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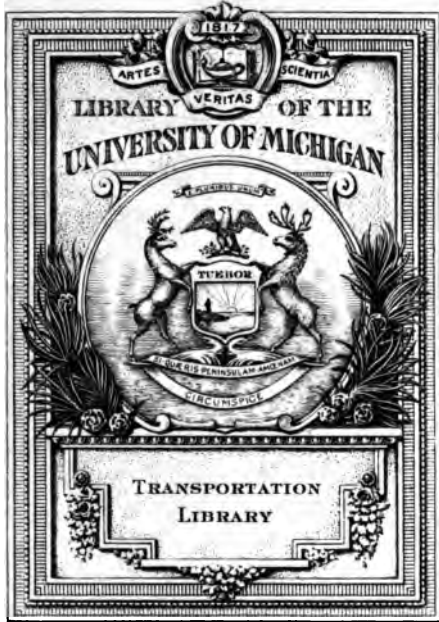
# A FEW HOURS' TALK

## A RAILROAD MAP

By *Samuel Johnson*

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# FEW HOURS' TALK

WITH

## A RAILROAD MAN.



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BY  
THOMAS H. <sup>MA</sup>BOWNE.

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1894.



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## INTRODUCTION.

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The object with which this work is presented to the public is to demonstrate the practical railroad questions of the day which have become matters of public concern. The man who would really study the subject would of necessity be required to seek his material and information amongst hundreds of different arguments and reports, many of which are exceedingly able, and, I dare say, few of them easy of access, and still fewer at all complete in themselves.

The author's aim is to treat each topic in simple manner, having in mind the needs of new men who may engage in the service, and that an average man or layman can readily understand the internal affairs of a company. Let every man, therefore, avail himself of this opportunity, remembering the words of the poet,

"The best that we can do for one another is to exchange our thoughts freely, and that after all is but little."

THE AUTHOR.



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## EARLY AMERICAN RAILWAY HISTORY.

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THE history of railroads in the United States is very interesting, exhibiting as it does the growth and development of a system superior in all respects to that of any other country.

The American railroad system is the most wonderful product of human invention, adaptation and enterprise of this the most progressive of the centuries. It correlates the arts and possibilities, and to its peculiar exigencies of physical characteristics has revolutionized the commercial methods and the social habits of the world. This has been accomplished within memory of persons now living; the railroad mileage has increased from 23 miles, 1830, to over 170,000 in 1893.

It would be a difficult and arduous undertaking to present and trace each stage of proceedings which led to the establishment of railways in the United States. The subject alone with its magnitude would certainly be a volume within itself; yet, however, there are some important proceedings connected with the subject which I shall present to the reader in a brief tone that will be of some interest to him. When the Stephensons, of England, made a trial trip of their locomotive before the people of that country they thought it a wonderful piece of ingenuity, and it was beyond a doubt such. It received considerable appreciation; but when we center our thoughts upon one who was even as much of a genius as he was, we cannot give the credit in its entirety to him, but come to our own country and bestow the graces of a good loyal American

citizen upon one worthy of it, "Oliver Evans." At some periods, few things were attempted which were not imitations of something that had previously been done in Great Britain. This rule has a notable exception, the first of which was the invention of a high pressure engine which under favorable circumstances could presumably have been developed into a successful primitive locomotive by Oliver Evans, an able and successful inventor, at an earlier date than any equally important forerunner of the locomotive had been devised elsewhere.

There were no railways in America at the period when Evans first conceived his idea of a steam roadwagon, remarkable as it was at that time. He has the honor of being the first citizen of the United States to devise a machine capable of moving itself and additional weight by steam power over an ordinary street or road. In a letter published in Niles's Register, dated November 13th, 1812, he describes at length the steps he had commenced soon after 1772 to construct steam wagons and to organize methods for applying them to useful service, and which he considered his most remarkable discovery. At one time a book fell into his hands which described the old atmospheric steam; he was astonished to observe that they had so far erred as to apply steam only to create a vacuum and to use the mere pressure of the atmosphere instead of applying the elastic power of the steam for original motion, the power which he supposed irresistible. Having been forcibly impressed that his aspects were correct, he renewed his studies with that persistent zeal which he possessed and soon declared that he could make steam wagons. In 1776 he petitioned the legislature of Pennsylvania for exclusive right to use his improvement in flour mills and steam wagons in that commonwealth.

A committee was commissioned to hear his pleadings; they came to the conclusion that he was insane by his representations concerning steam wagons. Not feeling at all discouraged at this he made a similar application to the legislature of Maryland which resulted favorably, mainly on the ground that the grant could injure no one and the encouragement proposed might lead to something useful; but, for the want of pecuniary resources, he was compelled to abandon his pursuits.

In 1800 or 1801 he constructed a small stationary engine which was used for grinding plaster; this fully demonstrated the correctness of his theory, and in 1804 he further demonstrated his theory by building a machine for cleaning docks which was propelled by steam through the streets of Philadelphia, from the Delaware to the Schuylkill rivers.

Another important proceeding is presented to us by that venerable and judicious gentleman, Col. J. Stevens, of Hoboken, N. J. He was the first citizen of the United States who combined advocacy with persistence and faithfulness that led to any final practical results. He commenced advocacy and construction of a railway about 1810, and in the year 1811 he applied to the legislature of the state of New Jersey for the first American railway charter, which was granted in the year of 1815.

In the year of 1812, when the question of constructing a canal from Lake Erie and to connect with the Hudson river was being agitated, Colonel Stevens urged the New York commissioners of inland navigation to construct a railway instead of a canal. His suggestions however were rejected, but this movement did not prove fruitless but helped the public to direct their attention to practical use of improved highways. Failing in his at-



tempts to secure a favorable consideration from the New York commissioners, and like all other ambitious geniuses, he published his suggestions in pamphlet form in 1812 and made an earnest appeal to the Federal Government for the purpose of having an experimental railway constructed to test the feasibility of his plans. His efforts on this occasion were also unavailable, and he then directed his attention to secure a railway charter from the State Government of New Jersey authorizing a road from Trenton, N. J., to New Brunswick. At all events he was successful in obtaining a charter in 1815, but being unable to speedily obtain financial resources to construct the proposed road he abandoned the idea and directed his attention to the construction of an experimental railway of his own in Hoboken in 1820. In the year of 1818 or 1819 Colonel Stevens addressed a memorial to the legislature of Pennsylvania, recommending the construction of a railway from Philadelphia to Pittsburgh, and in the year of 1823 he secured, in conjunction with other corporators who were citizens of Pennsylvania, the passage of an act by the Pennsylvania legislature authorizing the construction of a line from Philadelphia to Columbia, and the act was approved on March 31st, 1832.

Oliver Evans, Col. J. Stevens, and Robert Fulton who, above all others, best represented the inventive and practical talent of the United States applicable to transportation during the early decade of the nineteenth century, adopted advanced views, and their dissemination was a slow progress but an actual demonstration of the superiority and utility over the crude railroad or tramways on which horse power was used. This was a powerful agency in educating the public mind and securing the assistance of capitalists. One of the outgrowths of this

state of affairs was the organization in Philadelphia, in December, 1824, of the Pennsylvania Society for the promotion of Internal Affairs in the Commonwealth. At the outset it contained 48 members, each subscribing \$100.00 for the immediate promotion of the cause for which organized and an additional amount of \$10.00 a year. In 1825, William Strickland, Esq., was sent to England in search of information bearing on the advancement of railways. He furnished valuable information and forwarded reports from time to time dating from June 16th, 1825. Up to 1825 actual work had been simply confined to a few crude railroads, but from 1825 to 1830 there was considerable anxiety and enterprise displayed.

After the publication of Mr. Strickland's reports, the public was certainly desirous of having cheaper transportation, and with this object in view quite a number were constructed. The longest and most important one was the Mauch Chunk R. R. which was completed in the autumn of 1827; a line used for the purpose of carrying coal. Others were constructed for similiar purposes but are hardly important enough to be noted as an exception.

Three events of considerable importance were the passage of an act by the Penna. legislature in 1828, which provided for the construction of a railway by the State of Pennsylvania, to extend from Philadelphia to York, Pa., touching at Lancaster and Columbia, Pa., which was purchased afterwards by the Penna. R. R. Co. The incorporation of the Baltimore and Ohio R. R. Co., to extend from Baltimore, Md., to some eligible point on the Ohio river, by the legislature of Maryland and other states, in the years 1827 and 1828, and the Charleston and Hamburg Railway in South Carolina in 1827.

The latter part of the third decade of the nineteenth

century was an eventful period. It formed an era during which sufficient changes in the prevailing sentiment were effected to make the year of 1830 a vigorous starting point in railway improvement; beyond a doubt it was certainly a remarkable year in the advancement of railways in the United States.

The State of Maryland can be given the honor for taking the lead in the construction of a full-fledged railroad, which is the present Baltimore and Ohio R. R., the pioneer of them all; this road was chartered in 1827 and begun in 1828, and on the fourth of July of that year Charles Carrol, last surviving signer of the Declaration of Independence, laid the first rail, which was on the first section of the line and extending in length 15 miles, and opened for operation in 1830.

Railroads in the early periods were like modern street railroads in their construction; that is to say, instead of having transverse sleepers, they were laid upon heavy wooden beams or sills, placed lengthwise; these beams were the real supporting power; the rails were simply a flat strip of iron to protect the underlying wood from wear. Roads with such a track were too frail and would not support the locomotives that were being shipped from England, the first of these were for the use of the Delaware and Hudson Canal Co. in 1828. This created advanced ideas to commence manufacturing locomotives in this country, the West Point Foundry Works being the leader in the matter.

The most rapid growth centered around Philadelphia. To the northwest was a system of coal roads, principally owned by private parties, and were connecting links to the various mining properties. In 1833 the Philadelphia and Reading R. R. was chartered and opened in 1838.

In 1846 the Pennsylvania R. R. was chartered and the west end of the Camden and Amboy route was opened as early as 1832-34. The Philadelphia, Wilmington and Baltimore R. R., which forms a part of the world's greatest system, the "Penna. R. R.," was chartered in 1831-2 and was opened in Baltimore in 1838.

The Baltimore and Ohio R. R. advanced but slowly after 1835, the greatest activity being shown further south. By the year of 1840 there seems to have been a continuous line of rail opened from Fredericksburg via Richmond to Wilmington, N. C.

The Charleston and Hamburg R. R., chartered in the year 1827, and when opened in the year of 1833, was 137 miles in length and considered the longest line of railroad under one management in the world.

The earliest New York railroads were built near Albany.

The Mohawk and Hudson (Albany and Schenectady) opened in 1833.

The Rensselaer and Saratoga in 1835.

New York Central route was opened to Utica in 1836, and to Buffalo in 1842, though the consolidation of the different sections did not take place till eleven years later. In the meantime the Harlem River R. R. had been opened and many other roads were well under construction, especially the Erie; its main line was not opened through its whole length till 1851.

In Massachusetts there were three railroads opened from Boston toward Providence, Worcester, and Lowell respectively almost simultaneously in 1835. The whole line of the Boston and Albany was completed in 1842, the only road that has the distinction of being the only through route not merely supported by local traffic.

In Ohio part of the Cincinnati, Sandusky and Cleveland R. R. had been built about 1837, and it was not until 1848 that through rail connections by any route whatever was secured from Cincinnati to the Lakes.

The years of 1840-1850 formed a period of rapid railroad construction in New England, more rapid than in any other section of the country during that decade, but after the year of 1850, railroad construction in New England diminished and was diverted to Middle and South Atlantic States. In 1851, the Cleveland, Cincinnati and Columbus R. R. was opened and the Cleveland and Pittsburg in 1852, as well as the Michigan Central and Michigan Southern Lines. In 1853, the connecting link between Cleveland and Toledo was opened, furnishing through rail communication to Chicago, and in 1855 the Chicago and Galena was opened, and followed up by the Chicago and Alton, Chicago, Burlington and Quincy, and Illinois Central. The Ohio and Mississippi R. R. from Cincinnati to St. Louis. The first line to reach the Missouri was the Hannibal and St. Joseph in 1858.

The railroads of the United States have certainly grown from the year of 1830, when the first full-fledged railroad was opened for traffic in this country, up to the present time. Until the year of 1850, each railroad in the United States was, as a rule, operating independently of all other companies. The idea of connecting the tracks of different companies having a termini in the same town was repelled by railroad managers as something in the nature of an entangling alliance fraught with complications and administrative difficulties which had better be avoided. The transportation business of to-day could not be handled with any degree of dispatch had it not been for the consolidation of the various companies.

The social, commercial, postal and military necessities of the age were certainly elements of importance towards brushing aside all obstacles to the formation of that great American railroad system which is to-day unto the traveler and shipper as one instrumentality of transportation, embracing over 170,000 miles of track, and employing, June 30th, 1892, 821,415 men. If the total population be assigned to the number of men employed on railways, it appears that there was one employee to each seventy-nine inhabitants.

With these figures before us we can see what the railway industry is. Considering this vast organization of human devising it would hardly be practical to conceive that it could exist with the absence of an intelligent directory.

The American railroad system was not a thing which could run alone. Its existence involved conventional agreements touching on every point of detail and co-operative arrangements for the maintenance of such relationship.

Associations of various sorts were organized to bring them all together as a unity. Certain of these organizations are based upon the idea of managing the traffic of great geographical areas, while others take cognizance of great traffic currents. There are also associations which have for their object the management of through cars, *i. e.*, car service associations. There are besides these claim associations and local associations, etc., etc. These associations form the mind or legislative thought of the American railroad system. Their functions embrace the classification of freight, making joint rates, traffic facilities, the apportionment of traffic, receipts from traffic and a

vast volume of details requisite in the legislative management of so great a transportation system.

With these facts the author will leave this subject and repair to the question of the requirements necessary in organization.

## CORPORATION OF A RAILWAY.

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WE have now come to consider the requirements and powers necessary for the complete equipment of a company or corporation for the transaction of its business.

The author's aim is to present in this chapter—first, Information “to those engaged or interested in the line of steam railway business,” in the organization of new corporation, the consolidation of existing companies, and the charter; second, to define the legal and commercial terms which are used in the business, so that the internal affairs of a company may be readily understood by the average man or stock-holder, and, thirdly, to name some of the special requirements that are imposed by state and municipal authorities in the granting of charters and franchises.

It is not the intention to invade all the provinces of the legal profession, and give a code that could be used without legal assistance, but to illustrate and describe some of the elementary and essential features of certain legal forms so that a common ground can be formed upon which the layman may be able intelligently to discuss the business of the company. To give a copy of all the different forms in use and compile the various state enactments this chapter would expand to a volume of an ordinary law-book.

