

GIRDLED BY WATER

RAILROAD'S ELABORATE SYSTEM OF FIGHTING FIRE.

More Than Seven Miles of Large Water Mains Surround Their Expensive Machine and Car Shops at Mechanical Center.

To determine the efficiency of its own system of fire protection, one of the great railroad lines of the country has undertaken a thorough test of its fire fighting facilities at its headquarters where there has just been finished a new high pressure water system for fire protection purposes only, and without connections with any other distribution pipes.

That it is of great importance that this system should have been developed may be realized in the fact that a conflagration there would seriously interfere with the operation of the entire system, because the city is its mechanical center. Besides, the insurable value of the machine and car shops, with the equipment in adjacent yards, is more than \$6,000,000.

Gridironing the expensive machine and car shops are more than seven miles of large water mains, with 72 two and three way hydrants, supplying 184 streams of water. These afford a protection which, from exhaustive tests, has been shown to make very remote the possibility of a serious fire.

In addition to two fire engine companies, chemical extinguishers are distributed through the shops, while sand and water pails, hose racks, chemical engines, water caisks and ladders add to the equipment with which these railroad fire fighters are armed. Some 31,000 feet of cotton rubber-lined hose is available for utilizing the water from the hydrants, which, owing to the arrangement of the mains and valves, cannot be shut off from their water supply by breaks in the pipe lines.

In the same way has this railroad established its fire protection at every large and small terminal and station. At the more important points systems proportionately as elaborate have been installed to protect the property of the company. Networks of fire mains, with plugs at convenient places, make it unlikely that the company will suffer serious loss from fire.

At the test at headquarters a number of supposititious fires were started in different parts of the railroad shops, and firemen, with their helpers, responded to fight imaginary flames. Some thirty-two regular firemen and a score or more of the auxiliary force directed the streams of water, while inspectors checked up the results. To make the test more thorough 17 streams were brought into service. At intervals of two minutes streams were turned on, and after all of them were throwing water on the buildings readings were taken of the pressures. The test continued for an hour and a half, during which time some 185,000 gallons of water was used.

Newcomb's Definition of "Magnet."

Personally, Newcomb was an agreeable companion and a faithful friend. His success was due largely to his tenacity of purpose. The writer's only personal contact with him came through the "Standard Dictionary"—of whose definitions in physical science Newcomb had general oversight. On one occasion he came into the office greatly dissatisfied with the definition that had been framed for the word "magnet"—a conception almost impossible to define in any logical way. We had simply enumerated the properties of the thing—a course which in the absence of authoritative knowledge of their causes was the only rational procedure. But Newcomb's mind demanded a logical treatment, and though he must have seen from the outset that this was a forlorn hope, his tenacity of purpose kept him, pencil in hand, writing and erasing alternately for an hour or more. Finally he confessed that he could do no better than the following pair of definitions—"Magnet, a body capable of exerting magnetic force," and "Magnetic Force, the force exerted by a magnet." With a hearty laugh at his beautiful circulus in definiendo he threw down his pencil, and the imperfect and illogical office definition was accepted.—North American Review.

Alaska Still Has Much Gold.

The decrease of the gold product of Alaska, which is noticeable for the years 1907 and 1908, has been seized upon by some persons as an indication of the exhaustion of the metal. But such is not the case. The decline has been due to labor troubles and a lack of water, which is regarded as temporary only. There is every indication that the product will be very materially increased in the near future, owing to the establishment of valuable facilities. A number of good roads have been built recently, by which the freight charges for interior transportation will be reduced. Foundries and similar establishments have been located at desirable points, and by a recently devised process the sluicing season will be prolonged into the winter.

RUSSIA HOLDS SECOND PLACE

Second Only to United States in the Matter of Greatest Railroad Mileage.

If it is a question merely of bigness the Russian railroad system is far and away the first in Europe. There are already many more miles of railway in the vast empire than in any other country in the world excepting the United States, and Russian railways are still only in their infancy.

It is of course quite true that there are now in the United States more miles of road than in all Europe and almost as many as in all the rest of the world put together, and that our territory is so large and as yet so far from complete development that we shall probably keep the lead as far as railroad enterprise is concerned for a long time to come.

