

This Engine Weighs 503,000 Pounds

Steel Mills Plan to Meet Demand of Railway and Public

At last, after months of agitation, following long years of appalling disasters, a safer rail is promised over which the heavy trains of modern commerce may thunder in comparative safety.

So amazingly frequent have become railroad wrecks in this country of recent years, and so enormous has been the death rate from this cause, that the United States has been regarded with amazement by other peoples of the world.

Each year the fateful figures—figures meaning death, disaster and immense financial loss—have mounted steadily higher.

During the first three months of the present year, according to recently published reports of the Interstate Commerce Commission, there were 3901 derailments and collisions. Passengers and employes killed numbered 381, and the injured, 4920. Of these accidents, many were caused by breaking rails.

So alarming became the danger from this source that last June a committee was appointed by the American Railway Association to make a demand for better rails of the United States Steel Corporation. E. H. Harriman headed the movement.

Conditions, he said, had reached a crucial

TRAGEDY IN STEEL!
This, indeed, has been the story of the fight for better rails, long resisted by powerful manufacturers, who, it has been declared, refused to listen to the demands of the railroad men or to heed public opinion.

Thousands of persons have been crushed to death in wrecks, and railroads have lost hundreds of thousands of dollars because a safer rail was not supplied to support the fast-flying and heavily laden trains.

E. H. Harriman took the initiative in bringing about better conditions. Other railroad magnates, the biggest of them, feared to antagonize the Steel Trust. They were given to understand that they had to take what was supplied them or do without rails.

Before 1902 any road in the country could have its rails made according to its specifications, and thus a standard rail was secured. But when the mammoth corporation was formed it prepared its own specifications. It was then in a position to dictate; the railroads were compelled to accept whatever was given them.

The railroads were absolutely dependent on the corporation. Of course, there were independent concerns, but these could not nearly meet the demand. The International Rail Association began allotting the output and fixing the prices. At present, so railroad officials charge, the corporation is selling rails in Japan at \$18 a ton, and these, it is said, are better than those sold in this country at \$28.

Rails sold in the United States, railroad people declare, were made of inferior ore; in order to increase the output, they said, the rails were finished at too high a temperature, and further, that thousands of tons of "piped" rails were unloaded on the roads of this country.

Naturally there followed wrecks, and thousands of human beings were sacrificed. Perhaps no one will ever compute the number who have been killed because of defective rails.

HARRIMAN FOUGHT THE TRUST

In the year previous to the formation of the Steel Corporation only twenty-nine rails rolled the year before were taken from the railroad tracks in New York state as worthless. During three months of the present year, according to a report of the New York State Railroad Commission, 826 rails rolled in 1906 were taken from the tracks as worthless—336 dire menaces to life and property.

Mr. Harriman, taking the initiative last spring, gave an order for 100,000 tons of rails to an independent concern. These rails were made by specifications of the railroad company.

Then, with the mastery of will and purpose which has enabled him to become one of the greatest railroad magnates in the country, Mr. Harriman marshaled the forces of the railroad people in their battle with the trust. Their object, a safe steel rail.

The American Railway Association is composed of high executive officers of all the great railroad systems. Its members represent 220,000 miles of road. The committee appointed to deliver an ultimatum to the steel corporation was composed of the following:

- G. L. Peck, general manager of the Pennsylvania lines
- W. J. Edwards, chief engineer, maintenance of way, Pennsylvania Railroad
- J. Kruttschnitt, vice president Southern Pacific Railway
- J. Wilson, vice president of the New York Central and Hudson River Railroad
- R. Mott, consulting engineer, Louisville and Nashville Railroad
- C. Carter, chief engineer, Chicago and Northwestern Railroad
- William Garstang, superintendent motive power, Cleveland, Cincinnati, Chicago and St. Louis Railway
- R. L. Ellinger, consulting mechanical engineer, Southern Railway
- W. E. Fowler, master car builder, Canadian Pacific Railway

At a meeting of the association, Mr. Peck asked all the members who were satisfied with the steel rails then furnished by the corporation to raise their hands.