A charter may exist in fact or only in name. In some states the filing of the articles of agreement with the clerk of the county and the secretary of the State is a presumptive evidence of the incorporation, while in



other states the governor issues a patent or charter after the articles of association have been filed with the secretary. Some states have enacted a general corporation law under which all corporate bodies are organized, while in others a special act is passed in each case. In most cases the parties desiring to form a corporation or company take the initiative on their own account and afterwards file their articles of agreement.

A corporate charter is a contract between three parties viz.: the state, the corporation, the stockholders. First, it is a contract between the state and corporation, "an artificial person;" second, it is a contract between the corporation and the stock-holders; and, thirdly, it is a contract between the stock-holders and the state. As between the state and stock-holders, the contract is protected by that provision of the United States Constitution which prohibits a state from passing any law which will impair the obligation of a contract.

A charter may be perpetual or may be limited, and if limited may contain provisions for an extension. In some cases it may be extended by filing application as in the first instance, but, in some states the legislature reserves the right to alter, amend, or repeal the charter at any session. The reservation, however, is generally for the protection of the state's interest and not by any means for the benefit of the corporation or individual. A state tax for the privilege of organization is usually imposed upon corporations having capital stock divided into shares, which tax is due and payable before the certificate of incorporation or articles are filed.

A like tax is also required in some cases upon an increase of capital stock. In addition to taxes a fee is demanded for filing the certificate in the office of the

secretary of the state and a fee of        cents per folio for recording in both the county and state records. For an example, and to present a comprehensible idea what the articles of corporation should consist of, will give the form of certificate of corporation under the railroad law of the State of Pennsylvania, approved April 4th, A. D. 1886, to wit:

#### ARTICLES OF ASSOCIATION OF

We, the undersigned, nine of whom are citizens of the State of Pennsylvania, do hereby form a company for the purpose of constructing, maintaining and operating a railroad for public use in the conveyance of persons and property under the provisions of an act of the General Assembly of the Commonwealth of Pennsylvania, entitled "An act to authorize the formation and regulation of railroad corporation," approved April 4th, A. D. 1886, and the acts supplementary thereto; and for that purpose do make and sign these articles of Association.

FIRST.—That the name of the said company is———

SECOND.—That the said company is to exist for the term of———

THIRD.—That the places from and to which the said railroad is to be constructed, or maintained and operated, are as follows, namely: ——

FOURTH.—That the length of said railroad will be as near as may be——miles, and the name of each county in the state through or into which it is made, or intended to be made, is as follows, viz: ——

FIFTH.—That the capital stock of said company is to be—dollars, being at least ten thousand dollars for every mile of road constructed, or proposed to be constructed, and shall consist of—shares, of a par value of—dollars each share.

SIXTH.—That affairs of the company shall be controlled by a president and a board of—directors, and the following are the names and places of residence of those who shall manage its affairs for the year, or until others are chosen in their places, a majority of whom are citizens of Pennsylvania.

NAME.	RESIDENCE.	
.....	.....	PRESIDENT.
.....	.....	} DIRECTORS.
.....	.....	
.....	.....	
.....	.....	
.....	.....	

IN WITNESS WHEREOF the subscribers to these Articles of Association have hereto subscribed their names, places of residence and the number of shares of stock which each agrees to take.

NAME.	RESIDENCE.	NO. OF SHARES.
.....	.....	.....
.....	.....	.....
.....	.....	.....

## AFFIDAVIT.

STATE OF PENNA., COUNTY OF

ss:

Before me, the subscriber, a——in and for said county and state, in which county the principal office of the company is designed to be located, duly authorized to take the acknowledgment of deeds personally came——being three of the directors named in the foregoing Articles of Association, and in due form of law acknowledged as their act and deed for the purposes therein set forth.

In testimony whereof, I have hereunto set my hand and seal this——day of——A. D. 189—

.....  
 .....

STATE OF PENNA., COUNTY OF

ss:

Personally, before me, a——in and for the county and state aforesaid, came——being three of the directors of the——and named as such in the foregoing Articles of Association, who being duly sworn, according to law do depose and say that——dollars for every mile of road proposed to be made has been in good faith subscribed thereto, and that ten per centum paid thereon in good faith and in cash to the directors named in said Articles of Associa-

tion and that it is intended in good faith to construct the road mentioned in said Articles of Association.

Sworn to or affirmed and subscribed before me this  
 \_\_\_\_\_day of\_\_\_\_\_A. D. 189—

.....  
 .....  
 \_\_\_\_\_

After these Articles of Association have been drawn, and at least nine thousand dollars of stock for every mile of railroad proposed to be made is subscribed thereto, and ten per centum paid thereon, in good faith in cash to the directors named in said Articles of Association and that an affidavit is endorsed thereon or annexed thereto "as the foregoing affidavits" made by at least three of the directors named in said articles and file the same with the articles of association to the secretary of state whereupon the said articles shall become and be a charter for the company.

It very often occurs that necessity requires the changing of the proposed route and in such instances proper certificate must be drawn setting forth the required changes. Again it may be necessary, in the opinion of the directors, in order to fulfill their wishes and equip the road in a complete sense, to increase the amount of capital; this can be done by filing with the secretary of the state a certificate setting forth the amount of such increase, whereupon a new issue is granted provided the original amount of stock and increase shall not exceed the sum "fixed by law."

## STOCKS AND BONDS.

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THE term stocks, as used in this country, covers a wide area of significations, embracing almost every species of obligations, from the best secured pledges of national and state indebtedness to the personal promise to pay of individuals. Stocks may be properly divided into two classes, namely: Interest Stocks and Dividend Stocks. Interest Stocks or mortgage bonds are those calling for a certain fixed percentage on the amount loaned or the amount which they represent and are secured by mortgage on the property and franchises of the corporation. The value of bonds does not depend upon the percentage of dividends, but upon the character of the securities upon which they rest and the market value of money. Bonds are disposed of through trust companies, viz.: The officers of the company executes a mortgage on the property and franchise of the corporation to a reputable trust company, which in turn guarantees the payment of the bonds.

The bonds are printed for a certain amount and have coupons attached, stating the amount of interest payable annually or semi-annually. These coupons are cut off in order, as the interest installments are paid, and are equal in number to the interest period before the bond becomes due. In disposing of the shares of a company the directors of such company are usually constrained by law from selling them below the par value, but the bonds may be given away or be sold. The annual or semi-annual income to bond-holders is a fixed and certain

amount of "interest" without regard to the success of the business, while the income to stock-holders is uncertain, depending upon the paying or passing a dividend. Dividend Stocks are of two classes, namely: Common and Preferred. Common Stock is the original or considered capital stock. Preferred Stock is created by a special legislative enactment and may differ in any state. Holders of preferred stock are entitled usually to a certain fixed amount or per cent. of the net earnings before or in preference to that of common stock. In some states the preferred stock-holder is not liable for any debts of the company, the debts falling absolutely upon the common or original holders.

**WATERED STOCK.** In some states companies are required by law to pay to the state all profits over and above a certain per centage on amount of capital invested. Wherever this be the case, and in order to evade this obligation, they increase their capital stock to a sum large enough to reduce their percentage of profit to the rate limited by their charters. This is called watering stock. For example: The Pennsylvania Railroad Company has a paid up capital of \$1,000,000; the state requires railway companies to pay to it all excess of profit over six per cent. per annum; it is to be seen that this company with its present capital will earn during the coming year at least twelve per cent. net profit, that is, \$60,000 for itself, and \$60,000 which should, according to its charter, be paid to the state. Now, in order to defraud the state of these \$60,000 the company increases its capital stock to \$2,000,000, thus making the percentage of profits six per cent. on \$2,000,000, instead of twelve per cent. on \$1,000,000, and thereby retaining \$120,000, and giving the state nothing.

## CONSTRUCTION OF THE ROAD.

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WHILE I do not intend in this chapter to invade all the principles and mathematical problems connected with this branch of railway construction, yet in order to make the question clear the author will give a general outline of it.

The first object for consideration in examining a project for a railroad, is the nature and extent of the traffic to be provided for. If this is large and of character to demand high speed, the work must be adapted to bear the contemplated service ; bridges and rails must be stronger than for lighter traffic and lower speed. If a light traffic, and especially where a lower rate of speed is anticipated, much may be saved in the expense of construction, and also in the expense of operating the road by adapting the work to the service to be performed.

### LOCATION OF THE ROAD.

The location, or layout, of a road consists in determining and marking out on the ground those points through which the road should pass. In the location of the proposed line, the engineer's first duty is to make a survey by eye without the aid of instruments, which is called "Reconnaissance." This is a rapid preliminary survey of the region through which the road is to pass, and is generally made by the eye alone without instruments. It is intended to be only an approximation to accuracy, and serve to determine through what points the route should be instrumentally surveyed. The road-maker



must examine the country map in hand, visit and identify the points selected on the map and see whether his closest decision has been correct. He must go over the ground backwards and forwards in opposite directions, for it will appear quite different, and convey very dissimilar impressions, according to the points from which it is viewed. Thus, a hill which one is descending may seem to have a very easy slope, while it may appear very steep to one ascending it. After the general position of the line has been agreed upon, the engineer in charge takes up the different maps, and lays down a new line which may coincide with that surveyed or perhaps be quite different. The parties are then sent back into the field and stake out the new line called the approximate location upon which the curves are all run in. In a difficult country it may be run over a third or fourth time, while in an easy country the preliminary may be all is wanted. After the railway line has been finally located, the next duty of the engineer is to prepare the work for letting, or the actual "construction" of the road. A "specification" is first to be prepared, containing an exact and minute description of the manner of executing the work in all its details.

Copies of it, with maps, profiles and drawings of the proposed road, etc., are to be submitted to the inspection of the persons desiring to undertake it, who are to be invited by advertisement to hand in sealed tenders of the prices per cubic yard (or other unit of measurement) at which they will agree to perform the work.

The proposals are opened on the appointed day, and the lowest are accepted, other things being equal. The "contract," which is to be then signed by the parties, should contain copious and stringent conditions as to the

time and manner of performing the work; stipulating when it is to be commenced, how rapidly to progress, in what order of parts, and when to be completed, which of the incidental expenses are to be borne by the contractor, and for which he is to be remunerated. The specification is considered to form part of the contract, and a "bond" is appended, by which the contractor and his securities are "holden and firmly bound" in a penal sum, "this bond to be null and void if the said parties shall faithfully execute and fulfill the accompanying contract.

Each contract should include such a length of road, called "a section" (usually a half a mile or a mile long, or even a greater distance). There should be separate contracts for the mechanical structures required. The works which will need most time for their execution should be commenced first; but no contract should be let till the land which it includes is secured, or exorbitant demands will be made.

The forming of the road-bed is our next thought for consideration. The grading of a line embraces all work required to bring the surface of the ground to the grade line, and is mostly earthwork, and for a limited extent of the line it is rock work, "which is the foundation and support of the whole superstructure." This work prepares the bed for the superstructure, and when the earth is not composed of sufficiently hard gravel it is excavated to a proper depth, so as to give space for the ballast. An important feature connected with this line of work is the drainage, and a thorough attention to this is essential to a good railway.

In soils through which the water percolates freely, as course gravel and sand, the drainage may be so well provided for, as to require little attention, but most soils are

too retentive for this and drains are to be so made as to take the water off quickly to some natural or artificial channels which will carry it beyond the reach of influence of the road-bed, because water standing at or near the road-bed will soften the foundation and allow the ballast to settle and thus derange the superstructure. The road-bed or foundation of the ballast should be so constructed as to give support, and be to the requirements of the traffic to be hauled.

It is also necessary to provide for the passage of water, by natural streams or artificial channels, which flows across the railway. In order to accomplish this, bridges and culverts are constructed. The term culvert is used for work on small streams and bridges for large ones, and the building of the same depends entirely upon the condition of the body of water and its tributaries. The "ballasting" of the track, and in this connection there are two characteristics to be considered, namely: First—A material that by its open porous character will allow falling water to pass quickly and prevent heaving by frost. Second—By its hardness and firmness in all states of weather to sustain the action of trains, so as to prevent as much as possible the derangement of the track. If these conditions are secured all requirements will essentially be provided for so far as the ballast depends. The best material for ballast is clean gravel and sand. Broken stone is very good and makes the most durable ballast, but has the least tendency to make dust, and is not at all times favorable toward the durability of the rail or rolling equipment, and in selecting broken stone for ballast a rather hard, silicious kind is better than a more solid and unyielding quality, as it favors the elasticity desirable in a rail track.

The "cross-sleepers," upon which the rails are placed, are usually of chestnut, oak, pitch-pine, or red cedar. They are hewn on both sides, allowing about six inches of material for the thickness, and more if possible. The longer they are the better, as the extra length on each side of the track lessens the danger of settling. The rails which are also a very important factor to be considered, should be to the requirements of the traffic to be hauled. If the traffic is light much can be saved by placing a light rail down, but if the traffic is of a heavy character a heavy rail will be more profitable and durable. The rails may be directly fastened to their supports, and also have their ends held by "chairs," spiked to the blocks or cross-sleepers. The chairs are generally cast-iron, and weigh from twenty to thirty pounds. They are cast in one piece, consisting of a bottom plate, and two side pieces, between which the rails pass, its under surface being about an inch above the block. The opening of the chair must be as wide as the lower part of the rail, in order that it may be removed and replaced without disturbing the chair. A key of wood or iron is used to fill up the openings which are made in between the joints, and to hold the rail firmly in the chair, but without offering any resistance to its longitudinal motion in expansion and contraction. The force with which iron expands is from six to nine tons per square inch of section, which corresponds to ten pounds to the yard, so that a rail of seventy pounds expands with a force of about fifty tons.

## RAILWAY MANAGEMENT.

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It would be impossible to give a complete account of the organization, distribution of duties, systems of working and checks in the various departments, and to describe technically the variations of practice in the different sections, and on different roads, for the reason of the difference in opinions of the officers in charge. Considering this fact, let us only look at the essential feature of a good management. No matter how small or large the company may be, there are certain and important duties requisite to a good management, and they may be classified as follows:

1. The physical care of the property.
2. The handling of trains and moving of freight and passengers.
3. Accounting and the collection of revenue.
4. Making of rates and soliciting business.
5. The custody and disbursement of revenue.

