TRANSCONTINENTAL.

The Wonderful Story of Building the Pacific Roads.

TOLD BY GEN. G. M. DODGE.

The Engineer and Railway Builder Whose Genius Found the Path Over the Mountains.

REALITIES MORE READABLE THAN FICTION.

Recited by the Man Who Built the Union Pacific With a Regiment of Soldiers at His Back to Protect His Workmen From Indians.

General G. M. Dodge, of Iowa, who served conspicuously with the Union forces during the war of 1861-65, read a paper before the Society of the Army of the Tennessee, at its twenty-first annual re-union at Toledo, Ohio, September 15, 1888, on the transcontinental railways, which is so replete with interesting historical data, and is so charmingly told, that it is here given in full:

GENERAL DODGE'S STORY.

Mr. President and Companions of the Army of the Tennessee: "Habit," says Carlyle, "is the deepest law of nature; it is our supreme strength."

Likewise, to use the words of a compeer of Carlyle: "In a great majority of things, habit is a greater plague than ever afflicted Egypt."

I hasten to add my indorsement to both these observations. Nothing less than the truth contained in the former, I think all here who know me will admit, could support one like myself, whose life-long pursuits unfit him for the role I have to accept, and subject him to the keen edge of the truth contained in the latter, in obeying such an order as the following:

LETTER FROM GENERAL SHERMAN.

"FIFTH AVENUE HOTEL, NEW YORK, May 14, 1888.

"*General G. M. Dodge, No. 1 Broadway*—DEAR GENERAL: The receipt this morning of the Annual Report of the Proceedings of the Society Army of the Tennessee, at Detroit, September 14th and 15th, 1887, reminds me that our next meeting will be at Toledo, Ohio, September 15th and 16th, 1888, and that it is my duty to name two 'Members' to read at that meeting papers of interest and value for future historic reference. After scanning the list of living members, with a full knowledge of what has gone before, I have settled on you and Surgeon Hartshorn, of Cincinnati. You can choose your own subject, and what I add is mere suggestion. The civil war which we shared was only a link in the great chain of our national development. Important events preceded that war which have plainly crystallized into history; the world did not stop, but went on, and you were directly an agent in the consequences. The Pacific States had to be brought into clear harmony with the older Eastern communities, and you did much to build up the Union and Central Pacific Railroads, the pioneers, followed by four other transcontinental lines, now in full operation. On this subject you can say much that will have 'historic interest.'

"I ask you to do this, and it will be printed and perused by thousands in the great future who cannot hear it read, but who will be edified long after you and I are gone.

"Simply write me that you will be at Toledo, September 15th, and I will assure you of all else. As ever your friend,

"W. T. SHERMAN."

ACCEPTS FROM HIS OLD COMMANDER.

But I derive encouragement to proceed when I reflect on the happy issue of the many seemingly desperate enterprises undertaken in the past at the bidding of our commander, to whose orders we all learned, a quarter of a century ago, to yield unquestioning obedience. More than a quarter of a century ago I learned to trust in his judgment, rather than my own, and my experience is all the greater, since I know from experience and observation something of his capacity for correct judgment in these matters, as well as in those that were dominant during the war.

I recall the fact that it was, in a measure, under his auspices, if not his orders, that I proceeded from my post in the army to that of which I am now required to make report. Let me read the documentary proof of this, as well as his words of approval when the work was done:

THE GREAT WORK CONTEMPLATED.

"HEADQUARTERS MILITARY DIVISION OF THE MISSISSIPPI, ST. LOUIS, May 1, 1866.

"*Major General Dodge*—DEAR GENERAL: I have your letter of April 27th, and I readily consent to what you ask. I think General Pope should be at Leavenworth before you leave, and I expected he would be at Leavenworth by May 1st, but he is not yet come. As soon as he reaches Leavenworth, or St. Louis, even, I consent to your going to Omaha to begin what, I trust, will be the real beginning of the great road. I start to-morrow for Riley, whence I will cross over to Kearney by land, and thence come into Omaha, where I hope to meet you. I will send your letter this morning to Pope's office, and indorse my request that a telegraph message be sent to General Pope to the effect that he is wanted at Leavenworth. Hoping to meet you soon, I am, yours truly, W. T. SHERMAN, M. G."

THE TIME FOR CONGRATULATIONS.

After an interval of three years, when I telegraphed General Sherman that the tracks were joined, he answered as follows:

"WASHINGTON, May 11, 1869.

"*General G. M. Dodge:* In common with millions, I sat yesterday and heard the mystic taps of the telegraphic battery announce the nailing of the last spike in the great Pacific road. Indeed, am I its friend? Yea. Yet, am I to be a part of it, for as early as 1854 I was Vice-President of the effort begun in San Francisco under the contract of Robinson, Seymour & Co. As soon as General Thomas makes certain preliminary inspections in his command on the Pacific I will go out and, I need not say, will have different facilities from that of 1846, when the only way to California was by sail around Cape Horn, taking our ships 196 days. All honor to you, to Durant, to Jack and Dan Casement, to Reed, and the thousands of brave fellows who have wrought out this glorious problem, spite of changes, storms, and even doubts of the incredulous, and all the obstacles you have now happily surmounted.

"W. T. SHERMAN, General."

FIRST SURVEYING FOR THE OVERLAND ROAD.

More than this. Turn with me to the first volume of his memoirs, page 79, where he says:

"Shortly after returning from Monterey, I was sent by General Smith up to Sacramento city to instruct Lieutenants Warner and Williamson, of the Engineers, to push their surveys of the Sierra Nevada mountains, for the purpose of ascertaining the possibility of passing that range by a railroad, a subject that then elicited universal interest. It was generally assumed that such a road could not be made along any of the immigrant roads then in use, and Warner's orders were to look further north up the Feather river, or some of its tributaries. Warner was engaged in this survey during the summer and fall of 1849, and had explored to the very end of Goose Lake, the source of Feather river," when this officer's career was terminated by death in battle with the Indians.

He was too modest to add, as I have no doubt was the fact, that those instructions were sent at his own suggestion; that that was the first exploring party ever sent into the field for the special purpose of ascertaining the feasibility of constructing a railway on a portion of the line of one of the transcontinental routes; and that the exploration preceded, by at least four years, the Act of Congress making appropriations "for exploration and surveys for a railroad route from the Mississippi river to the Pacific ocean," the earlier fruits of which were embodied in thirteen ponderous volumes, printed at the expense of the Government.

And still further. The interest thus early manifested, continued with unabated force, was signalized in the closing days of his official life by a summary of transcontinental railroad construction up to that date, 1883, so exhaustive as to the leading facts that I am at a loss touching the scope he expects me to give to this paper. The summary may be found in General Sherman's last report to the Secretary of War, including the exhaustive statistics of Colonel Poe. (Ex. Doc. 1, part 2, 48th Congress, first Session, pages 46-47 and 253-317.)