Not a hand was raised. In sending his order for rails to the independent company, Mr. Harriman declared:

"The lives of the passengers of the Southern Pacific are more valuable than the necessity for dividends on steel stocks."

So the Steel Trust capitulated. Now, it is stated, a better quality of rail is to be furnished.

According to experts, numerous causes contribute to defective rails. It is explained, among other things, that the Bessemer range ore used in the Bessemer process has a large percentage of phosphorus than other ores. This, it is said, makes it difficult to secure the percentage of phosphorus needed.

Another cause is the phosphorus and other impurities in the iron ore. In Russia, the phosphorus is removed in Russia on the molten ingot. To supply good steel,

point. Within one month, February, 449 rails broke on his lines, and of this number, 179 had been in service less than six months.

Mr. Harriman transferred an order for rails to an independent concern; the Pennsylvania Railroad threatened to make its own rails; demands were made on the corporation in all parts of the country.

As a result of this general uprising, the steel corporation has decided to make a better rail. Arrangements have been made by the Carnegie Steel Company for the manufacture of a new Bessemer rail, which, the officials declare will prove superior even to the new open-hearth rail which was demanded.

the commission contended, at least 30 per cent. of the ingot should be trimmed away, in order to get of this imperfect exterior. Instead, to save steel, it is charged, only 8 per cent. has been cut off.

In the effort to get out a big output it was said that the rails were finished at too high a temperature and did not receive sufficient "work" or manipulation, in the rolls to work out impurities. As a result, "pipes," or cracks, resulted on the inside of the rails.

When the imperfect rail was laid on a track, it would soon split open or separate under pressure of a heavy train.

Explaining the defects of steel rails, an expert recently said:

"A 'pipe' is a long crack in the center of the steel rail—most often it is not visible on the polished surface. The 'pipe' has caused more wrecks than any other defect in the rail. There is no excuse for such a defect to exist.

"When pig iron is converted into steel through the Bessemer converter, the molten metal, changed from iron to steel by a chemical process, is poured into moulds and formed into ingots.

"In cooling this mass, the steel sinks or convales in the middle, just as lard settles in the center when it cools in a pan. Toward the center of the settled metal

flow all the impurities in the steel ingot. The sinkage may range from six to eighteen inches below the surrounding surface.

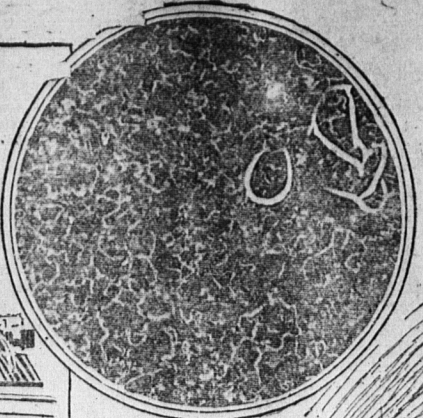
"The proper thing would be to cut off the ingot below the sinkage. Instead, the ingot is rolled into a 'bloom' and the impurities are distributed through the steel.

"Thus, when it is finally rolled into a rail there is a fine crack in the center, just where the two opposite sides of the 'pipe' come together.

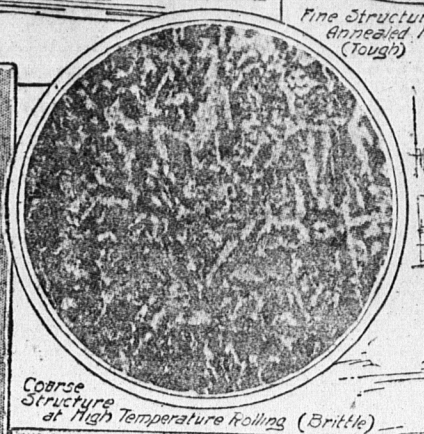
"When the demand of the American Railway Association was made, Mr. Schwab in an interview declared: 'The final solution will not be found in the open-hearth rail, although its general use will help some. The railroads are too important a part of the country's wealth and human life to be precious for either railroads or people to be content with anything short of the best, and the best is found in nickel steel, or some other alloyed steel, which can only be made at a cost largely in excess of the price now paid for steel rails.