The president is of course the executive head of the company, but in important matters he acts only with the consent and approval of the board of directors or an executive committee, clothed with authority of the board which may be called the legislative branch of the management. The president's duty is of a dissimilar character, the variations in the scope of the labors actually performed by the railway presidents of the United States have been accompanied with and perhaps partly caused by noticeable differences in their individual characters, acquirements and antecedents. In a general manner the

tendency in recent years has been strongly inclined toward a requirement that they should possess an extensive railway experience. In many instances it was acquired in various branches of railway affairs, the preliminary labors being either in legal profession, engineering, construction, or operating department. The selections of presidents to-day have been made chiefly on account of the favorable influence they could presumably exercise either in commercial, banking or investing circles, with very little regard to their actual knowledge of the complicated details of the railway movements. Others have virtually elected themselves by their control of stock or influence with stock-holders; and again others have been selected as president solely on account of skill displayed in the management of one or more branches of practical railway affairs and possession of recognized executive ability. The office is one of great importance, and the stock-holders of different companies have acted in some instances on the theory that they neither desired nor expected the president to be the active head of all departments, looking to him chiefly as a financial leader; while in many other cases presidents have been chosen in the expectation that they would exercise intelligent supervision over all classes of operation. Whatever the antecedent training or acquirements of a railway president may be, he can usually, if he chooses, exercise a positive influence over all the affairs of his own company and materially affect sundry other companies with which it connects or competes, so that his characteristics may be a matter of considerable consequence. There is perhaps no single class of men who have left a deeper impression upon the transportation systems of the United States than railway presidents.

Every company has a board of directors or a board of managers. The latter title is adopted in few instances, and, perhaps, represents more correctly than the former, the functions theoretically exercised, as they include action on every important new proceeding,—the declaration of dividends, the issue of new securities, either the appointment of important officials, including the president, or the ratification of important appointments made by the president or high officials, the construction of new lines or other work of consequence. Their nominal position is somewhat analogous to that of a legislative body of a political government, as they are always elected by the share-holders and are supposed to act as their immediate representatives. The extent to which boards of directors or managers do manage railway operations or control the policy and movements of great lines varies materially, and the actual state of affairs differs widely in different companies. The executive power and supervision of the president may be delegated to one or more vice-presidents, excepting everything that relates to financial matters, but, as their functions are merely subdivisions of those of the president, they have no part in a general scheme of authority.

The first four of the subdivisions of duties indicated above are usually confined to a general manager who may also be a vice-president, and the last is in charge of a treasurer reporting directly to the president. The power and supervision of the general manager may be delegated to the following, namely :

1. A superintendent of roadway, having charge of the track and keeping the right of way in good condition.
2. A superintendent of transportation, who has charge of the handling of trains, the keeping a record of the lo-

cation and whereabouts and movements of all cars, and the preparation of the train schedule.

3. A superintendent of machinery, who has charge of the construction and maintenance of all rolling stock, and is assisted by a master car builder, who looks after the repairs to all cars, and the inspection thereof along the line of the road.

4. A traffic manager, or a general freight and passenger agent, who has charge of the making of rates, advertising and soliciting for business, and the adjusting of claims arising from overcharge or loss and damage to property.

5. A comptroller, who has charge of all the book-keeping by which the revenue and disbursements of the company are accounted for.

6. A paymaster receives money from the treasurer and disburses it under the direction of the comptroller for all expenses of operation.

Besides these already mentioned there are the legal and purchase departments. The legal department is in charge of a lawyer or in other words a solicitor. He looks after all claims for loss or injury to persons and property, the preparation of contracts and agreements, which should always pass under the scrutiny of a counsel. The verification of all forms of bonds, mortgages, debentures and stock certificates should also be made by the counsel.

The purchasing department is in charge of a purchasing agent. His position is a very important one; he buys and sells all the material and supplies and stationery for the company; he is assisted by what are commonly called "store-keepers," who are stationed at various points and disburse the supplies when a requisition is made for the same.



Having given an idea of the management and the principal features of each department, let us turn our attention to the diagram on page 35, showing the skeleton of a railroad organization and line of responsibility.

Handling of trains, which is one of the many features of the operating department, comes under the direction of a superintendent, and is called conducting transportation, in charge of a superintendent. The duties of a superintendent are by no means limited or easy; he has perhaps as great a variety of occupations, and as many different questions of importance depending upon him as any business or professional man in the country.

Fully one-half of his time is devoted out of doors, looking after the physical condition of the road. He must be familiar with every foot of his track and in cases of emergency must know what course to pursue for immediate remedy. All train hands, train masters, train dispatchers, telegraph operators, and station forces come under his immediate supervision, and must furnish all regular and irregular service, when the traffic department requires it. The time-table or schedule is the general law governing the arriving and leaving time of all regular trains at all stations. They are issued from time to time, as the case may require, and from the moment the new one takes effect, any and all preceding tables are superseded by the one issued, as well as all instructions "special" relating thereto. The regular meeting or passing points for trains on the road, are indicated on the time table in full-faced type, as well as the arriving and leaving time of a train, when both are meeting or passing trains, or when one or more other trains are to meet or pass it between those times. In preparing

COUNSEL	Comptroller {		Auditors of Receipts and Disbursement.		
			Travelling Auditors.		
	Purchasing Agent.		Storekeeper.		
GENERAL MANAGER	Supt . . . .	Station Agent	{ Receiving Clerk		
			{ Shipping Clerk		
			{ Loading Clerk		
			{ Discharging Clerk		
			{ Collectors		
			{ Laborers		
			{ Yard Master {		
			{ Yard Engineers		
			{ Switchman		
			{ Conductors		
			{ Brakeman		
		Train Master	{ Train Despatchers		
			{ Operators of the Telegraph		
		Car Accountant	{ Conductors and Brakemen		
			{ Record Clerks "Foreign and Local"		
			{ Mileage "		
			{ Lost Car and Tracing Clerks		
PRESIDENT TREASURER	Supt. of Machinery	Foreman Mch. Shop	{ Engineers and Firemen		
			{ Hostlers and Cleaners		
			{ Mechanics and Laborers		
		Foreman Car Shops	{ Mechanics and Laborers		
			{ Greasers		
			{ Car Inspectors		
SECRETARY	Supt. of Roadway	Road Master	Supt. of Bridges	{ Bridge Foreman	
				{ Watchman	
			Supt. of Road.	{ Mason and Carpenter Gang	
				{ Section Foreman.	
			{ Gang and Track Walkers.		
			{ Wood and Water Tenders.		
			{ Floating Gang Constructing in Transit.		
VICE PRESIDENT	Traffic Manager	General Freight Agent	{ Division Freight Agents		
			{ Travelling Freight Agents		
			{ Rate Clerks		
			{ Tariff Clerks		
			{ Freight Claim Agent {		
				{ Register Clerk	
				{ Investigating Clerk	
				{ Voucher Clerk	
				{ Special Agent	
				General Passenger Agt.	{ Division Passenger Agent
		{ Travelling Passenger Agent			
		{ Rate Clerk			
		{ Apportionment Clerk			
		{ Advertising Agent			

a time-table, our first step in that direction would be to obtain from the engineer in charge a chart showing the miles of the road, and the distance between stations, with a scale, then secure a sheet of paper that would be sufficiently large to contain the diagram. After the stations are divided off by proportional horizontal lines, as per the scale, divide the sheet into twenty-four equal spaces of one inch width, which represents the twenty-four hours of the day; these spaces are again divided into twelve equal spaces representing the minutes of the hour, by vertical lines. The course of every train can now be plotted thereon, and the time that each train will arrive at any station can be ascertained by drawing or extending a line obliquely across the sheet, the intersecting point being the time due at that point, as for example:—

A Passenger Train, No. 1, leaves station A at midnight and arriving at R at 6.40 A. M.

An Express Train, No. 2, leaves station R at midnight and arriving at A at 5.35 A. M.

No. 7, which is a freight, leaves station A at 1 A. M., runs to G by 3.10 A. M. remains there until 3.35 A. M. to allow No. 5 to pass and arrives at R 10.50 A. M.

No. 5, Local Passenger, leaves station A at 1.30 A. M.; runs to station K by 4.42 A. M. and returns to A by 9 A. M, being called No. 4 on the return.

No. 3, Freight, leaves station A at 4 A. M., arriving at R. at 11.50 A. M.

No. 9, Local Passenger, leaves station A 6.50 A. M., arriving at J 10.20 A. M.

No. 6, Local Passenger, leaves station R 5 A. M., runs to K by 8 A. M., remains there until 8.30 and arrives at station A 12 noon.

The diagram shows at a glance how, when and where every train is at any moment and at what points they should meet and pass.

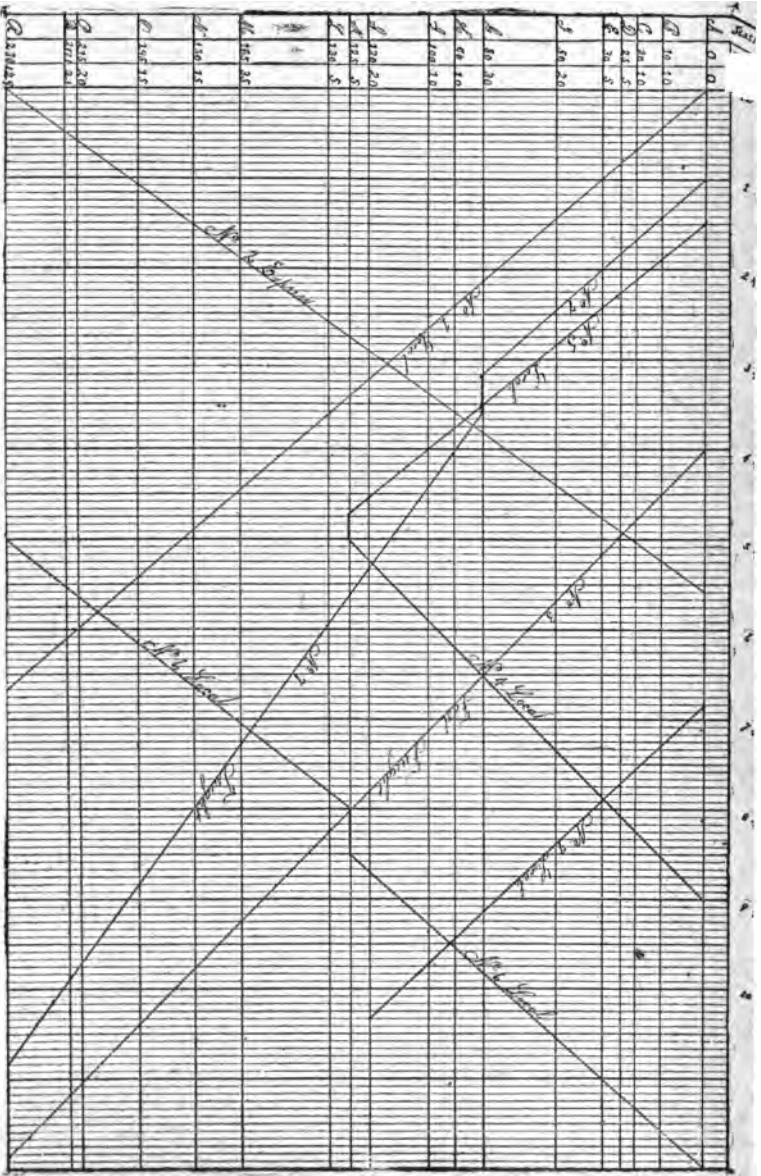


DIAGRAM USED IN MAKING RAILWAY TIME TABLES.

Even numbers are generally assigned to trains of one direction and uneven numbers given to those of the opposite direction. Trains are classified according to their superiority and right to the track, namely: First-class trains (passenger trains) have the superiority over any succeeding classes. Second-class trains (mixed trains) have the superiority over any succeeding classes. Third-class trains (freight trains) have the superior right over any succeeding classes, and so on. Extra trains are those not represented on the time table, and are run without notice and have no superiority over any class but of an inferior character. If all trains could be run according to the time as shown on the time-table, very little trouble would present itself, but, when irregular service is put on the road (extra trains) the trouble begins, and of necessity requires the use of the telegraph. Telegraphic orders are usually written on a prescribed form for that purpose, and when issued every one contains the same wording so that each person receiving them will have a duplicate of what is given to the other.

These orders simply contain one special movement, or at least should not contain any more than the one to which it has reference.

When they are addressed for a train, a copy must be given to engineman, conductor, and the pilot, should there be one. Train orders are of various forms and significations, and too numerous to invade this chapter.

The signal, which takes an important part in the movement of trains, is the only means of communication. They have many significations, too many however to mention in this article, but in order to make the subject plausible, will mention some few of them, namely:

Red signifies danger, and is a signal to stop.

Green signifies caution, and is a signal to go slowly.

White signifies safety, and is a signal to go on.

Green and white is a signal to be used to stop trains at flag stations for passengers or freight.

Blue is a signal to be used by car inspectors.

An explosive cap or torpedo, placed on the top of the rail, is a signal to be used in addition to the regular signals.

The explosion of one torpedo is a signal to stop, two torpedoes is a signal to reduce speed immediately, and look out for a danger signal, and when a fuse is burning on the track all trains must stop, and not proceed until it is burnt out.

A lamp swung across the track is signal to stop.

A lamp swung vertically in a circle across the track when the train is standing, is the signal to move back.

A lamp raised and lowered vertically, is a signal to move ahead.

A lamp swung vertically in a circle at arms length across the track when the train is running, is the signal that the train has parted.

Train rules governing the movement of trains are very simple and would be all that is requisite, if all trains could always be kept exactly on time. But as this cannot at all times be done, certain provisions are made to overcome all the complication which may arise therefrom.

The first and most important rule is, that no train must ever, under any circumstances, run ahead of its schedule time, that is, the time appearing on the time-table.

The second is, that any train making a stop not on its schedule, must immediately send out flagmen with red flags, lights, and torpedoes, to protect it, sometimes at a dis-

tance of six hundred yards or twelve telegraph poles, and again at a distance of twelve hundred yards or twenty-four telegraph poles. This is a very important one, and it is a difficult matter for the officials to impress the importance of it upon the minds of the train hands.

It is essential to make some requirements, when a train is prevented from arriving on time at its meeting or passing, by which the opposing train may proceed, or business will be suspended. As space will not permit a full description of these principles, only the general principles of these rules will be given, namely:—

First.—All trains of inferior class must keep out of the way of a train of a superior class; that is, all freight trains or extras must wait indefinitely, and must keep out of the way of all passenger trains.

Second.—When one train only is behind time, the opposing train of the same class will wait for it a special time usually ten minutes, and five minutes for possible variation of watches, then go ahead keeping fifteen minutes behind its schedule.

Third.—But should such a train, running on delayed time, lose more time, or in any other way, should both trains get behind time, then the one which is bound in a certain direction, for instance north, has the right to the track, and the other must lie by indefinitely.

Still there is another safe-guard in the handling of trains where they become very numerous, and this is multiplying telegraph stations at short intervals, and giving them conspicuous signals of semaphore arms and lanterns, until the whole road is divided into a number of so called blocks of a few miles each. No train is permitted to enter any block until the preceding train has passed through or out.

In the approaches to some of our great depots, where trains and tracks are multiplied and confused with cross-overs and switching service, signal towers are built and all the switches are set, and all movements are controlled from them.

