

How a Great Railway System Has Been Built Up in a Few Years

By Frank H. Spearman

From The Outlook



AMONG all the stories in American railroading—and it has teemed with the marvelous—few chapters are so extraordinary as the building up of the Union Pacific railroad system by Edward H. Harriman. The boldness of the conception, the magnitude of the undertaking, and the constructive genius shown in the working out of the plans are all unusual features even in a day of undertakings that make for us every year new records in industrial history. But a little more than ten years ago the Union Pacific was a Cinderella among our railways, sitting forlorn and in ashes, and all unconscious of the presence of one ready to fit the slipper of efficiency to its foot and lead it to the highest place in American railroading.

Mr. Harriman's success has been so phenomenal that not every one has been willing to give him undivided credit for it. We have been reminded—and with a measure of truth—that in providing an unparalleled prosperity for his entire railway territory an overruling Providence has done a great deal for him. But it is not to be forgotten that the opportunity of acquiring the Union Pacific railroad twelve years ago, and for a comparatively few millions of dollars, knocked at many doors before it reached the door of Mr. Harriman. The golden chance was within the grasp of Jay Gould; he never realized it. It lay very obviously before what railway men then called the Boston party—Mr. Charles Francis Adams and his associates. It waited at the door of the Burlington people. It might easily have been seized by Mr. Hill—and the railway map of the United States changed for generations. But it was left for Mr. Harriman to grasp. He had faith in the mysterious, hopeless-looking, wonder-working western empire that lies wrapped in its unending dream of sunshine beyond the Missouri river; he had the keenness of vision to map out within it a traffic confederation of unequalled strength, the iron determination to supply it with railways the best of their class in the world, and the tremendous personality necessary to persuade careful men to risk unheard-of sums of money to make good his plans. Any estimate of Mr. Harriman and his railway work that includes less than this is manifestly incomplete; the results are at hand and the facts may be reckoned with.

The Union Pacific railroad—and the same may be said of the Southern Pacific today—is the poor physically of the standard railway lines of the east. Such a statement would be unwarranted if offered with a sanction less than that of the head of operation—the senior vice president—of the New York Central lines themselves. And this standard of efficiency, I take it, remains, in the face of many remarkable achievements, the chiefest title to Mr. Harriman's strength as a railway man.

Building Up the Property

He found in the Union Pacific a completely broken-down property. Our country was emerging from the industrial paralysis following the panic of 1893. There was absolutely but one thing he could do to insure the command that is his today in the American railway world, and to do it required the courage that all of us who are not Harrimans lack. That was, not to wait for things to happen, not to look for a buyer for his property, but to do something that none of our railway speculators had ever done before him; namely, to borrow huge sums of money and build up his property physically; to cut down granite grades, fill mountain valleys, provide the heaviest rails, the best engines—in a word, to buy for his new line, even at enormous cost, high efficiency. Efficiency has been the key-note of his railway policy. He, himself, has repeatedly said this, and it cannot be gainsaid. It is this that has stamped Mr. Harriman as a man to be reckoned with in any of his undertakings—not the mere buying of the railway junk, but the tremendous wager he laid on the future of his railway territory.

His buying of the Union Pacific road itself was followed so rapidly by his acquisition of his branch lines and the far more momentous purchase of the Huntington interest in the Southern Pacific as to seem at this distance almost one operation. But the rapid moves of those days were very serious moves for Mr. Harriman, and could hardly have been accomplished without the anxieties of an ordinary lifetime. Lacking the Southern Pacific, the Union Pacific never had been and never could be a great railway. Ogdon, Utah, never had been and never could be a terminal, except in the sense that the Union Pacific ended there. Successful railways consist of two essentials—feeders and terminals. Something may be done without feeders, but nothing is possible without terminals; and in acquiring the Southern Pacific Mr. Harriman did what the railway logic of the situation indicated absolutely. In the Union Pacific he had really got hold only of the tail of the transcontinental trail dog; in the Southern Pacific he got the traffic dog itself.