"Some rails of this kind have been used by the Pennsylvania, and while results were not entirely satisfactory, they showed, I think, that this kind of rail will surpass all others.

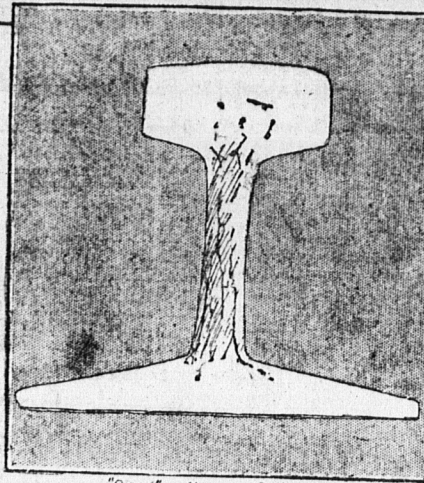
"Rails of this kind were made by the steel corporation



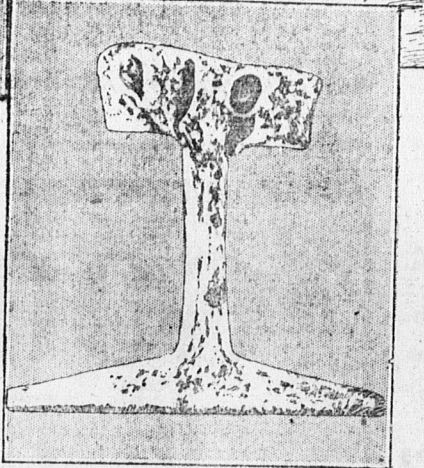
Fine Structure of Annealed Rail (Tough)



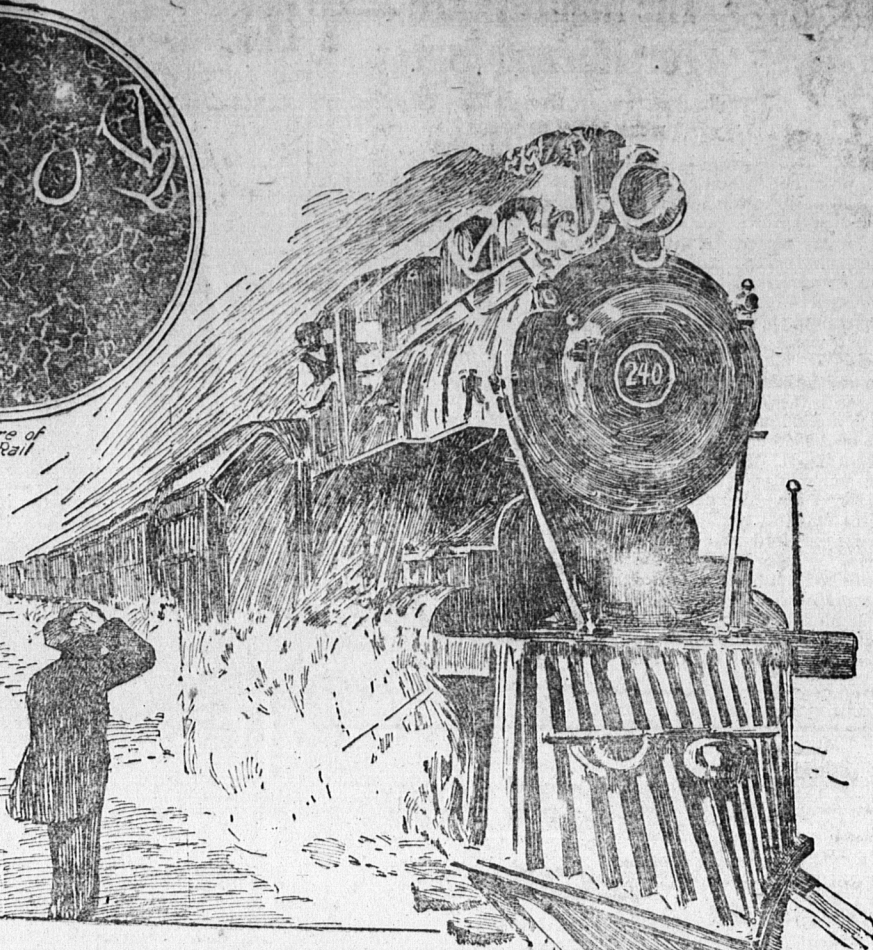
Coarse Structure of High Temperature Rolling (Brittle)



