

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.

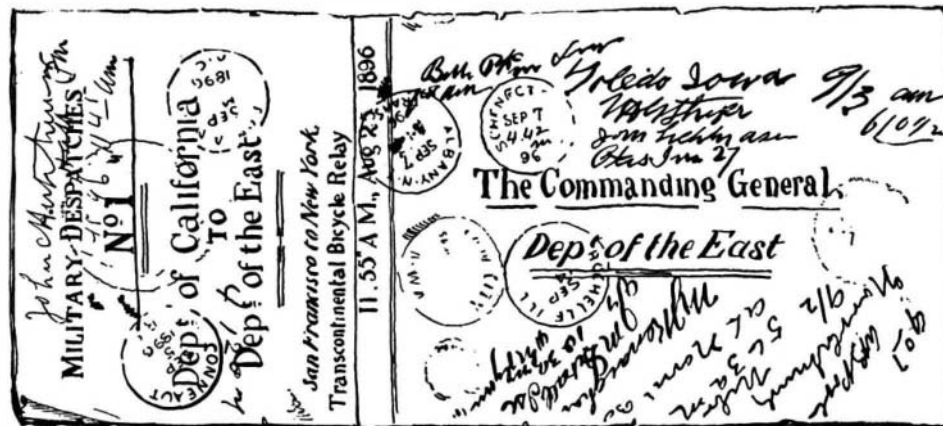
Our illustration, for which we are indebted to the

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



THE ENVELOPE CONTAINING THE BICYCLE RELAY WAR MESSAGE.

has ever been accomplished by that mechanical marvel of the day, the bicycle.

#### 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 employees 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 employees, 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 unflinching 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.