Unifying the Management

When he faced the final burden of his united properties he had 18,000 miles of railway to handle. Everything had to be done in the direction of unifying the management. In running a railway there are, apart from the treasurer's functions, two divisions of work. One is the traffic end of the business; the other the maintaining and operating end. The operating man provides the transportation facilities and the traffic man sells them. In moving to organize these departments Mr. Harriman showed a second trait found only in able executives—that of surrounding himself with strong men. From the Southern Pacific he took J. C. Stubbs, the logical man for the position, and placed him at the head of his 18,000 miles as director of traffic. It is perhaps worth while to note in passing that in choosing his railway chiefs Mr. Harriman was not in the least disturbed by the public clamor of that day for young men to fill high executive offices. He chose in the end thoroughly tested and seasoned officers who had learned their business on his newly acquired lines from the ground up—who had years to show for their experience and had very definitely made good. Mr. Stubbs, coming from San Francisco, where he had been connected with the Southern Pacific almost from the day the Ogden line was completed, and as vice president, in sole charge of its traffic affairs for many years, took the reins for Mr. Harriman at Chicago, and with them a high place among those American traffic directors who hold a vital industrial responsibility in stimulating the growth of our country.

The satisfactory unifying of his traffic affairs in so extended a territory led Mr. Harriman a step further in railway management. With his lines made ready at so great cost for higher effective results he now hazarded a very great success or failure in an attempt to unify the operating of his huge system—for it must be remembered that no railway organization in the country had ever before combined, under one operating management, 18,000 miles of track. Railway men, and able ones, looked with misgivings on the experiment. Many openly predicted the failure of a method that placed the man in operating authority 1,500 to 2,000 miles from the execution of his order. When Mr. Harriman brought Julius Kruttschnitt, also a vice president of the Southern Pacific, from San Francisco to Chicago, and endowed him, as director of maintenance and operation of the Harriman lines, with plenary operating authority, it was not alone outside observers that were guessing at the outcome; no more interested guesser on that point could be found than Mr. Kruttschnitt himself. And, in a position in the railway world that afforded nowhere any precedent, it was put up pretty seriously to him to make good.

The Problems Considered

The problems that confronted him were, in part, wholly new. On the other hand, wasteful conditions due to operating the various

systems separately could be done away with at once and substantial economies secured. It was not that these lines were operated in a less careful way than other lines, but that they were operated in the conventional way, and, applied to the long mileage and sparse-traffic routes of the west, these methods entailed serious waste.

Roads may make money even under these disadvantages provided natural conditions favor them—and natural conditions certainly do favor the Harriman lines. They serve a traffic territory exceptionally rich in natural resources; far less developed than the territory of the Pennsylvania, yet enormously rich. The problem in the case of the Harriman lines, as it is in the affairs of every railway, was to minimize the cost of handling its traffic; and each railway finds its success in different particulars. In this instance it was only by bringing the operating of the separate lines under a central authority that the best results could be secured. For example, the Union Pacific was returning empty Southern Pacific freight cars to the Southern Pacific, while at the same time the Southern Pacific was returning empty Union Pacific cars to the Union Pacific. This presented the operating spectacle of each of these roads hauling trainloads of empty cars across the Rocky and Sierra Nevada mountains in both directions at the same time; the very layman will perceive the hopeless waste. The policy of pooling the car equipment of all the Harriman lines was adopted, and it was enacted that a Union Pacific freight car should be as much at home on a Southern Pacific siding as a Southern Pacific freight car, and vice versa. This stopped the hauling of empties both ways at once; the figures for empty-car mileage on the Harriman lines—always the nightmare of operating railway officers—dropped with a tumbler. It followed, in working out the policy, that a Union Pacific car disabled in Portland, Ore., or in Tucson, Ariz., should no longer be hauled 2,000 miles empty to Omaha to be repaired, but should be repaired by the Oregon Railway and Navigation company or the Southern Pacific, respectively, at Portland or at Tucson. The expense of these repairs was then distributed equitably between the various systems in proportion to the totals of their car equipment; and the saving to all of them by this simple co-operation may be imagined. Only when a freight car is to be rebuilt is that car taken in hand by its own line and rebuilt at its proper cost.