But in taking these large views, says Moody's Magazine, we have forgotten that Russia is two and a half times as large as all the United States put together with a population more than half as large again as our own; that in territorial extent it is more than twice as large as all Europe; that it stretches across the world for 170 degrees of longitude—nearly half way around the globe—and that it includes one-sixth of the land surface of the planet.

It is not surprising that in such a country railroads should have had a large development, that already there is a considerable mileage and that the prospects in this direction seem to have no limit. In the future Russia and the United States are likely to divide the railroad empire of the world between them.

FIRST SLEEPING CAR BUILT

The "Pioneer" Cost \$18,000, in 1864, and Was Regarded as Reckless Extravagance.

The first sleeping car was built in 1864. It was called the "Pioneer" and the builder further designated it by the letter "A," not dreaming that he would soon exhaust the letters of the alphabet. Outing says. The "Pioneer" was built in a Chicago & Alton shop and cost the almost fabulous sum of \$18,000. That was reckless extravagance in a year when the best of railroad coaches could be built at a cost not exceeding \$4,500.

But the "Pioneer" was blazing a new path in luxury. Without it was radiant in paint and varnish, in gay stripes and lettering; it was a giant compared with its fellows, for it was a foot wider and two feet and a half higher than any car ever built before. It had the hinged berths that are the distinctive feature of the American sleeping car of to-day, and the porter and the passengers no longer had to drag the bedding from closets at the far end of the car.

The "Pioneer" was not only wider and higher than other passenger cars, but it was also wider and higher than the clearances of station platforms and overhead bridges. But when the news came of the death of President Lincoln the fame of Pullman's "Pioneer" was already widespread and it was suggested that the new car should be the funeral coach of the president. This involved cutting wider clearances all the way from Washington by way of Philadelphia, New York and Albany to Springfield, Ill., and gangs of men worked night and day to make the needed changes.

Last Thought Was His Record.

Passengers on a train wrecked near Bristol, Ga., recently told of the bravery of Engineer Bush, who died as a result of his injuries. Bush was painfully working his way out of the wreck of his engine, scalded and frightfully bruised, when the few passengers who retained their senses dug iron to meet him. When the passengers offered him whiskey he begged them to look after the comfort of the other passengers. Told that no passengers had been injured, he said: "That's good. But before I take this whiskey I want you men to smell my breath and testify, if need be, that I had not been drinking when this happened. All a man has is his record." And Engineer Bush went out on his last run with his record spotless.

Revised Upward.

One evening at family prayers the head of the house read that chapter which concludes with, "And the wife saw that she reverence her husband." After the exercises had closed and the children had gone to bed, the New York Evening Post says, he quoted it, looking meaningfully at his wife.

"Let us see what the Revised Version says on that subject," said she. "I will follow the new teaching, if you please."

The Revised Version was produced, and her chagrin may be imagined as the head impressively read, "And let the wife see that she fear her husband."—Youth's Companion.

Balloon on Railroad Track.

A surprise meeting took place between a balloon and a train on the P. L. M. line near Chalons-sur-Saone, in France, which might have proved disastrous to the aeronauts. The train, which carried passengers, was approaching the station of Romaneche, and had luckily begun to slow down, when the balloon Anjou, which had started for Rueil with two Parisian aeronauts on board, landed on the track. The train was brought to a stop at once, and this gave the balloonists time to let their airship bound up again and land in a less dangerous spot.

Enormous Amount of Money Spent On American Railroads

Dwarfs Huge Sum World's Powers Pour Out on Armament

THE news traveled fast—from railroad board rooms to Wall street banks, and the floor of the stock exchange, and then across the ocean to the money markets of Europe. It ran on to rolling mills and blast furnaces on the Monongahela and the Allegheny, to car shops and locomotive works, to coal mines and coke ovens, to the iron ranges of Minnesota, and the forests of the Sierras.

There were lighted the fires of the idle blast furnaces, from the Alleghenies to Lake Michigan—beacon fires signaling the return of prosperity. The purse of the railroads, closed since the panic, had been opened again, and the country was glad.