WHOSE CONCEPTION WAS THE OVERLAND.

Under all the circumstances, therefore, I must assume that he expects me to confine my remarks to something of an elaboration of the details of the construction of those lines with which I was personally identified, more especially that which first of all linked the two oceans together.

Before proceeding with this, however, a single observation in reference to the priority of claim may not be uninteresting or out of place.

In General Sherman's summary, referred to above, it is stated that "It would now be impossible to ascertain who was the first to suggest the construction of a railway to connect the eastern portion of our country with the Pacific coast. It is probable that the idea in some form occurred to several persons. Very recently E. V. Smalley, in his 'History of the Northern Pacific Railroad,' has presented the claim of Dr. Samuel Bancroft Barlow, of Granville, Mass., to this distinction, details the evidence upon which the claim is founded, and shows that as early as 1834 (possibly in 1833) Dr. Barlow advocated the construction of a railroad from New York to the mouth of the Columbia river, by direct appropriations from the treasury of the United States. But in presenting this claim to priority, is it not possible that the fact has been overlooked that Dr. Barlow's paper in the *Intelligencer*, of Westfield, Mass., was called forth by a series of articles upon the same subject, published in the *Emmigrant*, of Washtenaw county, Michigan Territory? And is not, therefore, that unknown writer of those articles really entitled to whatever credit attaches to priority of suggestion?"

MEMORIAL TO CONGRESS IN 1846.

While this statement is true, so far as we are now able to ascertain, it is a singular fact that before a mile of railroad was laid in any part of the world a design of connecting the Atlantic with the Pacific Ocean by means of steam-carriage was broached, if we can believe the following statement, which I quote from the memorial of Robert Mills, of February 18, 1846 (H. R. Doc. 173, Twenty-ninth Congress, first session):

"The author has had the honor of being, perhaps, the first in the field to propose to connect the Pacific with the Atlantic by a railroad from the head navigable waters of the noble rivers disemboguing into the ocean. In 1819 he published a work on the internal improvement of Maryland, Virginia and South Carolina, connected with the intercourse of the States of the West."

"The following extract from this work will present the idea then formed, both of the practicability and importance of this intercourse to the nation," etc., etc.

Then follows a description, inclosed by quotation marks, of a scheme of steam locomotion between the headwaters of the Mississippi valley and that of the valley of the Columbia, too long for repetition on an occasion like this.

BEFORE THE RAILROAD AND NOW.

I shall confine my paper to the acts and works of those who first took hold, as citizens, and in a private capacity built the Pacific roads.

When I first saw the country west of the Missouri river it was without civil government, inhabited almost exclusively by Indians. The few white men in it were voyageurs, or connected in some way with the United States army. It was supposed to be uninhabitable, without any natural resources or productiveness, a vast expanse of arid plains, broken here and there with barren, snow-capped mountains. Even Iowa was unsettled west of the Des Moines river.

It cost the Government, in those days, from one to two cents per pound to haul freight 100 miles to supply its posts; and I was at one time in the country between Humboldt and the Platte nearly eight months without seeing a white man, other than my own employes.

Now, from the Missouri river to the Pacific, from the Red River and the Rio Grande to the British possessions, the territory is under civil law.

The vast region is traversed its entire length by five great transcontinental lines of railroad. There is hardly a county in it not organized, and it is safe to say that there is not a township that is without an occupant. Its plains teem with all the products grown east of the Missouri river. It has become the great corn and wheat producing belt of the United States; its mountains are the producers of millions of ores, and from every range and valley iron and coal, in immense quantities, are being mined.

It is is said that a railroad enhances ten times the value of the country through which it runs and controls, but the value of this country has been enhanced hundreds of times. The Government has reaped from it a thousand-fold for every dollar it has expended; and the Pacific roads have been the one great cause that made this state of affairs possible. The census of 1890 will place in this territory fifteen millions of people, and in twenty years it will support forty millions.

AN EARLY EXPERIENCE.

It is difficult, I doubt not, for you to comprehend the fact that the first time I crossed the Missouri river was on a raft, and at a point where stands the city of Omaha to-day. That night I slept in the "tepee" of an Omaha Indian.

When I crossed my party over to make the first explorations not one of us had any knowledge of Indians, of the Indian language or plains-craft. The Indians surrounded our wagons, took what they wanted, and dubbed us "squaws." In my exploring, ahead and alone, I struck the Elkhorn river about noon. Being tired, I hid my rifle, saddle and blanket, sauntered out into a secluded place in the woods with my pony and lay down to sleep. I was awakened, and found my pony gone. I looked out upon the valley and saw an Indian running off with him. I was twenty-five miles from my party, and was terrified. It was my first experience, for I was very young. What possessed me I do not know, but I grabbed my rifle and started after the Indian, hallooing at the top of my voice. The pony held back, and the Indian, seeing me gain upon him, let the horse go, jumped into the Elkhorn and put that river between us.

The Indian was a Pawnee. He served under me in 1865, and said to me that I made so much noise he was "heep scared."

Within a radius of ten miles of that same ground to-day are five distinct lines of railroad, coming from all parts of the country, concentrating at Omaha for a connection with the Union Pacific.

THE FIRST PRIVATE SURVEY AND EXPLORATION

Of the Pacific Railroad was caused by the failure of the Mississippi and Missouri, now the Chicago Rock Island and Pacific Railroad, to complete its project. The men who put their money in that enterprise conceived the idea of working up a scheme, west of Iowa, that would be an inducement to capital to invest in carrying their project across Iowa to the Missouri river. They also wished to determine at what point on the Missouri the Pacific railroad would start, so as to terminate their road at that point. The explorers adopted Council Bluffs, Iowa, as the point. All roads crossing the State for years ended their surveys at that point, and all roads now built connect with that point. These explorations, commenced by me in 1853, were continued each year until 1861, when the result was seen in the framing of the bill now known as the "Law of 1862."

After this bill was passed the Union Pacific Company was organized at Chicago, September 2, 1862, and Reed, Dey and Brayton made reconnoissances east of the mountains. Reed confining his work to the crossing of the mountains to reach the Great Salt Lake basin. The effort to engage capital in the road was a failure, and work was suspended.

THE INITIAL WORK AND MR. LINCOLN.

During the explorations in 1856 or 1857 I happened to return to Council Bluffs, where Mr. Lincoln chanced to be on business. It was then quite an event for an exploring party to reach the States. After dinner, while I was sitting on the stoop of the Pacific House, Mr. Lincoln came and sat beside me, and in his kindly way and manner was soon drawing from me all I knew of the country west, and the result of my surveys. The secrets that were to go to my employers he got, and, in fact, as the saying there was, he completely "shelled my woods." President Lincoln in the spring of 1863 sent for me to come to Washington.