Simplifying Control

The separate properties had been operated by six general managers, each of whom had been managing his own line, naturally to make the best showing for it, regardless of the troubles of his neighbors. Each was bent on getting hold of all the equipment he could and keeping all he could get, heedless of his fellow managers. It can be seen how public interests may suffer under these conditions. The movement of freight traffic may be delayed or even blocked. But without a central responsibility each road in difficulties may easily point to the other as the delinquent and the fixing of the blame be lost in recrimination.

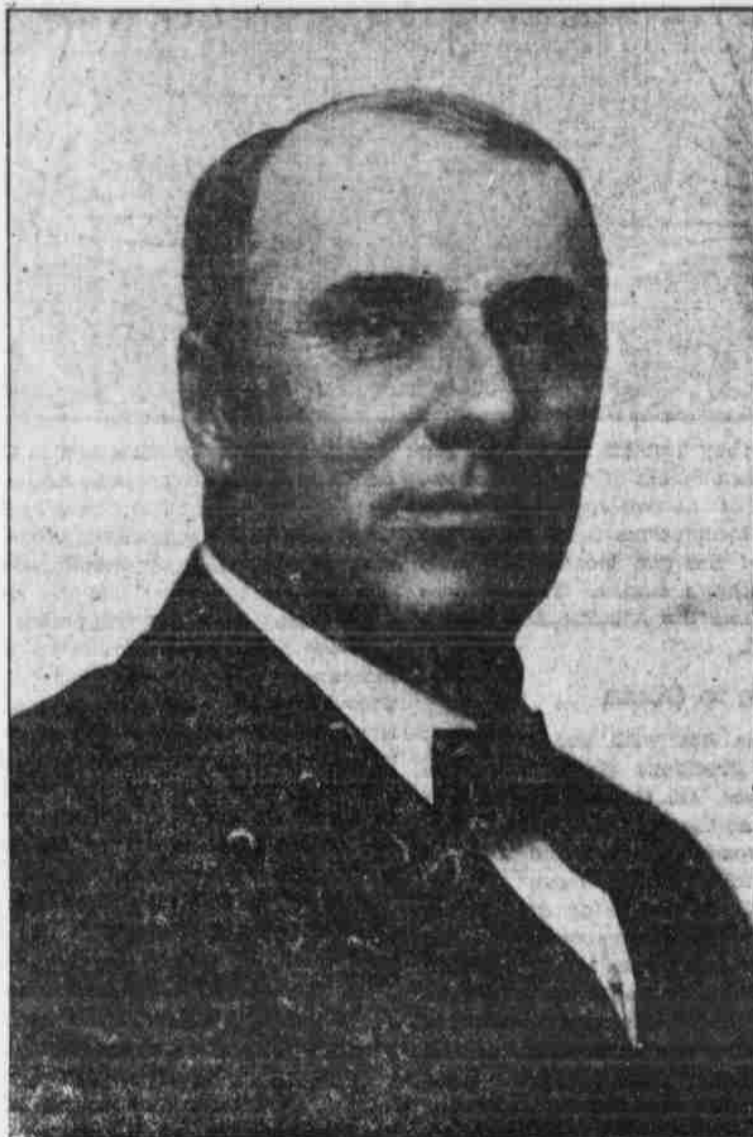
All of this was checked and the beauties of brethren dwelling together in harmony were insinuated and, if necessary, expounded by the director of operation. It is not to be understood that he courts opportunities to exercise his authority. He desires never to interfere, except in the event of absolute necessity, with the autonomy of the different operating systems as they exist; but every manager must regard the traffic predicaments of his fellow. No manager willingly surrenders car equipment that he needs himself. But the needs of one portion of a large system may be more compelling than those of any other. This is a question for a central authority to decide, and when all sides of the emergency have been considered he must assume the responsibility and issue his orders. If they are that one manager shall deliver to another fifty empty cars daily for thirty days the cars must be delivered. The order is peremptory and admits of no discussion. Before it has been issued every means have been considered to solve the vexing dilemma that calls for 1,000 cars when there are in all only 500 to go around. But the justification of a final order from the director's office is expressed only in the words, "For the good of the service."