They are sometimes operated by electricity, and others by compressed air.

Having given some facts pertaining to the handling of trains, the preparation of the time-table, signals, etc., let us repair to motive power department, which is under the direction of a superintendent of motive power. This department is divided into two branches, in charge of a master mechanic and a master car builder.

THE MASTER MECHANIC has direct charge over all engines and the repairs thereto; enginemen and firemen also come under his supervision. He keeps a record of all material and supplies furnished and consumed, the number of miles run and cars hauled by each engine, which is placed on a performance sheet. At the end of every month he is required to make up a report or balance sheet, which gives a complete account of all material received and disbursed, with a detailed account of the chargings to the accounts receiving the benefit.

The MASTER CAR BUILDER has charge of all repair shops where cars are repaired and erected. Under him are inspectors who are located at various points, and at junctions, for the purpose of inspecting cars. When these inspectors locate a defect in any portion of the car, they attach what is called a defect card, and if unsafe to run is not accepted; but where the defect does not render the car unsafe to run, or unsafe to train-men, is generally accepted. In such circumstances, every company to which the car is offered may require that a defect card be



securely attached to the car, and when any company, finding a car with a defect card attached, may make the repairs noted by the card, provided such repairs are necessary for the safe running of the car, at the same time rendering a bill for the same to the company attaching the card, stating upon the bill the date and place when the repairs were made, the card to accompany the bill as a voucher for the work done. A defect card which is generally used is as follows :

---

M. C. B. DEFECT CARD.

(Name of Road.)

Car No. . . . . Date . . . . .

Initial . . . . . line.

Will be received at any point on this company's line, with the following defects :

. . . . .  
. . . . .  
. . . . . Inspector at . . . . .  
. . . . .

---

The CAR ACCOUNTANT and his duties are of as much importance as any other officer of the operating department. He furnishes valuable information regarding the movement of all cars, either on home or on foreign roads, and his office may be properly divided into main branches, namely: Mileage and Record. The computation of mileage is made in most cases directly from the reports of each train, which are made out by the train conductor.

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These reports give the initial and number of each car in a train, whether loaded or empty, and the station whence taken and where left. To facilitate the computation of mileage of each car, the stations on the road are consecutively numbered, beginning at nought, and each succeeding station being represented by a number equivalent to the number of miles it is distant from the initial station, excepting, at divisional and terminal stations, which are generally given a letter in order to reduce the work of recording.

The conductor in making his report shows the stations between which each car moves, by their number or letter, so all that is necessary for the mileage clerk to do is to take the difference between station numbers, in each case, and he has the miles the car travelled. The mileage of every car on these reports is condensed and recorded into a ledger, and at the end of every month they are footed, showing the total mileage of all cars owned by the home company, and those owned by a foreign road.

At the close of every month each road renders the other a report showing the amount of mileage due them for that month of cars which were on the road within that month.

The Record Branch is of equal importance, where a broad and complete record is kept of the daily movement of every car upon the road either local or foreign. The records are divided between local and foreign. Local records are books used for home cars, and are of a large size, ruled in such a manner as to allow space for the daily movement or location of each car for one month. Foreign records are similarly ruled, but a slight change being necessary to allow the number and initials of the foreign cars, which could not be very



ing or unloading. Reports are also received from shops and yards, showing cars undergoing repairs or waiting for the same. It is plainly to be seen that the car accountant endeavors to get a complete record showing every car that may be either in use or standing at any point on the line. The diagram on page 44 illustrates a foreign record page, and the process of recording.

#### EXPLANATION OF DIAGRAM.

Each connecting line at each junction station is assigned a number. When a car is received from a connection, the record is shown by entering the road number in the upper space of the block under the proper date, followed by the character **X** if loaded or empty, together with the time. As for example, car 24710, is shown as being transferred from station 217, 11.30 and to have been received 11.25 from Pennsylvania Railroad, at Cayuga, (15). An entry in the lower space of the block indicates a delivery to connecting line Wayne & Amboy Railroad (20) at 8 o'clock A. M. The middle space of the block is used for the car movement, the first number or letter showing the station from which the car moved. The character **X** when a prefix to a station number, indicates that the car is being loaded at that station. The character—when used as a prefix, shows that the car is being unloaded; and as an affix, it indicates a movement empty, or on hand empty, and when used under a station number, it indicates a change date record, that is, leaving a station on one date, and arriving at another on the following date. Station numbers or letters without other characters, show that the car is loaded.

Sign B is used when the car is left at a station for repairs while in transit.

Sign T, lading transferred to another car, a transfer record being kept showing to what car transferred.

Sign R, on hand at station, or yard for repairs. Shops are assigned numbers with an O prefixed. The upper and lower spaces being used to show delivery to or received from the shop, similar to the interchanging record with connection.

For convenience the 24 hour system is used in recording time, and is shown in quarter hours, thus 10<sup>1</sup>, 12<sup>1</sup>, 18<sup>2</sup>, and 21<sup>3</sup>, or 12.25, 18.30, or 21.45. The transfer column shows the station at which the cars were reported on the last day of the previous month, and the date, also from what road received, with date.

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Red signifies danger, and is a signal to stop.

## FREIGHT RATE CONSTRUCTION.

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BEFORE taking up the various special topics, to which this article is devoted, it is deemed suitable to submit some of the general observations bearing upon the scope and the peculiar office of common carrier, and the increasing dependence of every occupation upon their facilities. Commerce reaches its destination by the most advantageous route. Trade seeks the easiest path from the producer to the consumer. The right of every person to just and equal treatment in all that pertains to public transportation is practically unquestioned. To secure the actual enjoyment of this right, to insure fairness and impartiality in the conduct and charges of public carriers, is the paramount purpose of all regulative enactments of the law governing interstate commerce. It is hoped that in a short time every shipper can and will enjoy a greater amount of privileges, and that the carrier will be equally remunerated.

The rates of railways are governed absolutely by the same law which controls the ruling price of other necessities of life.

The question may be asked, what is a reasonable rate? This is a difficult question to solve, simply due to the reason that what may be a reasonable rate in one section of the country, may not be in another. The question alone is purely a local one, and cannot be generalized or made to fit any particular formula, because it is a practical and not, as some writers infer, a theoretical question. The rate making power of a railroad company is an adaptive

one. It must take into consideration the producer, middleman and the consumer, as well as the carrier. All rates must conform to the market competitive influences of other carriers, and it is only in isolated countries and in petty cases that the rate maker exercises any discretion whatever. The commercial and industrial forces are so interwoven throughout the whole country, and compete so actively with each other, that they effect the rates of local carriers quite as powerfully as do local interests and rivals.

There are occasions where competition is so sharp, where the freights of some large shippers or combination of shippers is so needful to a particular road, that when reduced rates are demanded as the alternative of losing the tonnage, the carrier can scarcely refuse, and will deviate from the published rates, sometimes below the rates of its rival company. The question of rate making cannot be estimated on a theoretical proposition as some have inferred, but is the result of practical observations and compromises. With these observations presented to us, we can conceive what position the rate maker is placed in.

The first freight schedule of rates upon a new road in a noncompetitive district or territory, is based on sound principles, and if a manager could adhere and absolutely follow it, very little difficulty would be experienced, but every manager avails himself of every advantage that will bring business, often sacrificing a profit to do so. There are two divisions of expense necessary to be considered in the determination of rates, namely :

First.—The cost of terminal and station work.

Second.—The cost of handling.

Every shipment requires station work at both forward-

ing and receiving stations, and requires an expense for transporting it. The station expenses for a short haul are the same as for a long haul, but the transportation expenses is in proportion to distance. The expense at a station may be correctly estimated at one and one-half cents per one hundred pounds, or sixty cents per ton, that is the expense at both the forwarding and receiving stations, and one half cent per ton per mile can be considered a profitable rate for handling. The rate for one hundred miles on this basis would be \$1.20 per ton for station expenses and one hundred miles at one-half cent per mile, or fifty cents, making a total, or the rate for the one hundred miles, \$1.70. Now, if a manager were called upon to make a tariff or rates for a new road in a non-competitive district, whether he copied an old tariff or followed one which has been in effect at some former time on a road similarly situated, as no doubt he would, without first adhering to the underlying principles, or if he were compelled to rely on his own resources, the rates which he would produce would be substantially on this mathematical calculation.

Rate making in a competitive district is not so easy. The manager in charge will follow the quotations of his rivals and even make or offer a more advantageous basis in order to secure the business. Unreasonably low rates never happen, as a rule, except in the case of traffic to competitive points. It is unrestricted competition that brings rates below what is just and reasonable, and revenue lost by the adoption of unreasonably low rates to competitive points can only be compensated for by rates to non-competitive points. The opportunity of the shipper combined with the carrier's asserted necessity is a constant temptation to bargain for preferential rates, and



agreements between rival lines to maintain schedule charges are usually short lived, for they rest mainly on a pledge of good faith, and do not long survive when interest inclines either party to break them. Joint rates are made up by the agreement between the general freight agents of the roads desiring the rate. They are formed by a combination of each road's local rate up to the nearest junction point with each road. It frequently occurs that in forming a joint or through rate one or more roads may take an arbitrary position and demand as its or their proportion of the rate agreed upon, its or their local rate and, when this be the circumstance the remaining portion of the rate agreed upon is divided amongst the other roads. Then again another road which is a terminal company may demand in addition to its proportion of the agreed rate a terminal allowance, and in this case the amount must be deducted from the rate which has been agreed upon and, the balance divided amongst the remaining roads, as for example:—A, B, C, & D, are desirous of forming a rate from a point on A, to a certain point on D, which are competitive points, their rival road has been receiving all the cream from a certain line of merchandise finding a desirable market at the certain point located on D, while the competing roads have only been receiving the skim-milk; so they meet or, perhaps, make a lower rate in order to get the business, as their route is by far the longest. The rate agreed upon is 19 cents per hundred pounds, and the basis for dividing the rate is on a mileage one. A to receive forty miles, B to receive thirty-five miles, C to receive sixty-two miles and D to receive seventy-five miles. In order to ascertain what each will receive of the rate we would find the percentage of each to the total miles travelled, as for example:

A's mileage is 40 or 40-212	of 19 cents or 3.6 cts.
B's " " 35 " 35-212	" " " " 3.1 "
C's " " 62 " 62-212	" " " " 5.6 "
B's " " 75 " 75-212	" " " " 6.7 "
<hr/>	
Total 212	19.0 cts.

If any of the above roads were to receive an arbitrary amount in addition to their regular proportion of the rate agreed upon, for instance, A is to receive a terminal of  $1\frac{1}{2}$  cents per hundred pounds for facilities offered as the delivering road, plus its prorata proportion of the rate, D is to receive a junction allowance of  $\frac{1}{2}$  cent per hundred pounds offering a connection with C, plus its prorata proportion of the rate, the amount that each would receive and the process of figuration is as follows. We first deduct the arbitrary amounts, namely, terminal  $1\frac{1}{2}$  cents, and junction allowance  $\frac{1}{2}$  cent, or, 2 cents in all, leaving but 17 cents to be prorated. We would then divide this amount amongst the roads as per the foregoing example, and the result would be as follows:

A's mileage is 40 or 40-212	of 17 cts. or 3.3 plus 11-2:4.8 cts.
B's " " 35 " 35-212	" " " " . . . . . 2.8 "
C's " " 62 " 62-212	" " " " . . . . . 4.9 "
D's " " 75 " 75-212	" " " " 6.0 plus $\frac{1}{2}$ : 6.5 "
<hr/>	
Total	19.0 cts.

East and West bound rates, in conjunction with the Trunk lines, is another name given to rates. These rates cover all traffic from the eastern seaboard territory to western points and are subjected to the rules and regulations of the associations known as the Trunk Line and Central Traffic Associations, the former embraces the

important roads leading from the eastern seaboard to Buffalo, Erie, Salamanca, Pittsburgh, Parkersburg and Wheeling, which points are known as the western termini of the Trunk lines, and are also the eastern termini of roads in the Central Traffic Association. Under agreements of several years standing it has been the custom of these roads, forming by connections through lines from the seaboard to the west, to determine through rates from New York to Chicago, and to adopt such rates as the standard or basis for the construction of tariffs from other eastern cities and points adjacent thereto, which are directly or indirectly in competition for western business.

The principal seaboard cities are New York, Boston, Philadelphia and Baltimore, and adjacent to each of these are important industries commanding for the points at which they are located equal transportation rates and facilities with the larger cities. For twenty years or more the rates from Boston to western competitive points have been the same as from New York. From Philadelphia and Baltimore the rates are "agreed differentials" less than New York, the Baltimore rates being also lower than Philadelphia rates.

The westward traffic from the seaboard is carried principally under classified tariffs. The number of classes and the rates for each as now in effect are shown in the following table :

## WEST BOUND RATES, SEABOARD CITIES TO CHICAGO.

Classes in cents per 100 pounds.

	1	2	3	4	5	6
From New York to Chicago . . . . .	75	65	50	35	30	25
From Boston to Chicago . . . . .	75	65	50	35	30	25
From Philadelphia to Chicago . . . . .	69	59	48	33	28	23
Philadelphia, lower than New York . . . . .	6	6	2	2	2	2
From Baltimore to Chicago . . . . .	67	57	47	32	27	22
Baltimore lower than New York . . . . .	8	8	3	3	3	3
Baltimore lower than Philadelphia . . . . .	2	2	1	1	1	1

These rates have sprung up out of the conferences of many years, and the circumstances under which they were established varied in the different years and precludes the adoption of any form of analysis which could be applied to the determination of these rates.

Under existing arrangements the roads leading from the east publish rates and issue through bills of lading to all western points located on the railroads within the territory west of Buffalo and Pittsburg, east of the Mississippi and north of the Ohio rivers. The agreed rates and distances from New York to Chicago are taken as the standard, or one hundred per cent. Through rates to the principal western cities, towns and junction points, in the territory above described, are computed at a percentage of the New York-Chicago rates, based generally on the relative mileage of such points to the Chicago mileage. For example, rates New York to Detroit, Michigan, are computed at seventy-eight per cent. of the rate New York to Chicago, it being seventy-eight per cent. of the total distance. In the same manner rates New York to Indianapolis, Indiana, are ninety-three per cent. of the New York-Chicago rates. Thus the New

York-Chicago rates, being at all times applied as the basis, would, when changed, create relative changes in the rates to the other western points. In a similar manner the relation as to rates is maintained from the other eastern cities. When rates from New York to western points are changed, like changes are made from Boston, Philadelphia and Baltimore, and points receiving the same rates, the "differentials" as between the eastern cities being at all times maintained. The relative distance between points between which freight is to be carried is substantially the basis of computation. There are sometimes many routes of different lengths between the given points, and rates may sometimes be based upon the longest route or the shortest, and sometimes on the average length of the several routes. After a rate has been established for a competing point, Indianapolis, Ind., it being ninety-three per cent. of New York-Chicago distance, then the rate from a point beyond Indianapolis, Ind., if it be not a competing point, but a local point beyond on any one of the various roads which run to Indianapolis, is added to the through rate. The local rate for a short distance can generally only be charged to the first competing point. Again, if a rate is wanted for a point west of Chicago, but east of the Mississippi River, the distance west thereof is added to the New York-Chicago distance, and if it is, say 200 miles beyond, the rate to that point would be twenty per cent. higher than the rate to New York-Chicago, or one hundred and twenty per cent. of the rates current.