When I received the summons from General Grant at Corinth, Miss., to repair to Washington, giving no reason, it alarmed me. I had armed, without authority, a lot of negroes and organized them into a company to guard the Corinth contraband camp. It had been pretty severely criticised in the army, and I thought this act of mine had partly to do with my call to Washington; however, upon reaching there and reporting to the President, I found that he recollected his conversation on the Pacific House stoop; that he was, under the law, to fix the eastern terminus of the Pacific road; and also, that he was very anxious to have the road commenced and built, and desired to consult me on those questions.

MR. LINCOLN DECLARED THE ROAD A MILITARY NECESSITY.

In the discussion of the means of building the road I thought and urged that no private combination should be relied on, but that it must be done by the Government. The President frankly said that the Government had its hands full. Private enterprise must do the work, and all the Government could do was to aid. What he wished to know of me was, what was required of the Government to insure its commencement and completion. He said it was a military necessity that the road should be built.

From Washington I proceeded to New York, and after consulting there with the parties who had the question before them, the bill of 1864 was drawn. In due time it passed, and under it the Union and Central Pacific Railroads, constituting one continuous line, were built.

THE WAR CRISIS IN 1864.

In the fall of 1864, after the fall of Atlanta, and while on my return from City Point, where I had been to visit General Grant for a couple of weeks, the Commander-in-Chief sent me back by way of Washington to see the President.

While the President referred to the Pacific road, its progress, and the result of my former visit, he gave it very little thought, apparently, and his great desire seemed to be to get encouragement respecting the situation around Richmond, which just then was very dark. People were criticising Grant's strategy, and telling how to take Richmond. I think the advice and pressure on President Lincoln were almost too much for him, for during my entire visit, which lasted several hours, he confined himself, after reading a chapter out of a humorous book (I believe called the "Gospel of Peace"), to Grant and the situation at Petersburg and Richmond.

After Atlanta, my assignment to a separate department brought the country between the Missouri river and California under my command, and then I was charged with the Indian campaigns of 1865 and 1866. I traveled again over all that portion of the country I had explored in former years, and saw the beginning of that great future that awaited it. I then began to comprehend its capabilities and resources; and in all movements of our troops and scouting parties I had reports made upon the country—its resources and topography; and I, myself, during the two years, traversed it east and west, north and south, from the Arkansas to the Yellowstone, and from the Missouri to the Salt Lake basin.

DISCOVERY OF SHERMAN PASS.

It was on one of these trips that I discovered the pass through the Black Hills, and gave it the name of Sherman, in honor of my great chief. Its elevation is 8,236 feet, and for years it was the highest point reached by any railroad in the United States. The circumstances of this accidental discovery may not be uninteresting to you.

While returning from the Powder river campaign I was in the habit of leaving my troops and train, and with a few men, examining all the approaches and passes from Fort Fetterman south over the secondary range of mountains known as the Black Hills, the most difficult to overcome with proper grades of all the ranges, on account of its short slopes and great hight. When I reached the Lodge Pole creek, up which went the overland trial, I took a few mounted men—I think, six—and with one of my scouts as guide, went up the creek to the summit of Cheyenne Pass, striking south along the crest of the mountains to obtain a good view of the country, the troops and trains at the same time passing along the east base of the mountains on what was known as the St. Vrain and the Laramie trail.

About noon, in the valley of a tributary of Crow creek, we discovered Indians, who, at the same time, discovered us. They were between us and our trains. I saw our danger and took means immediately to reach the ridge and try to head them off, and follow it to where the calvary could see our signals. We dismounted and started down the ridge, holding the Indians at bay, when they came too near, with our Winchesters. It was nearly night when the troops saw our smoke-signals of danger and came to our relief; and in going to the train we followed this ridge out until I discovered it led down to the plains without a break. I then said to my guide that if we saved our scalps I believed we had found the crossing of the Black Hills—and over this ridge, between the Lone Tree and Crow creeks, the wonderful line over the mountains was built. For over two years all explorations had failed to find a satisfactory crossing of this range. The country east of it was unexplored, but we had no doubt we could reach it.

FRONTIER INCIDENTS.

In 1867, General Augur, General John A. Rawlins, Colonel Mizner and some others crossing the plains with me, reached the point where I camped that night. We spent there the 4th of July, and General Rawlins made a remarkable speech commemorating the day. We located there the post of D. A. Russell and the city of Cheyenne. At that time the nearest settlement was at Denver, 150 miles away; and while we lay there the Indians swooped down on a Mormon train that had followed our trail and killed two of its men; but we saved their stock and started the graveyard of the future city.

EXPLORATIONS FOR A PACIFIC RAILROAD

The explorations by the Government for a Pacific railroad are all matters of official report, long since published and open to all. They were the basis for the future explorations of all the trans-continental lines, except the Union Pacific, then known as that of the 42d parallel of latitude. That line, and the country from the Arkansas to the Yellowstone, was explored and developed mainly by private enterprise, and it is by far the most practicable line crossing the continent—the shortest, quickest, of lightest curvature and lowest grades and summits. It is not, in an engineering point of view, the true line from the Atlantic to the Pacific, but in a commercial point of view it is.

In an engineering point of view we demonstrated, before the year 1860, that the true line was up the Platte to its forks, to which point the Union Pacific is now built, then up the North Platte and Sweetwater to the South Pass, and then down the Snake river (where the Oregon Short Line now runs), to the Columbia and then to tide-water at Portland. The Union and Central were built for commercial value, and to obtain the shortest and quickest line from ocean to ocean.

The line of the Central was controlled almost entirely by the development of the mining industries in California and Nevada until it reached the Humboldt; then its natural course would be to reach Salt Lake and the Mormon settlements. The Union Pacific objective point was the Pacific coast by way of the great Platte valley and Salt Lake.

REGULATIONS CONCERNING CONSTRUCTION.

Every mile of the Pacific road that received subsidies from the Government, had to have the approval of the Government three different times, through its selected officers, before one cent could be received or an acre of land certified.

1st. The preliminary survey, showing the general route of the line, had to be accepted as in compliance with the law and satisfactory to the President.

2d. As each section of 50 or 100 miles was finally located on the ground, this being the actual line to be built upon, which could not be deviated from, it had to be filed in the Interior Department, receive the approval of its Secretary, and the Great Seal of the country.

Finally, when a section of 20 or more miles was completed and equipped as required by law, the United States Government sent out three expert commissioners, who examined again, not only all materials put in it, its method of construction and its road as constructed, but went behind all other approvals that had been made, and assumed the right of might, not law, to disapprove what had before been approved, and upon which approval the road had been constructed.

