New York Journal, shows the envelope containing the war message.

The story of the relay, as told by the gentlemen who followed it by train, is full of thrilling interest; and while the palm for speed was naturally carried off by the riders on the turnpike roads of California and some of the Middle and Eastern States, where speeds of over 20 miles an hour were sustained for stretches of from 10 to 20 miles, the credit for courage and persistency must be accorded to the men who rode up and down the steep and rough grades of the Rockies and across the alkaline deserts of the far West.

Naturally the trip was full of mishaps, though none of the riders was crippled or received more hurt than abrasions and bruises—a surprising result, when we bear in mind that one-third of the distance was ridden in the night. A notable case was that of Courier Erswell and his "trailer" Deitrick, of Cheyenne, Wyoming. They were riding by night and in a blinding rainstorm by a road which crossed a swollen torrent, whose bridge, a corduroy affair, had been washed out two or three hours before they reached the crossing. The riders, speeding on through the darkness, plunged into the river, first courier, then trailer. Climbing out, they used a fence rail with a spike driven through it to fish out their wheels, and then rode 36 miles to the nearest telegraph station. Quite of another kind was the experience of a courier in his 43 mile ride across the burning alkali desert, who staggered into the little hamlet at the end of his run and requested that a buggy be sent for his exhausted companion, who had dropped from sheer fatigue some 10 miles further back on the trail.

Eastern riders, who are accustomed to glide over the level surface of macadamized roads can appreciate the task of the mountain and desert relay when it is stated that the message was carried across two ranges of mountains, 7,000 and 8,000 feet high, and over so-called roads that for hundreds of miles had no more title to the name than has a sheep trail through an Eastern farm. In many respects this is the greatest feat that has ever been accomplished by that mechanical marvel of the day, the bicycle.



THE ENVELOPE CONTAINING THE BICYCLE RELAY WAR MESSAGE.

How the Chinese Language is Telegraphed.

According to the "Statesman's Year Book," says the San Francisco Chronicle, all the principal cities of China are now connected with one another and with Peking, the capital, by telegraph. Recent visitors to China say, however, that telegraphing there is a laborious and expensive process, and that the lines are a charge upon the state treasury instead of a source of revenue.

The dispatches are, of course, sent in Chinese, for not one in many thousands of the natives knows any language except his own. But the Chinese have no alphabet. Their literary characters, partly ideographic, partly phonetic, number many thousands. It is simply impossible to invent telegraphic signals that would cover the written language. Here was an obstacle in the way of using the telegraph at all.

The difficulty was obviated by inventing a telegraphic signal for each of the cardinal numbers, and so numbers or figures might be telegraphed to any extent. Then a code dictionary was prepared, in which each number from one up to several thousand stood for a particular Chinese letter or ideograph. It is, in fact, a cipher system. The sender of the message need not bother himself about its meaning. He may telegraph all day without the slightest idea of the information he is sending, for he transmits only numerals.

It is very different with his friend, the receiver. He has the code dictionary at his elbow, and after each message is received he must translate it, writing each literary character in place of the numeral that stands for it. Only about an eighth of the words in the written language appear in the code, but there are enough of them for all practical purposes.

But the Chinese system has its great disadvantages. Men of ordinary education have not sufficient acquaintance with the written language to be competent receivers, and the literati are not seeking employment in telegraph offices. So the government recruits its employes with much difficulty. There are almost no Chinese who have business relations all over the country, as is the case with many thousands of our business men. The public is not invited to buy stock in the Chinese telegraph lines, and if it were, nobody at present would buy with a view to dividends. The receipts do not equal the expenses, and the government makes up the deficit.

There is another great disadvantage of the Chinese telegraph system. All over the world the movement of railroad trains is regulated by telegraph. The orders received by the station agent are filed in plain view of the employes, and if need be the switchman may take temporary charge and carry out the instructions from the central office. Railroads have been introduced into China to a very small extent, and there is talk of greatly extending the service. But how about running the trains?

A writer in "Le Mouvement Colonial," of Paris, says that if railroads are introduced to any extent in China, the personnel must be exclusively European and American, or recruited from the literary class. He says the Chinese government will not take foreigners into its service, and that the educated men of China, who alone among the people have sufficient knowledge of the written language to be intrusted with the actual running of trains, would refuse most emphatically to be either train hands or station agents.

This is one of the many stumbling blocks in the way of China's progress, but it is quite effective in its way.

Inventions in the Shoe and Leather Trade.

Isaac H. Bailey, for twenty years editor of the Shoe and Leather Reporter, notes that "the improvements which have been brought about in the manufacture of leather and shoes are far more wonderful than is generally realized," and says: "But, after all, the inventors hold the lead in the creation of amazing auxiliaries to industry. They have contrived machinery in illimitable quantities, which performs labor with such absolute precision that they have revolutionized the whole domain of mechanism. They have amplified the facilities for shoe production to such a degree that they have lowered the cost and bettered the quality of shoes astonishingly. . . The skill which has been displayed in the manufacture of kid is surprising. A few years ago most of this material was imported, because of the superiority of the foreign over the domestic fabric. This current of traffic has been completely reversed. We are now exporting large and increasing quantities of kid of as good quality as was ever made. The demand for it abroad is increasing rapidly, and the consumption in our own land and in others has attained prodigious proportions. These results have been wrought by the genius and perseverance of men who devoted themselves to study and experiments with an assiduity so unfailing that there were no difficulties which they could not and did not surmount. Their persistency has been crowned with substantial rewards in the enlargement of the outlets of consumption and in the establishment of a business which is susceptible of wide expansion. There has been also a considerable augmentation of the exports of pretty much all the other kinds of leather, and the sales of them multiply fast; they are doubling every ten years. The exports of shoes have been insignificant hitherto, but they are growing apace, and are likely to become comparatively extensive in the course of time. Our manufacturers are making conquests in Europe, and American shoes are favorites in the best appointed retail stores in many of the leading cities of the old world. The efforts to secure this trade were only begun a short time ago, and they have already been rewarded so satisfactorily that it is probable, if not certain, they will be continued, and that solid advantages will accrue from them."

The Cyclone in Paris.

A cyclone of extraordinary violence burst over Paris, France, about ten minutes before three on the afternoon of September 10. Although the duration of the cyclone was not greater than one minute, still during that time two people were killed and about fifty were injured. Much damage was done to property in the city. Many of the trees which add so much to the beauty of Paris were snapped off as if they had been cut by a scythe. The smaller trees seemed to have survived the shock better, but even they were greatly injured. Cabs were upset, street lamps were broken, barges were sunk. The roof of the Opera Comique was much damaged, and the Palais de Justice was almost wrecked. Rain fell in torrents and traffic was stopped for two hours.