**DIFFERENTIAL RATES:**—This term is made use of in a somewhat restricted sense, being applied, not to the differences in rates generally or between the several

classes of freight as they are arranged in the tariffs of freight charges, but to the differences in rates which are made by railroad companies as between the several Atlantic seaport cities. They have not been determined on any principle but are simply the result of a compromise between the various companies.

An important element in the arrangement of rate schedules is the distinction made in the class of railroads or routes, by which certain routes are under agreement allowed to charge a lower rate than others to the same points of destination.

From each of the eastern cities there are two classes of roads, commonly termed the "standard lines" and the "differential lines." The standard lines are those which are conceded to possess advantages over their competitors by reason of shorter all-rail distance and superior facilities arising from old and well-established connections and freight organizations. The differential lines are those which, on account of the longer routes and inadequate facilities, or owing to their through routes being partly by water, or from other disadvantages, cannot command, at even rates with the more direct lines, an amount of tonnage which under customary methods for determining such matters would be considered a fair proportion.

With a view to equalizing these conditions, and securing the permanency of the tariffs, as well as to bring about a fair distribution of the traffic, the "differential lines" are accorded somewhat lower rates than the "standard lines." Differential rates may thus be considered simply premiums offered for business.

At this time there are ten different lines leading from New York competing for western business. Three are

“standard lines” and seven are “differential lines.” The standard lines are N. Y. C. & H. R. R. Co., Pennsylvania R. R. Co. and the B. & O. R. R. Co. The differential lines are N. Y., L. E. & W. R. R. Co., L. V. R. R. Co., W. S. R. R. Co., D. L. & W. R. R. Co., N. Y. O. W. R. R. Co., C. & C. Ry. Route and the Central Vermont R. R. Route. The rates governing all traffic moving via any of the standard routes from New York to Chicago for the six classes are

1	2	3	4	5	6
75	65	50	35	30	25

per one hundred pounds, and the rates for traffic moving via the “differential lines” are for the first four

1	2	3	4	5	6
70	61	47	33	29	24

per one hundred pounds, and for the latter three proportionately alike. With these facts the reader can conceive the meaning of “differential rates;” merely advantages offered to lines of longer routes and inadequate facilities.

## PASSENGER RATE CONSTRUCTION.

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THE construction of passenger rates is slightly different from freight rate making. In the first place the rate maker is not confronted with the fact of classification, and is not compelled to follow any specific principles in the figuration of a rate, merely the basis of so much per mile per passenger. Local passenger rates are very simple in their construction; they are usually based on three cents per mile for one way, and for a round trip two-thirds of the double one way rate. Of course there may be some exceptions to this problem, on the ground that every company may follow its own specific principles; however, should a manager be called upon to construct a schedule of passenger rates for a territory where there is no competition he would, if there were no other schedule to follow, simply adhere to this mathematical principle, and in doing so the revenue accruing therefrom would meet all expenses created through the passenger service.

Through passenger rates are made by the agreement between the general passenger agents of the roads desirous of the rate. They are not made up by a combination of each road's local rate, but simply on so much per mile. Of course this rule will in almost every particular be generalized to make fit any case, but exceptions, however, spring up widely different from these. Looking at the question from a general standpoint, they are computed in this way: The several passenger agents hold a conference and agree on a rate from the points in question; it may be an arbitrary rate



or so much per mile. If it be the former, then the roads sharing in the rate would receive, as their proportion of the rate, so much per mile of the total distance; for example: A, B, C and D are desirous of securing some business from a point on A to a point on D, and in order to do this they must make it low enough, and at the same time observe the fact of an adequate return. The total distance is one thousand miles and the rate agreed upon is \$16.50 or 165-100 cents per mile. A is to receive forty miles, or 66 cents of the rate per passenger; B is to receive one hundred and ten miles, or \$1.82 of the rate per passenger; C is to receive four hundred miles, or \$6.60 of the rate per passenger; and D is to receive four hundred and fifty miles, or \$7.42 of the rate per passenger. If the same rate were to be divided on so much per mile, regardless of the distance, that is to say, each road to receive as its proportion of the rate, namely: A is to receive its regular local rate up to the junction, being the same rate which it formerly received prior to the consolidation, and should D demand as its proportion of the rate 2 cents per mile, and B and C to receive as their proportion of the remainder on so much per mile of the aggregate mileage of B and C, the rate would divide as follows:

A's proportion	40 miles	at 3 cents per mile	or	\$1.20
D's	450	" " " 2	" " " "	9.00

The remainder or \$6.30 would divide

B's proportion	110 miles	at $1\frac{23}{100}$ cts. per mile	or	\$1.36
C's	400	" " $1\frac{23}{100}$	" " " "	4.96

These are only some of the many examples of

passenger rate construction, but it is the author's hope that they will lend a thought towards the comprehension of the subject.

At this juncture it is thought that a few remarks devoted to the explanation of some of the terms used in conjunction with the passenger business would be beneficial to the reader, believing that in case of travel they would be available.

*What is the definition of Stop-off?*

By a stop-off is understood a departure from the continuous train short of the final destination of the ticket; a failure to take, at a junction or transfer point, the first connecting train therefrom, or the stopping off at an intermediate station by reason of having commenced the journey on a train which does not stop at or connect for the desired destination.

*What is a Mileage Book Ticket?*

These are books containing one thousand miles and are usually sold at a rate of two cents per mile, and are only good to the persons in whose favor they are drawn.

*What is a Computation Ticket?*

These are tickets of different denominations, ranging from fifteen trips to even as high as one hundred trips; they are usually based on so much of the total cost of trips specified, say three-quarters or two-thirds of the total cost, except where they are simply an arbitrary amount.

*What are some of the tickets and how distinguished?*

Local one way.

Local half one way.

Local round trip; no round half fare tickets are sold.

Coupon tickets are issued in conjunction with foreign roads. They are of a limited and unlimited character.

Attached to these tickets are coupons specifying a certain distance or the points from and to which they are good; these are detached by the train conductor and forwarded to the auditor of the road, and are his authority when rendering bills against the road selling the ticket.

Limited tickets are only good within a certain period of time, but,

Unlimited tickets are good until used and are sold at a higher rate.

The reader may at some time be called upon to ship a corpse; unfortunate as it be; however, let us not consider it in its worst stage but from a point of necessity. The person shipping a corpse must accompany it, together with a certificate of a reputable physician or of the board of health, stating the cause of the death. In every case a full first-class fare must be paid.

## FIXING THE RATES.

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THE fixing of rates, that is to say, what will be the proper rate to charge on articles transported, is the topic for consideration.

This question is of a wide conception and its development of to-day is the outgrowth of irregularities and divided attention. The fixing of rates as practiced to-day is erroneous and not in any sense founded on good and sound principles, but is simply the action of compromises. This hit or miss method of rate making has been allowed to drift along year after year without any serious attempts to institute a radical reform, and naturally provokes the inquiry, why, if the matter is of such importance as seems to be universally conceded, it has not already received an adequate consideration. The reason is not far to seek. Railroad officials are busy men, more occupied, perhaps, than any other class. The matters crowding upon a traffic manager every day are far beyond his time or strength, and he will dispose of them in the quickest possible time; that means things keep moving in the same old rut. No good reason can be given for the marked differences appearing in the many rate sheets throughout the country other than that the judgment of men differ upon these matters as widely as upon other questions.

Schedule making, when taken up in a systematic manner, becomes a question of independent thought and judgment. The important question to each officer of every company is how to fix his rates so as to produce

the largest aggregate income necessary to meet all fixed charges and operating expenses, and at the same time observe the required uniformity and have due regard to matters of public policy.

When a manager starts out to construct a schedule of rates for a new road his first step would be to classify the commodities to be transported; that is to say, in the several classes which he decides upon. The purpose of the classification is to simplify the difficulties of rate-making by grouping together the different articles which it is thought should rightfully make the same contributions towards the payment of fixed charges and operating expenses. The second step, although not formerly practiced, would be to determine the relative rates upon the different classes; that is to say, what ratio the rates of one class should bear to rates of other classes. This measure is an absolute necessity to preserve uniformity. The third step would be, what the actual rate should be.

Having these thoughts presented to us let us consider them briefly. The first thought—which refers to the classification of articles necessary to simplify rate-making—is an essential feature. It would not be practicable to charge a uniform rate on all articles, as it would prohibit the movement of many. For instance, the wheat or flour of the western prairies would never reach the several seaboard cities, were they subjected to the same conditions and the same rate as on other manufactured articles, so it has been found expedient to classify the articles.

The second step is to determine the relative percentage of one class to the other classes. If a manager starts out with only three classes they certainly should bear or have a relationship, if a systematic principle is to

be followed. In the past the relationship of one class to the other has been wrought simply by compromises, and, while the proceedings are somewhat detailed, let us only consider the principle that we would think to be an equitable one.

Many plans for the proper way of determining the relationship of the various classes of rates have been presented; some are able while others are incomplete in themselves. The percentage system is one that would, it is hoped, meet every requirement. This system would afford means whereby the varying and multiform grades of differences in the relative transportation conditions of the many articles of the same general class may be expressed, while the distribution of all articles into classes on generic lines will permit each section of the country to adjust its carrying charges so as to develop its own peculiar interests. The plan is to take each article in its transportable form and follow it through the varying conditions affecting its transportation value to the highest conditions in its class, or until it is taken out of its original assignment and put into the composite class because of its union with other products. Instead of the variable and irregular rates as are in practice to-day, the use of a single basic rate to apply on all articles in the same class will always be maintained. That is to say, suppose the basic rate on a certain product between two points to be one dollar per hundred pounds. Each article included under that specific product will then be charged such a proportion of one dollar as is indicated by the percentage given to it; that is, if it be a twenty-five per cent. article the rate would be twenty-five cents per one hundred pounds, and so on. The basic rates on these general classes could

be varied to suit circumstances, but every article in a class would bear the same relation to every other article in the same class, regardless of what be the general rate on that class. The establishment of a fixed percentage relation for each article in its own class will, if intelligently done, insure that every article shall pay its proper proportion of the total charges on that class; while the variation in rate required by the diverse interests of the carrier will determine, within the limit of reasonableness, what shall be the basic rate on each class. As already presented, a reasonable rate in one section of the country may not be in another. With this fact in mind it would hardly be practicable to make a division. There is no one who is better acquainted with the fact of how much a certain shipment cost to transport and what were the assumed risks in carrying it than the traffic manager.

In a previous chapter the system of rate making is illustrated. The two divisions of expense that are necessary to be considered are, first, terminal expenses, which includes every expense at that point. Second, the hauling. The station expenses for a short haul are just the same as for a long haul, but the hauling cost is charged according to the distance; therefore, in determining the general rates for the various classes, these points should be considered.

The use of this system would permit any shade of difference in the rate of charges that may be desired, so that supposing wheat to be a thirty per cent. article, bran might be made one or two per cent. lower, and so on.

The use of this system would certainly simplify tariff making and at the same time make the use of tariffs by the public very much more practicable than is now the case.

In 1852 the Pennsylvania Railroad received as an average freight rate 5 and 42-100 cents per ton per mile. In 1892 the average rate was but .647 cents per ton per mile. In 1860 the Fitchburg Railroad received as an average freight 4 10-100 cents per ton per mile, and in 1892 the average rate was .925 cents per ton per mile. These figures give plainly the differences in rates as between the Middle and the New England States, therefore no set system of the price per ton per mile could with intelligence be given.



## CONSTRUCTION OF FREIGHT CLASSIFICATION.

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To trace the development of the present method of making freight classifications would be an interesting study. What every student wants to know is not so much how the present conditions were brought about but how and what are the principles of necessity requisite in the making up of a freight classification. The step from a railroad classification of 1856, which contained thirty-three specifications, in addition to the clause "Analogous articles will be charged at corresponding rates," to the present classification, comprising six thousand articles, is a long one, and it would be impracticable to give even a minute account of its origin.

Ordinarily a classification is understood to mean one thing and a rate sheet another; whereas, as a matter of fact, they are only parts of the same thing. If we were to take the rates away from the classification, what would its use be to us? and if we were to take the classification away from the rate sheet the charging and fixing a rate in an intelligent manner would be one of the impossibilities.

Prior to the date of the Interstate Commerce Act there were numerous classifications throughout the country, but to-day there are only three, "official," "western" and "southern."

There are two general classes of schedules under which the freight traffic of the United States is carried; namely, Class Tariffs and Commodity Tariffs. Class

tariffs are arranged to show the rates of the respective classes contained in the freight classification.

In the commodity tariff are found the great majority of articles carried by the railways, classified in accordance with the various elements that properly enter into the determination of freight charges. Under these are also found the commodities above mentioned, and although exceptionally treated in certain sections as to rates, they are all amenable to some rule of the classification. The rate-making foundation for all commodities is seen to lay largely in the freight classification. The commodity tariffs have reference to schedules applicable to such articles as grain, lumber, coal, live stock, dressed beef, fertilizers, oil, etc., transported between sections of the country where these articles have attained a commercial and shipping importance which has made necessary specific rules for their transportation differing from those covering classified traffic, as well as a somewhat lower scale of rates than is applied to the former.

The development of the railroad business of the country and the volume of business interchanged, has been the means of enlargement and extension of freight classifications. These publications, which are arranged in an enlarged and convenient manner, wherein may be found all commodities of commerce, described in every probable form of shipment, with a rate reference for each description, together with the rules and regulations under which each will be received for carriage, are now current guides to the shipping public and have an enormous circulation.

Concerning the basis of constructing classifications, it may be said to have been early discovered that the charges for transportation of different articles of freight

could not be apportioned among such articles with regard alone to the cost of carriage.

This basis of determining the charges, it was found, would confine to narrow limits the movement of different articles whose bulk or weight was large in comparison to their value, while heavier articles with less bulk would be made to pay disproportionately low rates. Under the system of apportioning the charges strictly to the cost some kinds of commerce which have been very useful to the country, and have a tendency to bring different sections into more intimate business and social relations, could never have amounted to any considerable magnitude, and in some cases could not have existed at all, for the simple reason that the value at the place of delivery would not equal the purchase price with the transportation added. The traffic would thus be precluded, because the charge for carriage would be greater than it could bear. On the other hand, the rates for the carriage of articles which, with small bulk or weight, concentrated great value, would, on that system of making them, be absurdly low when compared to the value of the articles, and perhaps not less so when the comparison was made with the value of the service in transporting them.