For the sake of peace and to avoid delays we submitted and made any changes demanded, which, to their credit I must say, were very few. The grades, the road-beds, the cuts, fills, bridges, ties, rails, spikes, joints—everything had to be done up to the standard adopted by the Government, a standard adopted on the advice, in several cases, of people who had never seen the country. And after the road was completed, in many cases it had to be changed to overcome one great obstacle that one unacquainted with the country would never dream of—the question of snow. We had to study every summit, every mountain side, every valley, to find from the currents which was the snowy side and which the barren; and over the whole 1,500 miles of line located for the Union Pacific for three winters we kept engineers in tents and dug-outs watching from four to six months the drift of the snow and water to be overcome, and the safest, surest and most effectual methods of doing it.

THE RATE OF GOVERNMENT AID.

The charter of 1884 provides that the loan in bonds shall change from $16,000 a mile to $32,000 at the east base of the Rocky mountains and west base of the Sierra Nevada.

When we reached the mountains a series of questions arose as to how this base should be determined. The eastern base was determined by Mr. Blickensderfer, who was appointed by the Government. After examining the country he declared it to be right at the foot of the mountains, where the heavy grades to overcome the first range, the Black Hills, were made necessary—a very proper decision.

The west base of the Sierra was located near Sacramento, where the drift of the mountains reached into that valley, or where, you might say, the first approach to the mountains begins, but long before the heavy grades commenced.

ESTABLISHING THE LINE THROUGH UTAH.

Reconnoissances made in 1862-63-64 had demonstrated that a serious question would arise in reaching the Humboldt valley from the western foot of the Wahsatch mountains in the Salt Lake basin. Should the line go north or south of the lake? The Mormon Church and all of its followers, a central power of great use to the trans-continental roads, were determinedly in favor of the south line. It was preached from its pulpits, and authoritatively announced that a road could not be built or run north of the lake. But our explorations in an earlier day unqualifiedly indicated the north side, though an exhaustive examination was made south and only one line run north, it being our main line to the California State line surveyed in 1867.

The explorations by parties south of the lake and the personal examinations of the chief engineer, determined that it had no merits as compared with the north line; and on such reports the north line was adopted by the company and accepted by the Government.

THE RACE IN CONSTRUCTION.

Brigham Young called a conference of his church and refused to accept the decision; prohibited his people from contracting or working for the Union Pacific, and threw all of his influence and efforts to the Central Pacific, which just at that time was of great moment, as there was a complete force of Mormon contractors and laborers in Salt Lake valley competent to construct the line 200 miles east or west of the lake, and as the two companies had entered into active competition, each respectively to see how far east or west of the lake they could build, that city being the objective point and the key to the control of the commerce of that great basin.

The Central Pacific Company entered upon the examination of the lines long after the Union Pacific had determined and filed its line, and we waited the decision of their engineers with some anxiety. We knew they could not obtain so good a line but we were in doubt whether, with the aid of the Mormon Church and the fact that the line south of the lake passed through Salt Lake City, the only commercial capital between the Missouri river and Sacramento, they might decide to take the long and undulating line; and then would arise the question as to which (the one built south, the other built north, and it would fall to the Government to decide) should receive the bonds and become the trans-continental line. However the engineers of the Central Pacific, Clements and Ives, took as strong ground, or stronger than we in favor of the north line, and located almost exactly upon the ground the Union Pacific had occupied a year before; and this brought the Mormon forces back to the Union Pacific, their first love.

The location of the Union Pacific was extended to the California State line, and that of the Central Pacific to the mouth of Weber Canyon. The Union Pacific work was opened and most of the line graded to Humboldt Wells, 219 miles west of Ogden, and the Union Pacific met the track of the Central Pacific at Promontory Summit, 1,186 miles west of the Missouri river and 638 miles east of Sacramento, on May 9, 1869, to the wonder of America, and the utter astonishment of the whole world—completing the entire line seven years before the limit of time allowed by the Government.

THE GREAT WORK ACCOMPLISHED.

On the occasion of the completion of the road there assembled on the bleak mountain side representatives of nearly all civilized nations. As the last spike was driven, connection was made with every telegraph office between the Atlantic and the Pacific, and every blow was heard throughout the land. To the representatives of the road there came over the wires the congratulations of authorities, officials and eminent people of every country that could be reached by wire, and among them all was one that I prized above all others — the telegram which I have already read in your hearing. You who know what it is to receive commendation and promotion on the field of battle, in the face of your enemy, can appreciate the satisfaction conferred by such a message from such a source.

THE GOVERNMENT COMMISSIONERS' REPORT.

How well we did our work I leave to the committee, who, after an exhaustive examination of it, submitted its report to the Government to say as follows:

"The foregoing shows that the location of the Union Pacific Railroad is in accordance with the law, as a whole and in its different parts, the most direct, central and practicable that could be found between Omaha and the head of Great Salt Lake.

"Taken as a whole, the Union Pacific Railroad has been well constructed. The general route for the line is exceedingly well selected, crossing the Rocky Mountain ranges at some of the most favorable passes on the continent, and possessing capabilities for easy grades and favorable alignments unsurpassed by any other railway line on similarly elevated grounds. The energy and perseverance with which the work has been urged forward, and the rapidity with which it has been executed, are without parallel in history. In the grandeur and magnitude of the undertaking it has never been equaled, and no other line compares with this in the arid and barren character of the country it traverses, giving rise to unusual inconveniences and difficulties, and imposing the necessity of obtaining almost every requisite of material, of labor and of supplies for its construction from the extreme initial point of its commencement.

"Deficiencies exist, but they are almost without exception those incident to all new roads, or of a character growing out of the peculiar difficulties encountered or inseparably connected with the unexampled progress of the work, a matter of the greatest importance and highly creditable to the able management of the company; and they can all be supplied at an outlay but little exceeding that which would have obviated them in the first instance, but at the cost of materially retarding the progress of the work. Under the circumstances, it is much more a matter of surprise that so few mistakes were made and so few defects exist than it would be, had serious deficiencies been of more frequent occurrence; and the country has reason to congratulate itself that this great work of national importance is so rapidly approaching completion under such favorable auspices.

"We are, very respectfully, your obedient servants,

"G. K. WARREN, Brevet Major-General, U. S. A.

"J. BLICKENSDERFER, Jr., Civil Engineer.

"JAMES BARNES, Civil Engineer.

"Special Commissioners U. P. R. R.

"HON. O. H. BROWNING, Secretary of Interior."

ANOTHER AND GREATER TESTIMONIAL

To the proper construction of the road is the fact that when the Canadian Pacific was about to be built the Dominion Government, some time in 1873 or 1874, examined the Union Pacific carefully, and, in making its contract for the building of the Canadian Pacific, used the Union Pacific as its standard; and there occurs a clause in their contract which provides that the Canadian Pacific, when completed, shall be equal in all its parts (in road-bed, structures, alignments and equipments) to the Union Pacific as found in the year 1874—and that Government is now making a settlement with its contractors and claiming that the Canadian Pacific has not yet been brought to that standard.

When we consider that England and its colonies have the reputation of building the most substantial roads in the world, this fact must certainly go to the credit of the builders of the Union Pacific, and is a severe comment upon the attacks that have been made upon the Pacific railroads by our own Government and people.