"Piped" or Unsound Rail



Unsound 30-Pound Steel Rail after 3 months Service



When Terrible Strain is Exerted on the Rail

load comes along, and the rail, like the ice, breaks." Many experts contend that the solution of the evil lies in adopting the open-hearth process of making rails. Because of the high proportion of phosphorus in the principal ores, it is said the hardness of the rail cannot be increased to as to meet the requirements of modern heavy traffic.

Each year sees the weight of traffic increasing. Besides this, the railroads are increasing the size of their engines.

Several years ago, when an engine was built by the Baldwin Locomotive Works, of Philadelphia, for the Atchafalaya, Topeka and Santa Fe Railroad, which, with the tender, weighed 400,000 pounds, it was considered the limit. One was recently built for the Pennsylvania Railroad by the American Locomotive Company which weighed, without the tender, 255,000 pounds.

MONSTERS OF RECORD SIZE

Last year five engines were made at the Baldwin Works for the Great Northern Railway which had a combined weight of 1350 tons. One of the engines weighed 660,000 pounds. Another, recently completed at Schenectady for the Erie, weighs 575,000 pounds, and is capable of hauling on the level 20 loaded freight cars.

When one considers the enormous weight of an engine of this size, followed by a heavy train, he begins to realize what strength and durability must be maintained in the rails.

It is still a problem, and although many of the manufacturers have taken measures to make better rails, Charles M. Schwab has declared that the breaking of rails will not be remedied until nickel rails, or rails of steel alloyed with nickel, are adopted. These, he says, will cost three times as much as the Bessemer rail.

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"Rails of this kind were made by the steel corporation

TRIFLES LIGHT AS AIR RESULT IN CATASTROPHES.

EVERY ONE who has gone to school knows how little drops of water and grains of sand make the big ocean and old terra firma; but how many have observed the many big results of little things which are not only unexpected, but decidedly unwelcome?

An innocent enough sport is shooting at a target with a little rifle at the outskirts of town, but it becomes serious when a bullet goes astray, hits a car of dynamite and blows up the town.

A collection of incidents for a comparatively brief period showing serious effects from wee causes is astounding.

THAT dynamite explosion at Jellico, Tenn., was a capital illustration of the well-known saying that mighty things from small beginnings rise. Three men were shooting at a mark. One little 22-caliber bullet took a notion to sweep over the target and career across the treetops toward the railroad. There stood a trainload of dynamite. That wee leaden missile penetrated one of the cars—

Boom!

When Jellico recovered its senses it found that twelve persons had been killed in the explosion, fifty had been injured, 500 had been rendered homeless and a property loss of \$1,000,000 had been inflicted.

The Governor sent militia from Knoxville to guard the ruins of the Union Depot and the wrecks of half the houses in the town.