No intricate compilations of dry statistics are needed to understand the big part the railroads play in the American industrial drama. Their wealth—in lands, roadways, buildings, equipment, and securities—is as great as that of all the wealth of the southern states, or the combined wealth of Belgium, Holland and Switzerland. One dollar in every eight of the wealth of this country is railroad property. The railroads' outlay next year for labor and materials and the payment of taxes, interest and dividends will be a sum as great as all the money in the country. The bills for labor and materials alone will far exceed all the money raised by taxation—national, state, county and town.

Europe is groaning under her terrific burden preparing for war. But the enormous cost of the armed peace of Europe is dwarfed by our railroad expenditures. What traveler thinks of the cost of the wooden ties? But, in the "fat" year before the panic, our railroads spent more on ties than England and Germany together spent in building fighting ships. Our steel rail bill next year will equal the combined naval budgets of Russia and France. The smoke trailing from the stacks of our locomotives will evidence the burning up of more wealth than all the naval powers—England, Germany, France, Russia, Japan and the United States—will spend on warships.

The German war lord's expenditures on an army that threatens the peace of Europe will be exceeded next year by the money our railroads will spend buying new freight cars and keeping the old ones in repair. Our locomotives will cost more than the British army. The military establishment of France will cost less than our track repairs. On bridges and culverts we will spend as much as will Italy on her army. All the money spent on the army of the czar would not pay for the steel the Steel corporation will make for the railroads. The huge outlay the railroads will make this coming year for new materials will equal the combined cost of the military and naval establishments of all Europe.

In the "fat year" before the panic one combination of eastern lines bought \$30,000,000 worth of cars and locomotives, \$12,000,000 worth of ties and rails, and spent \$30,000,000 in track improvements. They have spent \$300,000,000 in improvements in the past ten years—a sum greater than the entire capital stock of any single railroad in America, two only excepted.

In the west the big spenders for the past ten years have been the Harriman lines. "Mad Harriman" they called him because he spent \$30,000,000 improving properties that his predecessors had let go to ruin. Harriman gave more orders—big orders—to rail mills, bridge works, car shops, locomotive works and lumber mills than any other man who ever crossed the Mississippi to run railroads.

Here, then, are three American railroads whose expenditures for improvements in the past ten years foot up \$1,000,000,000. A billion dollars—how much is that? With that money you could build a railroad girdling the earth.

Railroad buying follows the tide of prosperity. Every great boom in this country has been marked by enormous railroad expenditures, and the great industrial and financial crises have been the aftermaths of these booms. The first big waves of prosperity were marked by the building of new railroads; the latter ones by railroad reconstruction.

The ebb and flow of prosperity in this country is like the tide in the Bay of Fundy—greater than anywhere else in the world. The country never runs along on even keel. The railroads, the arteries of commerce are highly sensitive to the ups and downs of trade, because they carry nearly everything the country produces, from producer to consumer. In boom times the production of the country rapidly increases, and the demand for transportation increases accordingly. Railroad gross earnings mount to record figures, and with them profits. To carry the growing tonnage big outlays must be made for new tracks, cars and locomotives, and for enlarging the capacity

GIANT INDUSTRY



The wealth of American railroads equals the total wealth of all the southern states, or Belgium, Holland and Switzerland combined. More money will be spent in 1910 in this country on cross-ties than England and Germany will spend on warships. More wealth in coal will be consumed in locomotives than the world's naval powers will spend on warships—England, France, Germany, Russia, Japan and the United States. The locomotives will cost more than the maintenance of the English army. The cars will cost more than the maintenance of the German army. New materials—mostly from the steel mills—will cost the railroads more than all Europe will spend on armies and navies. The railroads will take one-third the product of the steel mills. The coal bill nearly equals all the dividends. Car and locomotive repairs equal the bondholders' returns.

of the tracks and equipment already in use.

The greater part of the hundreds of millions of dollars spent in recent years has been devoted, not to new mileage, but to increasing the tonnage capacity of the lines built years ago. Hundred-pound rails, hundred-ton locomotives, and 50-ton cars have replaced 80-pound rails, 50-ton locomotives, and 25-ton cars. It is in the west that most of the mileage has been built.