The day for estimating the benefit of these lines to the nation or comparing them with anyone's foresight or predictions of the revolution they would make in the trade, commerce and population of the country, has long since passed.

BENEFITS OF THE PACIFIC ROADS.

Some of the benefits derived from the building of these roads are:

1. The change of climate.
2. The bringing under cultivation of millions upon millions of acres of plains-land, making homes for the numerous immigrants to the country.
3. The development of vast mineral belts that now supply the world with gold, silver and copper.
4. The development of immense quantities of coal, anthracite and bituminous, that are already supplying the population and industries between the Missouri river and the Pacific.
5. The discovering, yearly, of immense beds of all kinds of ore that go into the iron, tin, earthen and other industries. There seems to be no metal that the Rocky mountains cannot furnish the ore to produce.
6. The empire that the roads have made possible will, in the near future, exceed in occupied territory, population, wealth and savings all those of the country east of the Missouri river as measured to-day.

FINANCIAL AND COMMERCIAL RESULTS.

In the last two years the financial strides have been remarkable. The Government is daily adding to its treasury more than all the interest upon all the sums it has expended in developing it, and does not yet know what it has acquired; nor does it comprehend in any degree what it will in years to come pay into our treasury. It has already built up four great commercial centers, each controlling territory 500 miles in diameter—one on the Missouri river, one in Colorado, one in Salt Lake basin and one on the Pacific coast; and three more are in their infancy—one on the Rio Grande, one in Montana and another in Oregon. The banking capital and deposits in the centers illustrate their progress. They amount to over one hundred millions of dollars to-day.

On the completion of the road, at the request of the Board of Directors, we made an estimate of the earnings for five and ten years after completion. By claiming the overland trade of all the British islands, of China and Japan, and taking that of the entire Pacific coast, we estimated the entire earnings in five years at $5,000 per mile. We gave 80 per cent. of this to through traffic, and 20 per cent. to local. Within ten years the local development brought the earnings up to $12,000 per mile, and today the through traffic is not 5 per cent. of its gross earnings. In 1887 the Union Pacific system earned a grand total of $28,557,766; the Central and Southern Pacific, $37,930,162; the Atchison, Topeka and Santa Fe, $18,461,366; the Northern Pacific, $12,789,447, and the Texas Pacific, $6,200,000.

Nearly one-half as much more was earned by local roads that developed a portion of each State and Territory, but were not part of the continental system. The trade, traffic and development of that vast empire, not yet thirty-five years old, has passed beyond all figures, and we simply look upon it as two great commercial zones following that other great empire, between the lakes and the Missouri river, whose development has been the admiration and wonder of the world.

THE GREAT CLIMATIC RESULTS.

The building of the Pacific roads has changed the climate between the Missouri river and the Sierra Nevada. In the extreme west it is not felt so much as between the Missouri river and the Rocky mountains. Before settlement had developed it, the country west of the Missouri river could raise very little of the main crops, except by irrigation. From April until September no rain fell. The snows of the mountains furnished the streams with water and the bunch-grass with sufficient dampness to sustain it until July, when it become cured and was the food that sustained all animal life on the plains, summer and winter.

I have seen herds of buffalo, hundreds of thousands in number, living off bunch-grass that they obtained by pawing through two feet of snow on the level. It was this feature that induced the stocking of immense ranches with cattle. Buffalo never changed the character of the grass, but herds of cattle did, so that now, on the ranges, very little of the bunch or buffalo grass remains.

Since the building of these roads, it is calculated that the rain belt moves westward at the rate of eight miles per year. It has now certainly reached the plains of Colorado, and for two years the pioneers of that high and dry state have raised crops without irrigation, right up to the foot of the mountains.

Salt Lake since 1853 has risen nineteen feet, submerging whole farms along its border and threatening the level desert west of it. It has been a gradual but permanent rise, and comes from the additional moisture falling during the year—rain and snow. Professor Agassiz, in 1867, after a visit to Colorado, predicted that this increase of moisture would come by the disturbance of the electrical currents, caused by the building of the Pacific railroads and settlement of the country.

THE PACIFIC ROAD BUILDERS.

The Union Pacific and the Central Pacific were fortunate in selecting a class of young men for their work, some of them hardened by five years' experience in the war, whose whole soul and interest were in it. They commenced first in the exploring and engineering parties, and finally landed as chiefs in some part of the work.

On the Union Pacific were Dey, Reed, Hurd, Blickensderfer, Morris McCartney, Eddy, House, Hudnut, Maxwell, Brown, Appleton, Clark, Hoxey, Snyder, the Casements, and many others under them. Some of them laid down their lives in the work—all reached fame in after years and were builders and operators on all the great trans-continental lines, including the Canadian Pacific.

On the Central Pacific were Judah, Montague, Clements, Ives, Gray, Towne and others that I cannot name. Some of these men have met five times in making the connections that completed the great trans-continental lines. I found some of the men who made the first connection at Promontory again at Sierra Blanca, at the joining of the Texas Pacific and Southern Pacific, and still again at Emery's Gap the present year, in connecting New Orleans and the gulf with Denver. On the Atchison and Topeka and on the Northern, as well as on the Canadian Pacific, some of the men took part in laying the connecting rails.

The men who made possible this work, who threw their fortunes, their health, their reputations into it, will one day stand in civil life like our great leaders in the war. Monuments to their enterprise dot the country between the Missouri river and the Rocky Mountains, between the Pacific and the Wahsatch. They were the men who had made possible a population, within the next twenty years, between the Missouri river and the Pacific coast, of fifty millions of people. They have been libeled, abused, vilified, and, in some cases, bankrupted and driven to their graves; but their works stand, and their monuments will yet come—the Ameses, Dillon, Duff, Durant, Atkins, Dexter, Baker, Dix, Brooks, Stanford, Huntington, Hopkins and Crocker.

THE BUILDING WAS PATRIOTIC WORK.

I do not state this alone on my own knowledge, but I appeal to the most enthusiastic, the most helpful of all the Generals in this great enterprise. One who knew these people, who saw them, who watched them at their work, will tell you that they should deserve the same praise for their acts in civil life, as he and his followers did for their victories in the war. The two were inseparable, and the last could not have been but for the first.

Many have supposed that they engaged in it for purely mercenary motives—for the money they could make out of it; but I say to you that their hearts and patriotism were in the work, as much as yours were in the war, and if they had invested their money and credit in any other business, as they did in this, they would have been the gainers. They and their subordinates were

DETERMINED TO BUILD A FIRST CLASS ROAD.

I have plenty of evidence to sustain this beyond question. The President, Oliver Ames, and the Board of Directors sustained the engineers in building a road of the lowest grades and lightest curvature the country would admit. When some of those interested desired to use the maximum authorized by law and build a surface road, the Board invariably stood by for the lines of the engineers—those offering the greatest commercial value.