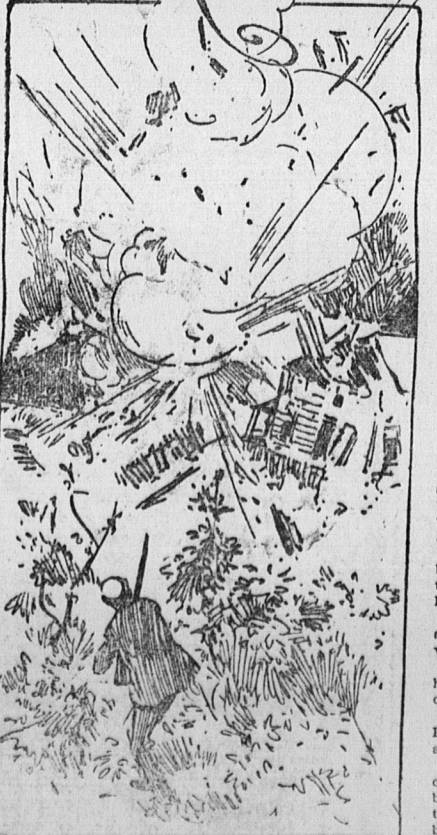
For hours Jellico—what was left of it—was cut off from the world because the telegraph wires had been destroyed. And all on account of an innocent shot at a target.

Not so serious but in some respects similar, was that explosion which followed the eating of three sticks of dynamite by James Tatman's calf near Topeka, Kan. The trouble, you see, came out of the calf's chewing a dynamite stick with the meal.

Of course, the calf wasn't such a great loss, but then fragments of it knocked Tatman into a well and hurt him internally.

A small thing seemed the slipping of a pipe into the same pocket where a dynamite stick had been carried on a city street. The pipe was not a pipe, but a tin can. As the tin can was slipping into the pocket, it struck the dynamite stick, and the result was a small explosion which blew the tin can into the air.

Another incident of the same kind occurred in a city street. A small child was playing with a tin can and a dynamite stick. The child slipped the tin can into the pocket where the dynamite stick was carried. The result was a small explosion which blew the tin can into the air.



When a small thing strikes a dynamite stick, the result is a big explosion.

interior bulkhead of one of the water ballast compartments had given way under pressure of the intake of water, which it was too weak to withstand. The unrelieved pressure was caused by a pebble, which completely closed the intake valve.

A nest of fleas closed the Second District school at Milwaukee, and birds' nests on telegraph poles near New York so troubled the big New York Central Company that it sent out a squad of men to destroy them. That was after a bird's nest had caused the death of Mark de Lucia, who had climbed a pole to get it.

A sick girl's bug caused the death of Dr. W. Ten Eyck Elmhurst, of New York. She was his patient, and the blood poison from which she was dying was communicated to the doctor through a slight scratch of her finger nails.

An innocent custard pie marred the beauty of Miss Josephine Bayley, of Hagerstown, Md. She was sitting at the table, when she became faint and her face dropped into the pie, which had just been taken, piping hot, from the oven.

Such a trifling thing as forgetting a wedding ring caused James Van Cleef a trip all the way back to Holland from New York.

He is one of the great merchants of Amsterdam. When he landed in New York he discovered his loss, sent his wife on to St. Louis, telling her that he would remain in Amsterdam only long enough to get the ring, then caught a ship just starting back from New York to the Old World.

Just to have her little joke—only it turned into a big joke—a strong girl at Mahanoy City, Pa., gave Anthony Pocus one good, long, hard hug. The hug broke his neck.

Catching hold of a cow's tail in fun was most disastrous to Charles Yoder, of Lewistown, Pa., for he was thrown against a rock and paralyzed.

A prick of a porcupine quill, received during a hunting trip, caused the death of William McKelvey, of Bloomsburg, Pa.

Searching for a penny with a lighted candle, Mollie Horwitz, a Philadelphia child, set fire to her clothes and was burned to death.

A sneeze is not a serious thing under ordinary circumstances. But when Patrick Healey sneezed in a boat off the coast of Madison, N. J., it was serious, for the boat was upset, and both the sneezer and his brother, Andrew Healey, were drowned.

But here's the oddest of all. Mills Dupree, a trapeze performer, showing at Johnstown, Pa., was doing an act suspended by a strap, which a strong man held in his teeth while hanging from a bar.