Accordingly it was found not to be unjust to distribute the entire cost of service among all articles carried, on a basis that gave greater consideration to the relative value of the service than to the cost. Such a method would be most beneficial to the country; it would enlarge commerce and extend communication, and would be better for the railroads because of the increased traffic which would be brought to them.

The value of the article, carried under this system,

would be the most important element in determining what freight charge it should bear. Other considerations, however, equally important, must not be overlooked when the freight classification is to be made. The classifications as now constructed have for their foundation the following elements:

The competitive element, or the rates made necessary by competition.

The volume of the business; that is, the tonnage movement.

The direction in which the freight moves; that is, whether it moves in the direction in which most of the freight is transported or in the reverse direction in which empty cars are running.

The value of the article.

The bulk and weight.

The degree of risk attending transportation.

The facilities required for particular or special shipments.

The conditions attending transportation, such as furnishing special equipment, as in the case of private dressed beef, cars specially adapted for freight of a perishable nature, or cars of large size for freight of extraordinary bulk.

Another condition which has also received consideration is the analogy which the new articles to be classified bear to other articles found in the classification. The conditions under which railroad companies can afford to transport traffic have a large influence in determining the classification.

These are the general rules under which classifications

are constructed, and while to a great extent controlling, the classifications are, notwithstanding, in great measure a series of compromises, the participants in which are not alone the railroads, but also the shippers and representatives of business interests throughout the country, the latter being afforded ample opportunity to join with the railroads in the discussion as to the proper classification of articles of shipment affecting their interests.

While the pressure for reduction is very strong from certain localities, concessions are not now so readily granted, as the territory covered by the freight classifications is so large that great care in the assignment of articles to particular classes must be taken in order to avoid working an injury to any particular section. The commercial and transportation interests are regarded as identical, and the welfare of the whole territory and all interests affected must be considered. It is however, occasionally observed that particular localities are to some extent preferentially served by the action of the carriers who resist proposed changes in the classification, for the reason that, in their opinion, they will operate to the prejudice of certain patrons. Thus exceptions to the classification are created by a road continuing to carry some articles at one class, when in the opinion of a majority of the roads using the classification, the articles could well stand a higher rating. At this time fewer articles are rated independently of the classification than ever before in the history of railroads.

At this time there are practically but three freight classifications in use throughout the United States; namely, the Official classification, the Southern Railway and Steamship Association classification, and the Western classification. The application of these are as follows:

First :—The official classification is used almost exclusively throughout the territory east of Lake Michigan, Chicago, and the Mississippi River, and north of the Ohio and Potomac Rivers to the Atlantic sea-board.

Second :—The Southern Railway and Steamship Association classification is applied generally to roads south of the Ohio and east of the Mississippi River to the sea-board.

Third :—The Western classification governs the territory north and west of Chicago, west of a line drawn from Chicago to St. Louis, and west of the Mississippi River, St. Louis to New Orleans.

In each of the three divisions of territory described exceptions to these particular classifications are made to some extent by state commissions, and by individual roads for state or local traffic. Traffic carried between different points in the sections above described is usually taken at either one or the other of these leading classifications. For example, the classified traffic from the Atlantic sea-board to the Pacific coast is carried under the Western classification; traffic from Chicago to Atlanta, Ga., is carried under the Southern Railway and Steamship Association classification.

The territory throughout which the official classification is shown to govern is the largest both in point of tonnage and communities served. At the date of the passage of the act to regulate commerce, one hundred and thirty one (131) railroad companies within the territory defined above as governed by the official classification, each had a separate classification, in addition to those classifications which had grown up mainly to foster local conditions, and were thought to be beneficial to the

particular roads and shippers, there were five associations of railroad companies each having a classification. These classifications were as follows :

First :—The local classification of each railroad company.

Second :—The through west-bound classification, generally known as the "Trunk Line classification," applying to through traffic originating at sea-board cities and points east of the western termini of the trunk lines, and destined to Buffalo, Erie, Pittsburg, Parkersburg, etc., and to a number of competitive points, trade centers or railroad junction beyond.

Third :—The east-bound classification, which alone applied to east-bound traffic originating in the territory east of Chicago and the Mississippi river, west of the western termini of the trunk lines and points east thereof.

Fourth :—Traffic between competitive interior points in the Middle States; namely, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia and West Virginia, and between the several trunk lines and connecting roads, was governed by the joint merchandise classification, which also applied to the local traffic on certain roads.

Fifth :—The Middle and Western States classification applied to the traffic between competitive interior points west of the western termini of the trunk lines east of the Mississippi River and north of the Ohio River.

When it became certain that the interstate commerce act would become a law, early in 1887, the railroad companies decided at a meeting held for that purpose

that it would be necessary to create, and, if possible, adhere to a uniform classification. At this meeting there was appointed a special committee, composed of representatives of ten or twelve different roads, whose duty it was to go over the various classifications then in force and unite them into one classification, and the result of the work of this committee was the formation of Official Classification No. 1.

Under the former arrangement the through or larger portion of the classified traffic was carried in two classifications; the west-bound classification was applied to traffic moving westward while an entirely separate classification was applied to traffic moving eastward.

These two classifications, as well as the rates of the respective classes, were entirely dissimilar; the latter made provision for twelve or thirteen classes, which embraced the heavier or bulk freight carried mainly in car load quantities from the western center to the seaboard; while the former provided almost exclusively for package freight, usually transported in small or less than carload shipments, the rules and regulations applicable to each classification being in a few instances similar.

The conditions and the requirements upon which the present classification is based are of an entirely different character, as the new issue governs all traffic, through and local, between all stations of the roads within the territory described.

It may be interesting to learn the methods under which an article may receive its place in the classification. This will be here briefly explained for the official classification, which is applied exclusively by carriers covering more tonnage than any of the other classifications in use.



The official classification committee is composed of twelve general and assistant general freight agents, representing twelve of the principal lines in the territory using that classification. While the twelve men referred to are the official representatives of only twelve railroads, the official classification governs and is used by one hundred and fifty different railroads the total mileage of which is 65,000. Over 50 per cent. of the total tonnage of all roads in the United States is carried under the official classification.

This class committee was created for the purpose of defining the classes under which freight shall be transported by the various lines within the territory above described.

What is known as the "through" business of the Trunk Lines Association and the Central Traffic Association is arranged for by a joint committee composed of members of the two associations named, and this joint committee appoints the classification committee, which latter committee has a permanent chairman. All applications bearing upon changes or additions in the classifications may be submitted in writing at any time, either by the railroads or shippers, to the chairman of the classification committee, together with the various reasons in support of the application for such changes.

The chairman acknowledges the receipt of every such application, following which an investigation is made as to the value, bulk, and various other features relating to the article for which a change is sought and which are usually considered when making a classification.

Upon the conclusion of the investigation the chairman renders a report to the classification committee for its consideration and action, with a recommendation for or

against the granting of the application. The chairman may make temporary rulings regarding the classification of any article, but the final classification of all articles is only obtained by vote of the roads in joint committee.

Official classification No. 1 was issued April 1, 1887, and may be said to have been largely experimental, as it was hardly to be expected that the commerce of so large an area could at once be made to conform to the new conditions resulting from the consolidation of the widely different classifications formerly in use.

Official classification No. 2 was issued on July 15, 1887. The revisions in the classifications have necessitated frequent issues of this publication, the last being No. 13, of January, 1894. Since 1887 there have been thirteen issued, and in view of this fact one can conceive what differences occurred and what changes were necessitated.

With these facts presented it is hoped that the student or reader may have a conception of the construction of freight classification.

## CONSTRUCTION OF FREIGHT SCHEDULES OR TARIFFS.

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ALL freight tariffs should serve to describe the rate they contain. Considering the vast number of railroads in the country and their methods of constructing tariffs, it would hardly be practicable to give even a minute account of their way of construction.

There are many tariffs in effect which, to a greater or less degree, are defective and imperfect in their construction, and do not present the rates or the rules and regulations governing the same with clearness. The printing of tariffs is one of the main features in the construction; they should be printed in large, plain type, and in such a manner that they can be readily understood and read. Many roads throughout the country use the various duplicating processes, such as the hectograph, mimeograph, typewriter type, etc.

Much can be said against these methods; they will fade in the light and in a little time cannot be deciphered, and from their vague construction do not give sufficient information for a clear understanding of their application. Every schedule should plainly state the places between which the rates apply. Tariffs are generally issued by the road on which the traffic originates.

It frequently occurs that a road will issue a tariff from points on another road to points on its own line, and such a tariff will make no reference to the initial connecting road other than giving the name of the point from which the traffic originates.

The title of the tariff will in no way indicate that it is a joint tariff, and in many cases nothing whatever appears showing that connecting roads have authorized the tariff. This should be done in every particular case. When a tariff is issued between points on different roads showing rates on various classes on basis other than combination of local rates, such a tariff is a joint tariff, and its title should read "joint through tariff on general merchandise." If it only covers one commodity the name of that commodity should be prominently shown, and should it become necessary to issue tariffs in different directions they should read, "joint west-bound freight tariff," or "joint east-bound freight tariff," as the case may be. If the tariff is only to cover one commodity, the name of the commodity should be prominently shown in the title of the tariff; for example, "joint east-bound freight tariff on lumber."

When using the word "joint" it should only be applied to titles of tariffs which are joint tariffs in fact, and omitted from any other tariffs. In constructing freight tariffs to apply between points on the same road, they might be called "freight tariff on general merchandise between local stations," "freight tariff on general merchandise," or "freight tariff on coal."

The front or title page of a tariff should make a clear distinction as to whether it be an individual tariff, that is, to only cover business between local points, or whether it is a joint tariff. The front or title page of tariffs should contain only:

First:—Number of tariff.

Second:—Reference in detail, by title or number, to all tariffs which are superseded, indicating in what

manner the new tariff changes the rates in the previous tariffs referred to.

Third:—Title of tariff; traffic covered.

Fourth:—Name of road, if an individual tariff, or names of all roads uniting in making the rate if a joint tariff. In the latter case suitable wording should be used to indicate the assent of all roads to the rates contained in such tariff, as set forth in the ninth requirement below.

Fifth:—Date of issue.

Sixth:—Date effective.

Seventh:—Note indicating the route and names of connections.

Eighth:—Name and address of the official issuing the tariff.

Ninth:—Appropriate certification of the rates by the officers authorizing their publication. For example, "the following officers of the above-named roads concur in the rates herein given;" following this the names of the proper officials.

The form as presented shows the title page of a joint freight tariff which contains all the information requisite to the foregoing regulations.

INTER-STATE.—TO BE POSTED IN TWO PLACES AT EACH  
FREIGHT STATION.

THE POTAMAC AND ROANOKE RAILROAD  
COMPANY.

BALTIMORE & OHIO R. R. COMPANY,  
WILMINGTON AND NORTHERN R. R. COMPANY,  
PHILADA. AND ERIE R. R. COMPANY,  
NEW YORK, LAKE ERIE & WESTERN R. R. Co.

ORDER No. 221.

JOINT CLASS RATE TARIFF.

Applying in both directions between stations on the Potomac & Roanoke R. R., Baltimore & Ohio R. R. and stations on the New York, Lake Erie & Western R. R. Company via Philadelphia & Erie R. R. Co., in effect December 1st, 1890.

The rates named in this tariff do not apply on coal, coke or fruit.

Under this tariff, when freight is to be loaded by consignor or unloaded by consignee, one dollar (\$1.00) per car per day or fraction thereof, for delay beyond forty-eight hours in loading or unloading, will be added to the rates named herein and constitute a part of the total charges to be collected by the carrier on the property; except, however, when in conflict with Car Service Association (or local regulations at shipping point or destination), in which case such car service association or local regulations shall prevail.

The following officers of the above-named roads concur in the rates herein given.

CHARLES J. BROWN,	WALTER JOHNSON,	WALTER DIETRICH,
G. F. A., P. & R. R. R., Philada., Pa.	G. F. A., B. & O. R. R., Pittsburg, Pa.	G. F. A., W. & N. R. R., Chester, Pa.

THOMAS H. BOWNE, JR.,	JOHN ECKERT,
G. F. S., P. & E. R. R. Co., Harrisburg, Pa.	G. F. A., N. Y. L. E. & W. R. R., New York, N. Y.

PHILADELPHIA, PA., June 20th, 1891.

In the arrangement of the points, classes and commodities should be systematic, and the language chosen for the purpose of expressing as to whether the rates may be used in one or more directions should be definite. There is a considerable amount of irregularity in the publishing of tariffs; simply because many roads where the duties of the officers are divided so that one agent will only be interested in through traffic, with authority to make rates, while the local traffic is in charge of others. The conditions surrounding the traffic covered by the through rates would not necessarily be known to the officers in charge of local traffic. Changes made in the through rates may therefore not come to their knowledge. In view of this fact it often happens that reductions are made to terminal points without corresponding changes to the intermediate points.

The authority for the publication of joint tariffs should always be shown, and what carriers and officials are responsible for their correctness and compliance with the act to regulate commerce, and they should indicate the routes over which rates are applicable. It frequently occurs that the route by which the traffic is to be carried is omitted, thereby making its application doubtful owing to the absence of this valuable information as to the routing of the traffic.

A large portion of the roads issue what are termed distance tariffs and distance tables, applicable to local traffic. These tariffs show rates upon the various classes and commodities for different mileage groups, generally of five or ten miles. The distance table shows the names of the various stations and the distance from each to all other stations. In some cases, however, they are combined, and in such events they are very often so con-

structed that it is not clear how one should proceed to obtain a particular rate. Ordinarily, to obtain a rate between any two stations under these tariffs, reference must be first made to the distance table for the mileage, and, second, to the distance tariffs for the corresponding mileage. If a rate is sought for a classified article the classification must be consulted.

These three papers, namely, the distance tariff, distance table and the classification, are all necessary to ascertain the rate.

In constructing tables of this character care should be given to the fact of clearness, system in the compilation, and should not in any sense be complicated, for example:

---

TO BE POSTED.

---

THE POTOMAC AND ROANOKE R. R. CO. AND BRANCHES.

---

Philadelphia and Baltimore, Baltimore and Potomac,  
Harrisburg and Lancaster and Reading and Carlisle.

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GENERAL FREIGHT DEPARTMENT.

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FREIGHT DISTANCE TABLE.

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ORDER NO. A 12 OF 1880.

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. . . . . STATION.

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IN EFFECT FEBRUARY 21ST, 1880.