The instructions given me by Oliver Ames and Sydney Dillon, one at the head of the railroad company and the other at the head of the construction company, were invariably to obtain the best line the country afforded, regardless of expense. Oakes Ames once wrote me when it seemed almost impossible to raise money to meet our expenditures: "Go ahead; the work shall not stop, even if it takes the shovel shop."

The Ameses were manufacturers of shovels and tools, and their fortunes were invested in that business, and, as we all know, the shovel shop went. When the day came that the business of the Ameses should go, or the Union Pacific, Oakes Ames said: "Save the credit of the road—I will fail."

It took a man of courage and patriotism to make that decision and lay down a reputation and business credit that was invaluable in New England and one that had come down through almost a century. To him it was worse than death, and it was the blow which, followed by others, put him in his grave.

TO EMPHASIZE THESE OBSERVATIONS,

Permit me to quote a brace of paragraphs from a letter dated January 6, 1859, addressed to Hon. John Sherman, M. C., and made public through the *National Intelligencer*. It was from his brother, then unknown to fame, and is even yet one of the most remarkable and instructive short papers to be found in the literature of trans-continental railway construction. He gave many weighty reasons why a railway to the Pacific should be built, but thought it could not be done unless by the nation. "It is a work of giants," he sententiously declares, "and Uncle Sam is the only giant I know who can or should grapple the subject." That paper alone, in the light of later events, would stamp its author as a far-seeing statesman and an enlightened engineer, and I shall ask his permission to record it as a part of this paper. The following declarations taken from it show how the project was viewed in 1859:

"It so happens that for the past ten years the Sierra Nevada has been crossed at every possible point by miners in search of gold, by emigrants going and coming and by skillful and scientific men. I, myself, have been along a great part of that range, and have no hesitation in saying that there are no passes by which a railway, to be traveled by the most powerful locomotive now in use, can be carried through the Sierra Nevada, unless at the extreme head of the Sacramento, near the town of Shasta or Fort Reading, or at the extreme head of the San Joaquin, near the Tejon.

"I now assert my belief that the great railroad will not receive enough net profits to pay interest on its cost. Yet, I will not attempt an estimate of either the cost of the road or its income. I believe the cost will not fall much, if any, short of $200,000,000, the interest on which (Government bonds, say 5 per cent. per annum,) would be $10,000,000."

THE WAR MADE BUILDING POSSIBLE.

The experience of the war made possible the building of this trans-continental railroad, not only physically but financially. The Government, already burdened with billions of debt, floated fifty millions more, and by this action it created a credit which enabled the railroad company to float an equal amount, and these two credits, when handled by men of means and courage, who also threw their own private fortunes into the scale, accomplished the work.

If it had been proposed before the war that the United States should lend its credit and issue its bonds to build a railroad 2,000 miles long, across a vast barren plain only known to the red man, uninhabited, without one dollar of business to sustain it, the proposition alone would have virtually bankrupted the nation.

Possibilities of finance, as developed during the war, made this problem not only possible, but solved and carried it out, and accomplished in three years a feat which no plan ever before suggested proposed to accomplish in ten years; and while it was being accomplished the only persons who had real, solid, undoubted faith in its completion were that portion of the nation who had taken active part in the war.

Necessity brought out during the war bold structures that in their rough were models of economy in material and strength. In taking care of direct and lateral strains by position of posts and braces they adopted principles that are used today in the highest and boldest structures; and I undertake to say that no structure up to date has been built which has not followed those simple principles that were evolved out of necessity, though reported against during the war by the most experienced and reliable engineers of the world.

A FEW BOLD SPIRITS BACKED THE ENTERPRISE.

With their fortunes and independent credit. They were called fools and fanatics, and Oakes Ames—the real pluck of the work—said to me once: "What makes me hang on is the faith of you soldiers," referring, at the time, to the support the army was giving us, led by Grant, Sherman, Sheridan, Pope, Thomas, Augur and Crook, and all who had direct communication with us on the plains. There was nothing we could ask them for that they did not give, even when regulations did not authorize it, and it took a large stretch of authority to satisfy all our demands.

The commissary department was open to us. Their troops guarded us, and we reconnoitered, surveyed, located and built inside of their picket line. We marched to work at the tap of the drum with our men armed. They stacked their arms on the dump and were ready at a moment's warning to fall in and fight for their territory.

GRADING A RAILROAD WITH BAYONETS.

General Casement's track train could arm 1,000 men at a word; and from him, as a head, down to his chief spiker, it could be commanded by experienced officers of every rank, from General to a Captain. They had served five years at the front, and over half the men had shouldered a musket in many battles. An illustration of this came to me after our track had passed Plum creek, 200 miles west of the Missouri river. The Indians had captured a freight train and were in possession of it and its crews. It so happened that I was coming down from the front with my car, which was a traveling arsenal. At Plum creek station word came of this capture and stopped us. On my train were perhaps twenty men, some a portion of the crew, some who had been discharged and sought passage to the rear. The excitement of the capture and the reports coming by telegraph of the burning of the train brought all men to the platform, and when I called upon them to fall in, to go forward and retake the train, every man on the train went into line and by his position showed that he was a soldier. We ran down slowly until we came in sight of the train. I gave the order to deploy as skirmishers, and at the command they went forward as steadily and in as good order as we had seen the old soldiers climb the face of Kenesaw under fire.

Less than ten years before, General Sherman had suggested a different method of disposing of the Indian. Writing to his brother, he said:

"No particular danger need be apprehended from Indians. They will no doubt pilfer and rob, and may occasionally attack and kill stragglers; but the grading of the road will require strong parties, capable of defending themselves, and the supplies for the road and maintenance of the workmen will be carried in large trains of wagons, such as went last year to Salt Lake, none of which were molested by Indians. So large a number of workmen distributed along the line will introduce enough whisky to kill off all the Indians within 300 miles of the road."

EARLY RAILROADS UNREMUNERATIVE.

Railroads first built in the United States have been remunerative only in a small way, and have grown and been supported mostly by the vast development of new territory. The advance lines are usually bankrupt, but they feed trunk lines by which they are financially supported, not because of the amount they earn for themselves, but for what is paid to their connection, as every pound of delivered freight and every passenger carried to and from the connection is additional and new business.

The unfriendliness of Congress since 1870, and of all the Western States since 1880, has been overcome by the world west of the Missouri river, newly conquered and occupied. Now their hostile legislation will soon have its reactionary effect upon themselves, and I predict that the demagogues who delight to legislate and destroy property that they have no interest in, will soon see the result in their own homes; for these, like the people east of the lakes, are becoming possessed of property and wealth through capital that comes to them, developing their country.