Suddenly several of the man's front teeth came out, the woman dropped and received fatal injuries. Look out for the little things.

tion while I was with it that are still giving good service on the Pennsylvania. They were not made under the best conditions, and the mills were not equipped for their production. Such rails will, I think, soon be called for by the railroads, and the steel mills will change their plants to furnish them.

"Getting the best is merely the matter of paying for it, and it will presently be recognized that the railroads can afford to have none but the best. Breakage can never be made impossible, but it can be reduced to the minimum, and that is what the railroads and people will agree must be done."

At the meeting of the American Society for Testing Materials, held in Atlantic City last June, the latest findings of scientists and experts on the steel-rail problem were discussed.

Before the meeting, William R. Webster, consulting engineer, sustained Mr. Schwab's statement by declaring that the manufacture of open-hearth rails cannot be relied upon to overcome all difficulties.

He said that most of the basic open-hearth steel manufactured in the country is much lower in carbon than required in the steel rail. What is wanted, he declared, is a steel nearly as uniform in carbon and other chemicals as possible.

The rail which will be turned out by the United States Steel Corporation, according to the official, will be better than the open-hearth rail. It is said to be an advancement over a rail invented by the late A. J. Cassatt.

It is proposed to have an ingot with twice the present cross-section and to eliminate the present rapid-cooling process. Arrangements were recently completed for the manufacture of these rails by the Edgar Thomson Steel Works, of Pittsburgh. They will be made for the Carnegie Steel Company, the rail producer of the United States Steel Corporation.

In the new rail, it is said, the defects have been overcome, and better material will be used.

In the meantime, however, scientists whose interest has been aroused have by no means given up their experiments in the production of a perfect rail. Tests are being made continually by experts in the employ of the big corporation.

"I do not hesitate to say," declared Judge E. H. Gary, of the United States Steel Corporation, "that we will make the best rail we can, and whenever practicable we will improve the quality of the rails."

While the railroad people united in a demand for better rails, perhaps there will be a decrease in the awful number of catastrophes which, for the last few years, have made railroad history a history of blood and death.

It is hoped to learn if the corporations have heard the people's voice at last.

A Stratagem That Failed

ATTENDANCE at church service is obligatory upon the part of soldiers at certain English posts, and amusing stories are told of the excuses the soldiers sometimes resorted to in order to escape this requirement.

At one post, where a number of recruits were temporarily stationed, an old sergeant was ordered to ascertain to what religious sect each man belonged, and to see that he joined the party told off for that particular form of worship.

Some of the men had no liking for church, and declared themselves to be atheists. But the sergeant was a Scotsman, and a man of experience.

"Ah, wool," said he, "then ye has no need to kape holy the Sabbath, and the stables has na been cleaned out lately." And he ordered them to clean out the stables. This occupied practically the whole day, and the men lost their usual Sunday afternoon's leave.

Next Sunday a broad smile crept over the face of the sergeant, when he heard that the atheists had joined the Church of England.

The Cigar Bismarck Enjoyed

CHARACTERISTIC anecdotes of Bismarck are still cropping out. And none shows the "Iron Chancellor" in a more lovable light than the following:

"The value of a good cigar," said Bismarck to a friend, as he proceeded to light an excellent Havana, "is best understood when it is the last you possess and there is no chance of getting another. At Konigsgratz I had only one cigar left in my pocket, which I carefully guarded during the whole of the battle as a miser does his treasure. I did not feel justified in using it. I painted in glowing colors in my mind the happy hour when I should enjoy it after the victory. But I had miscalculated my chances. A poor dragoon lay helpless with arms crushed, murmuring for something to refresh him. I felt in my pockets and found I had only gold, and that would be of no use to him. But stay—I had still my treasured cigar! I lighted this for him, and placed it between his teeth. You should have seen the poor fellow's grateful smile! I never enjoyed a cigar so much as that one which I did not smoke."