This extension and improvement of the railroads in boom times are paid for partly from surplus profits and the rest from new capital. Heavy outlays are accelerated in boom times by the ease with which new capital may be raised in the world's money markets. The big profits make railroad investments attractive, and, as everything else in the country is making money and searching for a place to put it at work, new railroad securities find a ready sale. The railroad purse, therefore, in boom times, is doubly stuffed—by receipts from big earnings and new capital from investors. Money is spent lavishly.

But the tables are turned in periods of panic and depression. The country produces less, trade slackens, and the demand for the product the railroads have to sell—transportation—declines. "Car famines" are quickly followed by miles of "idle cars" on the sidings. Earnings fall away, surplus profits disappear. The railroads, having more transportation for sale than the market demands, have no need for big outlays to produce more transportation. They could not spend much money, anyway, because of their declining profits and the disappearance of the investment demand for their securities. So, as the railroad purse in boom times is doubly stuffed, in periods of depression it is doubly depleted—by the cutting down of profits and the withdrawal of new capital. Hence the rigid economy of "lean" years.

When economy is forced on the railroads, money is saved along the line of least resistance. Taxes must be

paid; the failure to meet interest charges means bankruptcy; the continuance of dividends at the regular rate is the salvation of credit.

The first saving is made by stopping improvement work out of surplus earnings; then the current expenditures for materials for the maintenance of way and equipment are cut down, and along with this economy goes the pruning of the cost of labor—the biggest item of railroad expense.

It is interesting to note, in attempting to realize the magnitude of these outlays, that the 500,000 owners of American railroad securities, from the Rockefeller and Morgans and Harrimans down to the little one-share investors, all received in dividends but a little more than was spent on coal to be fed to the locomotives; that all the bondholders, spread over Europe and America, received no more than was spent on the upkeep of rolling stock, and that the heavy taxes but slightly exceeded the cost of wooden ties.

"Steel is either prince or pauper," said Carnegie—and it's railroad buying that turns the wheel of fortune in the industry. The railroads are the foundation of the steel trade, for they buy more than a third of all the products that are made from the ore of American iron ranges. When the railroads stopped buying in the "silent panic" of 1903, the steel business dwindled to the pauper stage, and the shares of the new steel trust tumbled from \$55 to \$8.

Again, when the panic of 1907 closed the railroad purse, gloom spread over the Alleghenies, and steel shares collapsed a second time. Late last winter, when all up and down the Allegheny and Monongahela valleys blast furnaces were cold and dark, Pittsburgh was in the doldrums because the railroads didn't buy. Prices were slashed, and the gloom spread to Wall street. Steel shares sold at \$41. Weeks went by, and then the news came across the mountains, "The railroads are buying." Now there is hardly an idle blast furnace to be seen in the valleys,

Cars Alone Cost More Than the Huge German Army

One-Third of the Product of Our Steel Mills Used

for the big spenders—the railroads—are pouring in orders. And Pittsburgh is beginning to complain that the rebound is too sudden and the pace too swift.

Some conception of the relation between the railroad business and the steel industry is had by taking an inventory of some of the visible railroad property made from iron and steel—the rails and rolling stock, the renewal of which is the foundation of the steel industry. The rolling stock consists of 2,250,000 freight cars, 50,000 passenger cars and 85,000 locomotives. The locomotives are worth an average of \$12,000 each; the passenger cars, \$6,000; and the freight cars \$1,000—giving an aggregate value of rolling stock of more than \$3,000,000,000. The rails now laid—35,000,000 tons—cost about \$1,000,000,000, so that rails and rolling stock represent upward of \$4,000,000,000.

This four billions' worth of steel-made products wears out rapidly under our heavy American traffic. Age adds no luster to the materials of industry on this side of the water. Over in England, when a locomotive gets along in middle life, they begin to tie ribbons on her, like a pet cow, and proudly keep count of her mileage from year to year. This is nice for the locomotive, but hard on the steel mills and locomotive works. Over here, to-day's giant of the rails is tomorrow's candidate for the scrap heap.