Railroad investment is creeping west of the lakes, and when the people legislate upon something they own or are interested in, no matter how small their interest, they will sustain and support it. I look to the day, not far distant, when in Kansas, Nebraska, Iowa, Texas, Minnesota and Missouri, it will be as unpopular to legislate to destroy capital invested in means of transportation as it is to-day in Ohio, New York and the New England States.

THE CHANGES IN THE RAILROAD WORLD

Have been caused mostly by the improved methods of transportation made necessary during the war; and the great principles then evolved have taught the American people that there was no problem in finance or relating to the development of the country so great that its people did not feel able to grasp and master it.

Railways have been known since the days of the Romans. The tracks were first made of cut stone. One hundred and fifty years ago iron rails took their place; and the modern railway was created by the Stephensons when they built the locomotive "Rocket." Civil and mechanical engineering have kept pace with the growth of the world, until now there is no river so deep or mountain so high, that they combined, cannot build under or over it. One of the principal geniuses in solving the problem for controlling steam (Ericsson, the companion of Stephenson) is still alive, and Horatio Allen, who pulled the throttle of the first locomotive on its first trip made in the United States, is still with us. When we consider that from that day to this over 150,000 miles of railroad have been built in the United States, one can comprehend the strides the railway has made up to date, but its future possibilities cannot be imagined.

A SUMMARY REVIEW

I cannot close this paper more appropriately than by reading to you the final page of my last report to the Board of Directors, written upon the completion of the Union and Central Pacific Roads. I submit that if written to-day it would not be materially changed. It as follows:

In 1853 Henry Farnam and T. C. Durant, the then contractors and builders of the Missouri River Railroad in Iowa, instructed Peter A. Dey to investigate the question of the proper point for the Mississippi and Missouri River Road to strike the Missouri river to obtain a good connection with any road that might be built across the continent. I was assigned to the duty, and surveys were accordingly extended to and up the Platte valley, to ascertain whether any road built on the central or then northern line, would from the formation of the country, follow the Platte and its tributaries over the plains, and thus overcome the Rocky Mountains. Subsequently, under the patronage of Mr. Farnam, I extended the examination westward to the eastern base of the Rocky Mountains and beyond, examining the practicable passes from the Sangre Christo to the South Pass; made maps of the country, and developed it as thoroughly as could be done without making purely instrumental surveys. The practicability of the route, the singular formation of the country between Long's Peak, the Medicine Bow Mountains and Bridger Pass, on the south, and Laramie Peak and the Sweetwater and Wind river ranges on the north, demonstrated to me that through this region the road must eventually be built. I reported the facts to Mr. Farnam, and through his and his friends' efforts,

THE PROSPECT FOR A PACIFIC RAILROAD BEGAN TO TAKE SHAPE

In after years, when the war demonstrated the road to be a military necessity, and the Government gave its aid in such munificent grants, surveys were extended through the country previously explored, its resources developed, its hidden treasures brought to light, and its capabilities for the building of a railroad to the Pacific fully demonstrated.

In doing this over the country extending from the Missouri river to the California State line, and covering a width of 200 miles, north and south, and on the general direction of the forty-second parallel of latitude, some fifteen thousand miles of instrumental lines have been run, and over twenty-five thousand miles of reconnoissances made.

In 1863 and 1864 surveys were inaugurated, but in 1866 the country was systematically occupied; and day and night, summer and winter, the explorations were pushed forward through dangers and hardships that very few at this day appreciate, as every mile had to be run within range of the musket, as there was not a moment's security. In making the surveys numbers of our men, some of them the ablest and most promising, were killed; and during the construction our stock was run off by the hundred, I might say by the thousand; and as one difficulty after another arose and was overcome, both in the engineering, running and construction department, a new era in railroad building was inaugurated.

Each day taught us lessons by which we profited for the next, and our advances and improvements in the art of railway construction were marked by the progress of the work, 40 miles of track having been laid in 1865, 260 in 1866, 240 in 1867, including the ascent to the summit of the Rocky Mountains, at an elevation of 8,235 feet above the ocean; and during 1868 and to May 10, 1869, 555 miles, all exclusive of side and temporary tracks, of which over 180 miles were built in addition.

THE FIRST GRADING

Was done in the autumn of 1864, and the first rail laid in July, 1865. When you look back to the beginning at the Missouri river, with no railway communication from the east, and 500 miles of the country in advance without timber, fuel or any material whatever from which to build or maintain a railroad, except the sand of the bare roadbed itself, with everything to be transported, and that by teams, or at best by steamboats, for hundreds and thousands of miles; everything to be created, with labor scarce and high, you can all look back upon the work with satisfaction and ask, under such circumstances, could we have done more or better?

THE COUNTRY IS EVIDENTLY SATISFIED.

That you accomplished wonders and have achieved a work that will be a monument to your energy, your ability and to your devotion to the enterprise through all its gloomy as well as its bright periods; for it is notorious that, notwithstanding the aid of the Government, there was so little faith in the enterprise that its dark days—when your private fortunes and your all was staked on the success of the project—far exceeded those of sunshine, faith and confidence.

This lack of confidence in the project, even in the West, in those localities where the benefits of its construction were manifest, was excessive, and it will be remembered that laborers even demanded their pay before they would perform their day's work, so little faith had they in the payment of their wages, or in the ability of the company to succeed in their efforts. Probably no enterprise in the world has been so maligned, misrepresented and criticised as this; but now, after the calm judgment of the American people is brought to bear upon it, unprejudiced and biased, it is almost without exception pronounced

THE BEST NEW ROAD IN THE UNITED STATES.

Its location has been critically examined, and although the route was in a comparatively short time determined upon, as compared to that devoted to other similar projects, yet, in regard to the correctness of general route, no question is ever raised; and even in the details of its location, 730 miles of which were done in less than six months, it has received the praise of some of the ablest engineers of the country. Its defects are minor ones, easily remedied, and all the various commissions, some of them composed of able and noted engineers, have given the company due credit in this particular, although they have attacked it in others; and to-day, as in the past the company need fear no fair, impartial criticism upon it, or no examination made by men of ability and integrity, or such as are masters of their profession.

That it yet needs work to finally complete it no one denies, but whatever is necessary has been or is being done.

Its future is fraught with great good. It will develop a waste, will bind together the two extremes of the nation as one, will stimulate intercourse and trade, and bring harmony, prosperity and wealth to the two coasts. A proper policy, systematically and persistently followed, will bring to the road the trade of the two oceans, and will give it all the business it can accommodate; while the local trade will increase gradually until the mining, grazing and agricultural regions through which it passes will build up and create a business that will be a lasting and permanent support to the country.

After General Dodge's paper had been read, General Raum (addressing the President):

"I move you, sir, that the hearty thanks of this Society be extended to General Dodge for his paper; and that it be spread upon the Record, and be printed with the annual report."

GENERAL SHERMAN'S INDORSEMENT.