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Distances as given herein are constructed for the purpose of arriving at freight rates only, and must not be



used for any purpose other than in connection with freight tariffs. Stations and sidings for which no distances have been provided will take the distance applying to the next station beyond.

CHARLES J. BOWNE, G. F. A.

SAMUEL DIETRICH, G. F. A.

PHILADELPHIA, February 1st, 1880.

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In the adoption of tariffs of other roads, associations, etc., the road receiving such tariffs for the purpose of announcing to the public rates from their own stations, should regard such tariffs the same as tariffs of their own issue, and should be provided with a supplemental title page, numbered and dated, showing plainly the names of the stations from, to, or between which the rates in the adopted tariff will apply; and the title page should be otherwise arranged after the form of their own tariffs. The manner of abrogating and changing tariffs varies in many cases. Some are complete in their purpose while others are indefinite. There is a variety of expressions used for this purpose, some of which are as follows:

Abrogating all previous tariffs.

Abrogating all conflicting rates.

Former rates conflicting are hereby withdrawn.

This is not considered a very satisfactory form or in any sense complete, and in many instances is misleading. A more definite form and one that will meet all the requirements, is as follows: If we were to cancel order No. 221 and instead issue another, our clause would read:

“Order No. 222 superseding Order No. 221 of December 1st, 1890, and supplements.” In this case order No. 222 would take its place, and should any one have occasion to refer to this tariff the information is at hand.

Numbering tariffs is a very important feature to remember; while there are a variety of systems throughout the country, some are complete and others not worthy of mention. To have a correct system is important. A number should serve as a part of the title of the tariff and should be plainly stated for the purpose of identifying each tariff, and further, for the purpose of abrogating or amending other tariffs. The numbering should be systematic, and references to the numbers should be plain and complete to be of service to all making use of the tariff. Where roads issue a series of tariffs they are characterized by letters, as for example: “Order A-221 of December 15th, 1890, and so on.”

Tariffs are of various sizes. Many are larger than they need be, while others are frequently on sheets so small that much of the information necessary to understand their application is omitted. The size that is fast becoming a standard, and is found large enough to embrace all the detail necessary to properly present the rates, is on sheets eleven inches long by eight inches wide.

When constructing a tariff the unity of quantity should always be given, so as one can determine the quantity for which the rates are named, such as “per one hundred pounds,” per barrel, per ton, per car. If the student will follow the foregoing suggestions he will have very little trouble to meet all the requirements requisite in tariff construction.

## PERCENTAGE TABLES.

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THE percentage tables are used in apportioning revenue accruing from the transportation of freight and the conveyance of passengers.

They may be characterized as "joint percentages," that is to say, percentages applicable in dividing business between two or more companies, and "local percentages," for the purpose of dividing the revenue of the home company. Percentage tables are of different construction; some are made up on an actual mileage basis and others on a constructive principle, commonly termed blocks, of so many miles each. In the establishment of these tables it is in some particulars identical to rate construction. One road will want a certain mileage to a certain given point, which may be several miles greater than the actual distance, and the other roads to receive but actual miles. Another principle of construction is the grouping system; that is to say, so many points within a certain limit of miles will take the same percentage as is given to that limit; as for example:—There are four stations within a distance of 20 miles, A, B, C and D. If we were to take the actual miles and ascertain the percentage, station D would be the largest, but the difference to the intermediate points being so small it is deemed practicable, for the sake of simplifying and lessening the work of prorating revenue, to give the same percentage to the intermediate points as the ultimate point. Local percentages are computed on an actual mileage principle.

To ascertain the percentage relationship between two

points on separate roads, our first step would be to find what distance these points are from the nearest junction point with that road. Say the distance from a junction point to A is forty-five miles and B is distant from the same point forty-nine miles, the percentage relationship would be :

A's mileage is 45 miles or  $45 \div 94 = 47.9$  per cent.

B's " " 49 "  $49 \div 94 = 52.1$  "

The solution is, what percentage forty-five miles is of the total distance or ninety-four miles. If forty-five miles is some percentage of ninety-four miles, then ninety-four miles, multiplied by some percentage, will equal forty-five miles. If ninety-four miles, multiplied by some percentage, equals forty-five miles, the percentage equals forty-five miles divided by ninety-four miles, the total distance, or forty-seven  $9 \frac{10}{100}$  per cent. The rule is, divide the relative distances by the aggregate and the result will be the percentage.

If the reader would follow the above rule, no matter how many roads were sharing in the revenue, the relative percentage would be obtained on that principle.

It very often occurs that an arbitrary amount is to be deducted before the total revenue is apportioned between the several roads, and when this is the case this amount is first deducted and the remainder divided on agreed percentages ; as for example :

Three roads, A, B, and C, and the amount to be divided between them is \$24.00. A's proportion is thirty per cent., plus arbitrary one cent per one hundred pounds. B's proportion is forty per cent., and C's proportion is thirty per cent., plus three cents per two thousand pounds. The amount that each would receive is as follows :

The shipment reads 24,000 pounds at 10 cents per 100 pounds or \$24.00.

A's proportion 30 per cent., of				\$21.24 plus arbitrary.	
				\$2.40 or a total of	\$8.77
B's	"	40	"	"	\$21.24
					\$8.50
C's	"	30	"	"	\$21.24 plus arbitrary.
					\$0.36 or a total of
					\$6.73
Total					<u>\$24.00</u>

All percentage tables are practically based on the foregoing principles and, with this brief explanation it is hoped that the reader has been given sufficient information to enable him to understand a table in an intelligent manner.

## RECEIVING, FORWARDING AND DELIVER- ING PROPERTY.

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WE have now come to consider the requirements which are necessary in the moving of property. This question of transportation is one of the weightiest topics in connection with conducting transportation. The essential principles are numerous, and if it were possible to invade all of them in this chapter, it would expand to an ordinary book of itself; however, let us only consider those which are absolutely necessary.

If the reader had a box of dry goods which he desired to ship he would be compelled to furnish a shipping order, signed by himself, giving full particulars of the consignment; that is to say, a correct list of the articles, with marks, and the name of the consignee and destination of the shipment in full, including the State or Territory and the county therein. This document is for the guidance of the parties shipping the property, as no verbal shipping directions are accepted. In turn for this, the company's agent gives a shipping receipt if it is a straight consignment, which should be an exact copy of the forwarding authority. This shipping receipt is not negotiable, but simply an acknowledgement for the property as described in the body of the receipt. Should the reader desire to ship this box of dry goods "to order," or to his order, notify the consignee; that is to say, deliver the freight only upon the presentation and surrender of the original bill of lading properly endorsed by him. It is necessary to secure a bill of lading, which is a binding contract, as per conditions within the body of

bill of lading, between him and the receiving carrier, and is of the same respective value as bankers' drafts or bills of exchange.

This bill of lading can only be obtained upon the surrender of the original shipping receipt, properly endorsed by the company's authorized agent. The box is then weighed, and the weight thereof, together with the number of car into which it has been placed, is noted on the shipping order, when it is ready to be manifested or way-billed, as no shipment is allowed to go forward without a way-bill.

This way-bill is a memorandum of the consignment, together with a full and complete shipping directions. It is made directly from the shipping order or forwarding authority, which should give all particulars of the consignment, the number and initial of car into which the property or box has been loaded, the record of the checking into such car, and the point to which the car is carded. As for example :

One box of dry goods from Cayuga, Pa., to New York, consigned to Mr. John Brown. The way-bill would read thus :

## JOINT FREIGHT MDSE. WAY-BILL.

CAR No. 23, INITIAL P. &amp; R. WAY-BILL No. 123.

FROM CAYUGA, PA., TO NEW YORK

VIA WAYNE AND ZEALAND JUNCTION.

Consignee and Destination.	Articles.	Weight.	Rate.	Freight.	Advances.	Prepaid.																		
Mr. John Brown New York	one box dry goods	300 lbs.	$\frac{100}{75c.}$	\$2.25																				
The revenue would divide				<table border="1"> <thead> <tr> <th colspan="3">Apportionment</th> </tr> <tr> <th>ROADS</th> <th>PER CENT.</th> <th>AMT.</th> </tr> </thead> <tbody> <tr> <td>A. . . . .</td> <td>20%</td> <td>\$0 45</td> </tr> <tr> <td>B. . . . .</td> <td>40%</td> <td>\$0 90</td> </tr> <tr> <td>C. . . . .</td> <td>40%</td> <td>\$0 90</td> </tr> <tr> <td colspan="2" style="text-align: right;">Total, . . . . .</td> <td>\$2 25</td> </tr> </tbody> </table>			Apportionment			ROADS	PER CENT.	AMT.	A. . . . .	20%	\$0 45	B. . . . .	40%	\$0 90	C. . . . .	40%	\$0 90	Total, . . . . .		\$2 25
Apportionment																								
ROADS	PER CENT.	AMT.																						
A. . . . .	20%	\$0 45																						
B. . . . .	40%	\$0 90																						
C. . . . .	40%	\$0 90																						
Total, . . . . .		\$2 25																						

The reader will observe that there are three columns provided for in this way-bill ; namely, Freight, Advances, Prepaid.

In the column "freight" are extended the total charges between points from and to which way-bill is made.

In the column "advances" are extended the amounts paid out by the forwarding station as back charges ; that is to say, when a shipment is received from a connecting road at a junction point the agent of the receiving road pays all the charges against the shipment up to that junction, and they are termed advance charges, which is a credit to the forwarding agent, as he advanced the money.

In the column "prepaid" are extended the amounts



collected by forwarding station to apply on the shipment. When a shipment is prepaid a memorandum is noted on the way-bill, explaining fully the point to which the prepayment is to cover, as, for instance: "prepaid to New York," or "prepaid to Boston, Mass.," and is a debit to forwarding station and a credit to the receiving agent or road.

The amount in "freight" and "advances" columns are a charge to the receiving agent or road; that is to say, all charges, whether freight or advance charges, appearing on the way-bill received is chargeable to the agent receiving it. The way-bill is now made and there must be some provision made for the proper handling of the car into which the box was placed so that the property will reach its correct destination. This is provided for by issuing memorandum manifests or card way-bills, which contain the same instructions as the regular way-bill, viz.: forwarding point and date, number and initial of car, contents, name of consignee, and ultimate destination. The car is carded with regular ticket which gives the forwarding point and destination, date, route, contents, car number and the initial.

The car is then sealed and together with the card way-bill is handed over to the train conductor, who makes an examination that no discrepancies exist, and the car is carried to its destination.

When the car reaches its destination the train conductor unloads the freight and delivers it to the agent at that point with the manifest. The agent receiving the property takes a record of the shipment and records it in a ledger or freight receipt book, and at the same time making out a bill against the consignee which is called an expense bill.

Upon the arrival of property notice is sent to the consignee, or the parties to be notified. The following rules are generally observed in the delivering of property :

When consigned to a certain party, the freight is delivered to that party only, or upon his written order.

When consigned to one party "in care of" a second party, the freight is delivered to the second party only, or upon his written order.

When consigned to one party, "notify a second party," the second party is notified, but delivery of the freight is only made upon the presentation and surrender of the original shipping receipt or bill of lading, properly indorsed by the first party.

When consigned simply "to order," or "to order of shipper," the freight is only delivered upon the presentation and surrender of the original shipping receipt or bill of lading, properly indorsed by the party to whom it was issued.

When consigned "to order" of a certain party, the freight is only delivered upon the presentation and surrender of the original shipping receipt or bill of lading, properly indorsed by the party to whose order the property is consigned.

When consigned simply "to order," or "to order of shipper, notify a certain party," the said party is notified, and the freight is delivered only upon the presentation and surrender of the original shipping receipt or bill of lading, properly indorsed by the party to whom it was issued.

When consigned "to order of one party, notify a second party," the second party is notified, but the property is not delivered until the original shipping receipt

or bill of lading, properly indorsed by the first party, is presented and surrendered.

No freight or any portion of a consignment can be removed from a station until all of the charges are paid, and when delivering property a delivering receipt is taken, which indicates the station at which delivery is made, the date and exact time of delivery, full reference to billing, the name and address of consignees, articles, marks, weight, charges, etc., as shown by the corresponding expense bill, and the condition of the property when delivered.

We now come to the accounting for the shipment. As previously referred to, every agent is charged with the amount on all way-bills received by him for collection, and all amounts collected to prepay on shipments forwarded, and all cash remitted to the treasurer, and all money paid out for advance charges, if he be a junction agent, are credits to him. The tables on pages 91 and 92 will show an exhibition of a "Station and Cash Account :"

*Daily Exhibit of Business from Agent at \_\_\_\_\_ Station.  
Daily Report for the \_\_\_\_\_ day of \_\_\_\_\_ 1894.*

	FOR LAST MONTH.	FOR CURRENT MONTH	TOTAL.
<b>STATION ACCOUNT.</b>			
BALANCE from latest daily report, . . . . .			
Passenger Collections, . . . . .			
Total to be Collected on Way-Bills Rec'd, Corrections and Collection Orders, . . . . .			
Prepaid Freight (T. & R. Proportion only Due Connecting Lines, Cash Advanced by Treasurer, generally to pay Back Charges, . . . . .			
Miscellaneous, . . . . .			
Dr. Balance from last month, . . . . .			
Daily Totals of Debits, . . . . .			
<b>TOTAL CHARGES to Station Agent's Account,</b>			
Remittances { Cash, . . . . . of { Vouchers for Back Charges, Other Vouchers or Bills Pd, Corrections, . . . . .			
Cr. Balance from last month, . . . . .			
Daily Total of Credits, . . . . .			
Balance to next Report, . . . . .			

*Daily Exhibit of Station Account.—Continued.*

CASH ACCOUNT.		AMOUNT.
<b>CASH BALANCE on hand commencing the day, . . . . .</b>		
Passenger Collections to-day, . . . . .		
Freight " (Way-bills received), . . . . .		
" " (Prep'd Way-bills), . . . . .		
Advances received from Treasurer, generally to pay Back Charges,		
Total Receipts of Cash to-day, . . . . .		
<b>TOTAL CHARGES to Cash Account, . . . . .</b>		
Cash remitted to Treasurer, { Passenger, . . . . .		
Back Charges PAID on Freight Forwarded, { Freight, . . . . .		
Total Payments of Cash to-day, . . . . .		
<b>CASH BALANCE on hand closing the day, . . . . .</b>		

RECEIPTS TO-DAY.

PAYMENTS TO-DAY.

From the foregoing illustration the reader can see how and under what principle the accounts at a station are kept. This exhibit is made out daily. Some roads follow this rule, while there are others which only require a weekly exhibit, and others a monthly report.

This report, together with a report of all way-bills received and tickets sold, and a report of all way-bills issued, are forwarded daily to the auditor, for recording.