To keep rails and equipment up to the American standard of use costs upward of \$400,000,000 a year, while additional equipment and new rail mileage is now costing around \$300,000,000 a year—that is, we have now reached the point of putting \$700,000,000 a year—as much as the whole cost of running the government—into rails, cars and locomotives. These are the big items of railroad steel consumption. Steel bridges, structural steel for other buildings and block signals and other structures, steel tools and machinery, and all the countless minor products of iron and steel used on the railroads add, perhaps, \$200,000,000 more.

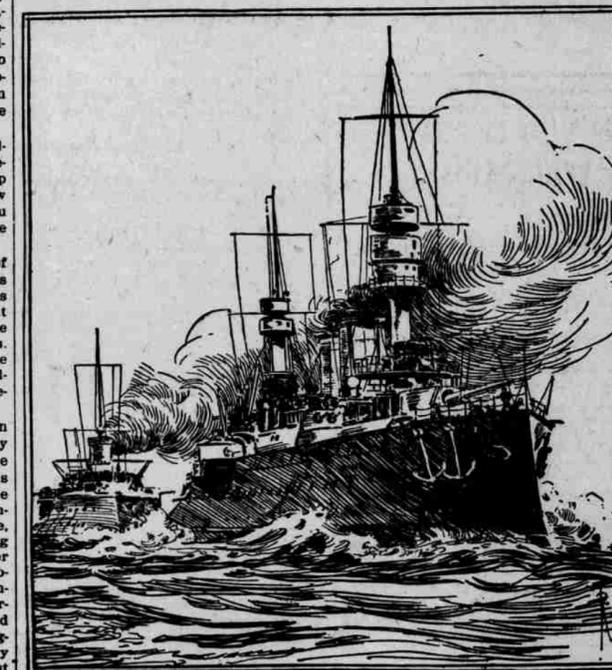
Here, then, we find the railroads now on a prosperity consumption basis of \$900,000,000 worth of steel products a year. Small wonder that the news, "The railroads are buying," vitalized the steel industry this summer and lifted the cloud of gloom from Pittsburgh. Steel is a prince again; six months ago it was a pauper—or thought it was.

What the closing of the railroad purse meant to the steel industry in the year following the panic of 1907 is strikingly shown in the slump in the output of rails and equipment. The rail mills in 1906 rolled 4,000,000 tons, sold for \$112,000,000; the car shops in 1907 turned out 280,000 cars, worth upward of \$300,000,000; the locomotive works output was 7,500 locomotives, bringing in something like \$90,000,000—all told, \$500,000,000. Last year the output fell away to 1,900,000 tons of rails, \$53,000,000; 76,000 cars, \$80,000,000, and 2,300 locomotives, \$27,000,000—in all, \$160,000,000, showing a loss in business to these three branches of the steel industry of \$340,000,000.

One need go no further than the reports of the big works to see the havoc that was wrought in the steel trade by the closing of the railroad purse. The Steel Corporation's sales were \$786,000,000 in 1907 and \$482,000,000 in 1908; a loss of \$284,000,000. The American Locomotive Company's gross fell from \$50,000,000 to \$19,000,000. One of the car works reported a decline in income from \$36,000,000 to \$8,000,000. The car builders were the worst sufferers, for the railroads always stop buying cars when traffic declines. In the dull times after the bank panic the idle cars on American railroad sidings would have made ten solid strings across the country.

Railroad buying to-day is enormous, but men like Hill of the Great Northern, and Brown of the New York Central, predict that the railroad purse is small compared with what it will be. Hill says that the railroads haven't grown as fast as the country, and that we ought to build them twice as fast as we are now. Five billions of new capital ought to be put into railroads in five years, he thinks. Brown believes that seven and a half billions in 15 years is a conservative estimate. But this is too low a figure. We are now on a half billion a year basis for new railroad capital. Four billions of new capital has been put into American railroads since the panic of '93, and half these years have been "lean" years.

One great industry that is just beginning to feel the stimulus of railroad buying, and that is likely soon to be revolutionized by an era of new construction, is the copper industry. Copper to-day is waiting for the railroads to open their purses in electrical reconstruction like that now in progress on the New York Central and the New Haven. Copper will boom as never before in its spectacular career when the news comes that "The railroads are buying."



More Money for Cross-ties in 1910 Than England and Germany Will Spend for Warships.