The President (General Sherman) said: I need not speak to an audience such as this in praise of the historic paper just read by General Dodge. It so happens that I was, before the civil war, during it and since, deeply interested in the great problem of a Pacific railroad. Every word of General Dodge's paper is true, to my personal knowledge, and I indorse every proposition he has made.

When the civil war was over, you all must remember that I was stationed at St. Louis, in command of all the troops on the Western plains as far out as Utah. I found General Dodge as consulting engineer of the Union Pacific railroad, in the success of which enterprise I felt the greatest possible interest. I promised the most perfect protection, by troops, of the reconnoitering, surveying and construction parties, and made frequent personal visits on horseback and in ambulance, and noticed that the heads of all the parties had been soldiers during the civil war. I firmly believe that the civil war trained the men who built that great National highway, and as General Dodge has so graphically described, he could call on any body of workmen to "fall in," "take arms," "form platoons and companies," "deploy as skirmishers," and fight the marauding Indians just as they had learned to fight the rebels down at Atlanta. I will not claim that all were of the army of the Tennessee, but the heads of parties were all, or nearly all, Union soldiers.

I was particularly interested in that part of General Dodge's paper wherein he described his discovery of the way to cross the Black Hills beyond Cheyenne (there was no Cheyenne then.) He was limited by the law to 116 feet grade to any mile. Instead of following the valley of Lodge Pole creek, as all previous engineers had done, he chose the upper, or anti-clinal line, instead of the lower, or sin-clinal line. This was a stroke of genius, by which he surmounted the Rocky Mountains by a grade of eighty feet to the mile, whereas by any other route then known he would have been forced to a grade of 200 feet, or to adopt short curves through Laramie Pass.

HONORS DUE TO THESE BUILDERS.

The Union and Central Pacific railroads were the pioneer trans-continental roads in America, and every man who did his part should receive all honor. Now there are five trans-continental railroads, the last the Canadian Pacific.

It so happens that two years ago, having traveled by every other, I expressed a wish to return from San Francisco eastward by the Canadian Pacific, just completed. To my amazement I discovered that the President of that railroad was Major W. C. Van Horne, one of our railroad men, educated in our war between Nashville and Atlanta. He was then, as now, the President of that road, with a salary of from $25,000 to $50,000, and they talk of making him a Duke. He can hold his own with any Duke I have thus far encountered. Anyhow, he acted like a Prince to me. From his office in Montreal, he ordered his agent at Victoria, B. C., to extend to General Sherman every possible courtesy, which was done. I had a special car for myself and daughter, Lizzie, with privilege of stopping over at any station.

On the way eastward I met many people and heard many things of great interest to me, and, maybe, to you. There are three mountain ranges between the Mississippi, or rather the Missouri Valley and the Pacific Ocean: The Rockeis, the Wahsatch, and the Cascades. These converge to the northwest, so that in the Canadian Pacific the engineers had to meet them closer together than by our "Northern Pacific," or by the "Central" and "Union."

OVERCOMING THE OBSTACLE.

In the first explorations, the English engineers saw no escape from the conclusion that to pass these ranges from their starting point to the Pacific—"Vancouver," a magnificent port—they would have to follow the grade of the Fraser river, by its west branch, to its very head, near the Henry House, and thence to descend the "Athabasca" eastward to Winnipeg, etc. This route was about 400 miles longer than the "direct line." The Board of Directors in Montreal then called on our United States experienced engineers, and found a man, Randolph, I believe, who undertook to cut across this great bend or loop. Instead of following the west branch of Fraser river, he took the east branch, "Thompson's," up to the Kamloop's Lake. The mountains eastward seemed impassable, but he reasoned "where there is a will, there is a way." Through brush and trees he forced his way, and found a pass in the Cascade Range called "Kicking Horse," where his horse had kicked him on the knee. Persevering, he, in the next or main range, observed the flight of an eagle, which did not, as usual, pass over the highest visible peak, but disappeared around a point; so he followed the same course, found an unexpected break and located a railroad with less grades than the Union Pacific, and saved a distance of four hundred miles, or two hundred millions of dollars. In looking over the usual time-tables of the "Canadian Pacific," you will find the "Kicking Horse Pass" and "Eagle Pass," through which millions of people will travel and millions of dollars worth of freight will pass. All are, in part, the consequence of our civil war, and of the men it educated.

General Dodge's most admirable paper will be embraced in our next annual report.

AN OCEAN MONSTER.

NEW YORK, January 25th.—A *World* special cable from Havana, Cuba, says: A great sea monster has appeared near Matanzas. Intelligent persons who saw him calculate that he measured about one hundred and fifty feet in length by forty feet wide. He was dark gray in color, with white spots the size of dinner-plates all over his back. The immense head, fins and tail are identical with those of a shark. The strange creature was roaming around the entrance to Matanzas bay for three days, and was the terror of fishermen, who declare that they have never seen anything to compare with it. It is supposed to be the great tiger shark seen several years ago in the Indian ocean.

Elastic Traces.

Everyone has noticed that a dray horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on the suggestion of M. Keller, Chief Engineer, the directors of the Eastern Railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with traces made of chains having a strong spiral spring inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory. A considerable gain has been made in the durability of the harness and the regularity of the work, through the diminution of the number of chains broken in the service, while the horses have done their work better and with less fatigue. The blow of the collar upon the shoulders at starting is far less violent and less injurious to the animal than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was formerly necesary, seem to gain courage, and pull steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial the directors of the company have become so convinced of the superiority of the new mode of harnessing that it has been adopted in all portions of the vast network of lines under their control.—*Scientific American.*

IT is good business for every one having a cold to treat it promptly and properly until it is gotten rid of—intelligent experience fortunately presenting in Dr. Jayne's Expectorant a curative thoroughly adapted to cure speedily all coughs and colds, and to allay any exciting inflammation of the throat or lungs.

In ancient times everybody played the lyre. Nowadays the liar plays everybody.—*Merchant Traveler.*

GENERAL NOTICES.

I have been afflicted with catarrh for over ten years—frequently my nose would bleed, and leave my nostrils in a dry, inflamed condition. I experienced relief after the first trial of Ely's Cream Balm. It is the best of many remedies I have tried.—[E. Gill, Madison, O., Editor of the "Index."

When I began using Ely's Cream Balm my catarrh was so bad I had headache the whole time, and discharged a large amount of filthy matter. That has almost entirely disappeared, and I have not had headache since.—S. H. Sommers, Stepney, Conn.

Advice to Mothers.—Mrs. Winslow's SOOTHING SYRUP should always be used when children are cutting teeth. It relieves the little sufferer at once; it produces natural, quiet sleep by relieving the child from pain, and the little cherub awakes as "bright as a button." It is very pleasant to taste. It soothes the child, softens the gums, allays all pain, relieves wind, regulates the bowels, and is the best-known remedy for diarrhea, whether arising from teething or other causes. Twenty-five cents a bottle. MWFly

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