To a lesser degree the locomotive equipment has been pooled. Engines naturally stay at home; but if emergency in traffic movement requires the shifting of motive power it is unhesitatingly shifted.

Bad Conditions Remedied

These are instances of the remedying of bad conditions. But to merge six operating machines into one six times as big, and into such efficiency that it shall run more smoothly than any one of the original six, is a gigantic task. These six lines were found divided, under standard railway practice, into twenty-six divisions varying in length from 200 to 600 miles. Every such railway division has its superintendent, who for all practical purposes should be its general manager. His division is a miniature, but complete, railway. He has under him his motive power man, his engineer to maintain track, his dispatchers to move his trains. Over his division he has entire charge. He is the man to whose office the public applies for cars, and he meets the public as the visible railway head. The division has been taken as the unit in operating the consolidated lines and they begin with twenty-six units. Following railway practice, these unit superintendents have been left grouped under their own general managers as the operating director found them. Each of these general managers has in his turn his master of motive power, his track and bridge engineers and his general superintendent to look after his general transportation. Preserving the identity of each of these twenty-six units as completely as possible, the theory that the director of operation has laid down for himself is that his position is analytical, suggestive, advisory and mandatory.

One chief result that the public looks for in railway operating



A. L. MOHLER, Vice President and General Manager.

efficiency is fast time in transportation. Let us suppose that it is deemed necessary to reduce a train schedule between San Francisco and Omaha from one hundred to eighty hours. The division units are looked over and each general manager concerned is asked to submit figures for the run over his part of the system. The general managers call for figures from their various superintendents, turn them in to Chicago, and when the totals are compiled it is found that if each man is given the time he asks for the revised schedule will look more like 110 hours than eighty. The estimates are sent back for revision. Each man holds fast to all he dare, but a second effort reduces the total, to let us say, ninety hours. Back go the figures, and they come in the third time at eighty-five hours. At this point no one will willingly concede more, and the hoped for schedule is still five hours away. Here the director of operation steps in. He must know thoroughly his divisions and what each is capable of doing. He makes a final revision of the figures, and this time when they leave his hands the knot is cut—the total is eighty hours, and the matter, having been carefully considered and discussed during the preliminary steps, is no longer one for argument; the divisions that have been called upon to take the additional strain must take it.

The matter, then, is one of assembling responsibilities, widely spread, into the hands of a chief executive. The matter of operating rules alone has given rise to many difficulties in standardizing the operation of the Harriman lines. American railways are operated under what are known as standard rules, and the operating rules of a railway are its book of statutes. But decided variations were found among the Harriman books of statutes. One of the early and most imperative things done by the general managers were to standardize these statutes.

It must be said that Mr. Harriman has spent money like water to make his roads safe; he has never winced at huge estimates in that direction. And the rapidly with which he has passed on the enormous sums required for betterments has often taken away the breath of his associates. It costs \$1,000 a mile to block signal a railway. More than \$5,000,000 have gone into that work alone on the Southern and Union Pacific. It is now possible to travel from Chicago to Portland or to Los Angeles, and from there far out into the Colorado desert entirely under block signals. Block signals do not greatly expedite train movement; they make train movement safer. The \$5,000,000 spent on them is only an item in the expenditures for betterment, additions and reconstruction on these two railways since Mr. Harriman took control of them. The aggregate for these purposes has reached in ten years \$118,000,000.

Shifting Industrial Center

There are published at intervals of some years interesting maps marking the shifting of our national center of population. The movement is slowly but unflinching in one direction—westwardly. In a similar manner a second great national center is shifting unmistakably toward the west—the center of our manufacturing industries.

Twenty years ago the Union Pacific railroad carried boots and shoes to the Pacific coast from New England; it carries them now from Cincinnati and St. Louis. It brought stoves from Troy, N. Y., and Reading, Pa.; it brings them now from St. Louis. Within three years—an industrial yesterday—a town to be devoted wholly to the manufacture of steel has risen south of Chicago on the sand dunes of Lake Michigan. Built by the largest of our steel manufacturing corporations, it is named after their ablest man, Judge Gary. It is to represent, when completed, an investment approaching \$100,000,000, and is to be the most extensive plant devoted to the manufacture of steel in the world. The iron ore will be brought in boats from the head of Lake Superior, the coal will be shipped in the coke made and the gas saved for fuel. But what is of especial significance in this connection is that this new-made Indiana town is destined before many years to shift the center of the greatest of our manufacturing industries and to wrest from Pittsburgh itself its long-time pre-eminence in steel. It is not alone several of these industries, but many of them, that are working from the east to the west of the Alleghenies and toward the Mississippi valley. Nor is it that there will ever be lacking a heavy volume of traffic moving from tide-water on the Atlantic seaboard, but that its significance will not seriously be felt by transcontinental railways. The west is always too far in the way of doing its own manufacturing.

It is not, however, the through continental routes of the Harriman lines, strong as they are, that constitute the essential strength of the system. Look at their map and study the network of their branchings throughout California. It is these stubs and spurs, these elementary spinal-processes of traffic, that are the real backbone of the Harriman lines.

Characteristics of Harriman

The recent movement of the lines toward Seattle and the Puget Sound country has been merely the doing what should have been done twenty years ago, the carrying out of Union Pacific plans that failed at that time because the road had no Harriman to put them through. The Union Pacific should have been in Seattle then, and goes there now because the traffic interests at that point justify an entrance. On the other hand, in central Oregon the Harriman lines are pursuing quite another policy, building branches where the traffic is still to be developed; for it is the railway, not the newspaper, nor the six-mule team, nor the schoolmaster, that is the real western pioneer. The railway comes before the factory, brings with it the plow, opens the mine and sounds the tragic knell of the receding forest.

Mr. Harriman is today the most discussed man in American railway affairs. No man in the railway field has been more bitterly assailed, and concerning none has it been more difficult to give to a

reflecting reader an intelligent estimate. He is so new even today as a great power in American railroading that it is too soon to offer anything like a final word. He has been described as a man cold and suspicious. But Mr. Harriman's early training was that of a stock broker, and in such a calling the very first requisite of success is secretiveness. Mr. Harriman has mastered secretiveness, and in Wall street has reaped its benefits. He knows his Wall street thoroughly—indeed, it is not too much to say, better than Wall street knows itself. But in the execution of great strategic plans in wider fields secretiveness may cease to be an advantage; it may become a positive disadvantage. Had Mr. Harriman's financial associates had at times his complete confidence his success in putting his plans through would have been correspondingly greater. In this respect he has in some degree suffered.

Mr. Harriman as a financier is widely known. It is hardly realized that he has so long been a practical railway man. In 1890 Mr. Harriman was living in Chicago as vice president in charge of operation of the Illinois Central. As far back as 1884 he was a director, the controlling spirit in the road's policy. He thought at one time of taking the superintendency of the Northern division in order to strengthen his knowledge of actual railroading. His earliest railway venture was the buying of a little eastern road which he knew would be wanted some time by the Pennsylvania. And it is worth noting that his first move in that instance after becoming, with his friends, the owner, was to borrow money enough to make the road a good road before he sought a buyer.

It is not a matter for surprise that under a brusque manner one will find in Mr. Harriman an inviolable regard for his word. Mr. Harriman's word is good. If one gets his promise it is a promise that may safely be slept on. With a home life that is described as ideal, he is not without thought for the army of men in his railway work, and he has in consequence a devoted following in them. One of his employees chancing to mention to him a rather serious operation that was to be performed on a member of his family, Mr. Harriman showed the liveliest solicitude, and asked to be informed as to the patient's condition and progress after undergoing it. Several days intervened before the operation was performed and the matter of informing Mr. Harriman was overlooked. But he had not forgotten. He sent telegram after telegram from his Oregon camp asking for details and conveying sympathy.

Undertakings On a Large Scale

His undertakings in whatever direction are on a large scale. Between Omaha and San Francisco two large bodies of water—and but two—interposed obstacles to his straightaway railroading—the Great Salt Lake and the bay of San Francisco. He is now (1909) across both with his locomotives. The traveler is familiar with his thirty-four miles of track over Salt Lake. It is a cut-off that does away, in the track curves of the old line around the lake, with eleven complete circles. His engineers have worried the government for permission to bridge the San Francisco bay waters, and his freight trains are ready to run over Dumbarton Point bridge from Oakland into San Francisco. To cross Salt Lake he drove 635 lineal miles of piles—some of them 110 feet long; built a mile of trestle a week, and spent \$8,000,000. But he did away with 1,515 feet of grade rise and fall that burned up coal and motive power for him. When he had bridged the bay of San Francisco he spent \$8,000,000 more boring, with two miles of tunnels, through the breastwork of hills that hedge San Francisco City on the south, and in doing it built for a four-track line. To elbow his way through the hills back of Omaha he has but recently run a seven-mile tangent, moved 4,000,000 cubic yards of earth, made a single 2,000,000 cubic yards fill and changed twenty miles of track into twelve miles, with two-thirds the curves and nearly half the grade rise taken out. Between Reno and Ogden he has abandoned more than enough railway to reach from Boston to Philadelphia. He has replaced it with a line fifty miles shorter, and one that cuts out thirty-five complete circles of curves and 3,064 feet of grade hills.

His Grasp of Detail

The grasp of details underlies all. He possesses an aptitude for operating a railway that amounts to genius. He is a natural-born railway man. His suggestions to men like President Hanrahan of the Illinois Central, President Underwood of the Erie, or to Mr. Kruttschnitt, are the amazement of these men, who have spent their lives in making railways. For example, every good railway has small branch lines, vital to it in that they supply freight traffic. The public living on such lines demands a passenger service that must be run at a loss. A branch line passenger train turning in gross earnings of 30 cents a mile eats heavily into the freight profits, and every American railway man has had occasion to worry over this difficulty. Motoring one day in France, Mr. Harriman said, pointing to the machine in which he was riding, "Why not try something of this kind on our Nebraska branches?"

Every one of our railway men had thought of the branch-line difficulty, but it was Mr. Harriman who thought of the solution. The result was a railway gasoline motor passenger car to take the place of the locomotive and the two heavy and nearly empty passenger cars of a train, with their two expensive crews. A company was organized which makes these cars and they are now used on the Union Pacific and other railways. Mr. Harriman has been first in declaring that our present track-gauge of four feet eight and one-half inches is inadequate to present-day railway needs; that we must come to a six-foot gauge. Some of our railways started out with such a gauge two generations ago. It was more than they could stand then, but it is what is needed today; and only the appalling cost of the change prevents its adoption.

At the head of an army he would have made an interesting figure. He has even in time of cankering peace organized an industrial army whose numbers have totaled 114,000. And, unusual as his achievements have been, there are inevitably others to follow. If he lives he will put a bore through the Sierra Nevada mountains and run his trains through it with electricity—already he is electrifying parts of his present lines. His ambition, reduced to a sentence, is to make his system of railways so perfect that he can handle business and still make a little money on margins that would leave absolutely nothing for a railway less efficient.

What does such an effort mean to the public? Certainly the efficient railway helps its public to the forefront of industrial activity. And every step that reduces the expense of operation reaches in the end the public purse, just as every waste of working capital ultimately comes out of it. If these be industrial benefits, there is no better practice among our railways today than is shown in the lines controlled by Edward H. Harriman.

Locomotive Cost Per Mile

For every mile run on the Union Pacific last year:

Repairs and renewals of locomotives, cost.....	\$10.70
The engine men, cost.....	9.06
The engine house expenses wext.....	2.52
Cost of fuel was.....	20.38
The water supply cost.....	1.23
The lubricants used amounted to.....	.26
Other supplies aggregated.....	.84