The way-bills appearing on the report of way-bills issued are recorded in a ledger or freight record, as some roads term it, consecutively in station order; that is to say, from the initial point to termini. The daily exhibit is also recorded in a ledger, or, as some have termed it, a station agent record, and the way-bills and total of each on the report of way-bills received are checked against the way-bills and totals of way-bills forwarded. If they both agree the agent is charged with that amount. At the close of every month these records are summarized and if the totals in the freight record agree with the total amount to be collected on way-bills received his accounts balance so far as that portion of his account is concerned, and he is charged with that amount. The sales of tickets are accounted for in a somewhat similar manner; the agent, at the close of every month, renders a monthly statement which shows a complete record of all tickets sold from his station, giving the beginning and closing numbers, to what station sold, the total number, rate and amount. Before this report is checked, however, all the tickets sold from a station are assorted according to the stations to which they are sold and arranged in consecutive order, the lowest number on top.

The report is then checked, and if the total number of

tickets shown on the report agree with the number on hand the report is correct and the agent is charged with that amount. This process is followed month after month.

## REVENUE AND EXPENSES.

---

The whole structure of the system of collecting freight revenue, holding accountable all agents who assess it and collect it, dividing it in the agreed proportion between the railroads over which it passes, and the tabulating of the immense mass of statistics, which are kept to show separately the quantities of freight received from and delivered to connecting lines, and every possible class and variety, by route, and to and from point of departure and destination, is founded upon a paper called the way-bill, neither the magnitude nor the minute elaboration of the system involved in a way-bill could be adequately described within limits.

The theory of a way-bill is that no shipment must move without one, which gives a full description, showing the points of departure and destination, whether it has been prepaid or to be collected at destination, etc., and not only must a way-bill accompany a shipment, but a duplicate of it must be sent to the office of the auditor.

Before making an entry of the way-bill received its extended figures are first checked by a rate clerk, who is kept constantly supplied by the traffic department with all current rates, classifications, and percentage tables by which through freight is divided. It has been the general practice to record all way-bills immediately and directly from the reports received from the agents making them, and afterwards, if an error was found, a correction was issued raising or reducing the charges as



the case may be. All way-bills are recorded consecutively and in station order. After the business of the month is closed, the records into which all the way-bills are recorded are summarized, the totals, which represent a debit against the receiving agent, are taken off on an abstract; that is to say, the total of all the way-bills received at one particular station and from all stations. The grand total is checked against the agent's account of way-bills received and they should agree. The theory is that all way-bills received must equal the amount of all way-bills forwarded. The records are then turned over to the statistician who separates the various classes of freight and the weight thereof, from what point and to what point, what connecting line received from and delivered to. When the total weight in pounds has been found, it is reduced to tons and tons one mile; that is to say, how many miles a ton was carried, and is arrived at by multiplying the tons by the difference of miles between stations.

All the tickets that are sold are taken up by the train conductor who forwards them to the auditor. These tickets are assorted according to the station selling them, and at the close of the month's business the agent will forward to the auditor a report showing in detail the number of tickets sold, price, and to what point.

These reports are checked to verify the extension and price, and the number sold is checked with the number received from the train conductor, which should agree. In ascertaining the total number of passengers carried, and the total number of passengers carried one mile, reference is made to the agent's report, which gives the total tickets sold, representing the total passengers carried; and the multiplying of this total by the difference

of miles between stations will give the passengers carried one mile.

All disbursements are taken account of by and are under the charge of an auditor of disbursements. All bills for the purchase of the material and other supplies for the road are received by him and verified as to their correctness, as well as any other bill which demands an outlay of money or is simply a department bill. These bills are recorded in a record called a bills payable book, or voucher record, and given a number. When they are found to be correct a voucher is drawn for the amount of such bill, which, after the endorsement of the authorized officers, becomes a bank draft and is negotiable.

Every bill must have a charge to off-set the amount disbursed. The accounts, which are numerous, cannot be given an adequate description, owing to limited space; but let us consider a few of them.

There are eight general accounts in disbursement account chargings; namely, general expenses, traffic or commercial department expenses, maintenance of way, maintenance of engines, maintenance of cars, conducting transportation, construction and equipment and open account. These general accounts are subdivided into several detailed accounts or sub-accounts, and when a bill is paid the amount is charged to one of these sub-accounts. When material is purchased in large quantities it is not charged directly to the account for which it was purchased, and included in the expenses of the month in which it was purchased, but is charged to an open or running account until a draft is made, when the amount is charged to expenses of the month in which it was consumed. This principle applied to material purchased is not the only one, but any open account is used for the same purpose.

The chargings to the accounts already referred to can be applied to operating the freight business, passenger business and general business; the latter cannot be applied directly to either freight or passenger, but must be apportioned between freight and passenger. The expenses coming under general division are salaries of superintendents, taxes, etc., and other expenses which cannot be applied directly to either one. This is done on a mileage basis. The total miles run by passenger trains, and the total miles run by freight trains, and whatever the percentage relationship is of the total miles run that will be the percentage basis for figuration.

## ANALYSIS OF ACCOUNTS.

### HISTORY, CAPITAL STOCK AND FUNDED DEBT.

Cost of Road and Equipment	{	Supt. and Engineers Expenses Right of Way Road-bed and Track Rolling Stock Repair Shops Telegraph Lines Offices Additions and Betterments						
Income . . . . .	{	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; vertical-align: middle;">Earnings</td> <td style="width: 5%; vertical-align: middle;">{</td> <td style="width: 65%; vertical-align: top;">                             Passenger and Freight                              Express and Mail                              Car Service                         </td> </tr> <tr> <td style="vertical-align: middle;">Other Sources</td> <td style="vertical-align: middle;">{</td> <td style="vertical-align: top;">                             Interest and Rents                              Surplus of previous year                         </td> </tr> </table>	Earnings	{	Passenger and Freight Express and Mail Car Service	Other Sources	{	Interest and Rents Surplus of previous year
Earnings	{	Passenger and Freight Express and Mail Car Service						
Other Sources	{	Interest and Rents Surplus of previous year						
Operating Expenses . . . . .	{	General Expenses Traffic Department Expenses Maintenance of Way Maintenance of Engines and Cars Conducting Transportation						
Fixed Charges . . . . .	{	Interest Rentals Taxes Franchise Charges						
Balance Sheet Assets . . . . .	{	Cost of Road Cost of Equipment Real Estate and Buildings Stocks and Bonds Franchise Other Permanent Investments Cash on Hand Bills Receivable Open Accounts Material and Supplies Sinking Fund Sundries Profit and Loss (Surplus)						
Balance Sheet Liabilities . . . . .	{	Capital Stock (Preferred and Common) Funded Debt Interest Due and Accrued Dividends Unpaid Audited Vouchers (Ready for Payment) Pay-Rolls (Unpaid) Open Accounts Bills Payable Sundries Profit and Loss (Deficit) Deficit of Previous Year						



# RAILWAY ASSOCIATIONS.

BY MR. ALDACE F. WALKER.

AN important difference between the railway service of the United States and that of other countries is found in the fact that traffic by rail is here conducted by a great number of distinct corporations. These independent organizations are found in all the states and territories of the Union, maintaining lines of roads interlaced and interwoven through almost innumerable junction and crossing points, and actively competing with each other for the freight and passenger business of every section of the country. There are now in the United States over 150,000 miles of railroad owned by nearly fifteen hundred companies; this aggregate mileage is now operated by about six hundred and twenty-five separate corporations. The process of combination and amalgamation is a marked feature of the railway situation, but as yet it has proceeded only to the extent above indicated. At the present time there is practically no part of the country in which active competition does not exist between organically independent carriers. Even of so-called local points, situated upon the line of a single road, there are very few where traffic is not in some respects subject to competitive conditions, or where the transportation charges can be arbitrarily established by the carrier. Nor is railway competition confined to the various routes which may exist to and from the nearest market; but all markets are thrown open throughout the land; rates in a given direction are often regulated by those which exist in a precisely opposite

direction ; the price of each commodity added to the transportation charge determines the direction of the shipment or the source of supply. Moreover, the various water routes with which our country is favored have an almost incalculable influence upon the railway rates, the expense being very small when compared with the expense of constructing, maintaining and operating railway routes.

The contrast thus presented with the railway system of France, for example, where six great railway companies have a vast sub-division of the national domain assigned to each exclusively, is too marked to require comment. And in other European countries the competitive conditions which are found in the United States have been to a great extent eliminated through state ownership, by protective legislation, or by amalgamation of titles.

In our peculiar form of dual government, each state authorizes the construction of railroads within its boundary without control or supervision by the nation. Practically, no restrictions have been placed upon local railway building ; and consolidations of ownership or of operative control are easily accomplished by the consent of state legislatures, coupled with concurrent action between adjoining states.

Answering the demands of the public for the freest possible interchange of products and commodities, an almost universal system of through traffic has come into existence ; affording facilities which, while altogether unprecedented, no longer excite surprise. Each company might have contented itself with receiving passengers or freight, and delivering them at the end of its line to its connections ; but this is by no means the case. On the contrary, the various companies have

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become accustomed to act together in establishing through rates of fare and through freight tariffs between most distant points, without regard to the hostile relations which necessarily exist among them in respect to competitive traffic. Tickets can be universally purchased for remote destinations; freight is everywhere consigned to every other point. Customs have arisen in the provisions for through business and in the adjustment of traffic balances which have the force of law. The shipper does not pause to inquire concerning the route over which his goods are to be forwarded; he is informed of the established through rate, and he relies without anxiety upon the arrangements which the companies have established among themselves, concerning which he has little knowledge and less care.

The work of railway auditors and accountants has become enormous, involving the exact apportionment not only of each company's share in all receipts from through traffic, but also of losses and of liabilities for damages, as well as the distribution of car service charges and through line expenses. One of the great wants of the present time is a railway clearing house, or a series of clearing houses embracing territorial groups of roads, for the purpose of auditing their innumerable transactions upon a common basis, checking all charges with the established tariffs, and adjusting settlements between the various lines each with each other. It may be said in passing that such a railway clearing house was early organized in England, and was placed upon a legal foundation by act of parliament in the year 1850. Nearly every company in the United Kingdom now participates in its benefits. Its affairs are controlled by a committee, on which each line is represented; and its



awards are made by law final and conclusive before the courts.

When the act to regulate commerce became effective on April 1, 1887, our railway system presented substantially the features outlined above, although many practical advances in conducting the details of universal intercommunication have since been adopted. It soon became manifest that every carrier, to some extent at least, was engaged in interstate commerce; and one consequence of this attempt at the national regulation of railways has been the perception by close observers that such regulation, to be successful, must be exclusive; in other words, that Federal control and state control conflict at innumerable points, so that their co-existence before many years will be found practically impossible.

The theory under which the Interstate Commerce law was framed, contemplated the maintenance of the independent existence of railway corporations as then constituted, subject to such organic changes as their owners might from time to time accomplish by contract among themselves in subordination to the laws of the several states under which they held their various charters, and all working together under a uniform national control. Although this was the first important occasion in which the Congress had undertaken to exercise the power intrusted to it by the constitution, to regulate commerce among the several states, nevertheless the act was in most respects well considered and did not contemplate the creation of any obstacles or embarrassments in the way of the free interchange of traffic. On the contrary, the maintenance of through routes and of through tariffs was provided for, and it was expressly made unlawful for any common carrier in any manner to

prevent the continuous carriage of freights from the place of shipment to the place of destination. It became immediately obvious that many duties were incumbent upon carriers, some imposed and others recognized by the new law, which could be satisfactorily performed only through joint action among the roads.

There were in existence at that time many tariff organizations, commonly known as pools, which, in addition to the apportionment between competing lines of earnings derived from competitive traffic, performed many other important functions in making necessary arrangements of all kinds under which traffic might be systematically conducted. These organizations had been found indispensable for the proper and efficient transaction of railroad business; and when the pooling of freights was abandoned these existing organizations each became the nucleus of a reorganized association, exercising a certain supervision and control over tariffs and traffic arrangements. The form of their organization, and their purposes are not clearly understood by the public; in fact, their very existence has given rise in some sections to jealousy; they have been attacked from time to time before the Interstate Commerce Commission; state legislatures have attempted their suppression; and in Texas a judicial decision of the highest tribunal has held one of them to be organized in a form incompatible with the provisions of the constitution of the state.

At the present time the leading railway associations are the following: The Trunk Line Association, embracing the great railroads which operate between the Atlantic seaboard and the cities of Buffalo, Pittsburg and Wheeling; the Central Traffic Association, which

includes most of the roads in the territory west of the Trunk Lines as far as Chicago and St. Louis; the Interstate Commerce Railway Association, with its affiliated organizations called the Western Freight Association, the Western States Passenger Association and the Trans-Missouri Freight and Passenger Association, covering the region between Chicago and St. Louis on the one hand and the Rocky Mountains on the other; the Southern Railway and Steamship Association and the Southern Passenger Association, having their field in the southern states east of the Mississippi river; the Southern Interstate Association, working in the southwest beyond the Mississippi; and the Trans-Continental Association, embracing traffic to and from the Pacific coast. In addition to the foregoing there are a number of other associations, some of which have to do with the freight or passenger traffic of smaller sections of the country; some with selected articles of traffic; some are limited to particular subjects like classification and the exchange of cars.

Their organization is very simple. The officer in charge is usually designated as commissioner, or chairman; and he is generally assisted by a secretary, an accountant or auditor, and a small staff of clerks who perform such services as are necessary in the preparation and publication of tariffs and the collection and distribution of statistics. They are purely voluntary, and are formed by agreement between the various lines which compose them, the details of which are expressed in articles of association subscribed by representatives of the several roads. These agreements are filed with the Interstate Commerce Commission, pursuant to the requirement of the act to regulate commerce, which

provides for the filing of copies of all contracts, agreements or arrangements between common carriers in relation to traffic affected by the provisions of said act. Stated meetings are held from time to time, usually monthly, which are attended by a representative of each line, and which are usually presided over by the chairman or commissioner. Unanimous agreement is commonly required in order to effect a change in established rates, rules or regulations respecting traffic, subject, however, to a right or independent action which is reserved in case of failure to agree. In the event of disagreement between the lines arbitration is sometimes provided for. The duties of the chairman frequently embrace the investigation of cases where it is claimed that tariffs have not been maintained, or that the established rules and regulations which govern the handling of traffic have been departed from; the requirements of the association in such cases being in conformity with the provisions of the act to regulate commerce, which forbids the charging of a greater or less compensation for the transportation of passengers or property than is specified in the schedule of rates, fares and charges at the time in force, and which requires ten days' public notice of any advance in rates, together with three days' public notice of reduction.

The basis upon which these associations rest is simply good faith among the members. They are not corporations, and they exercise no corporate powers; yet they deal at times with questions of the utmost importance, and their influence is distinctly visible in every branch of the railway service. The subjects which they treat are not restricted to the territory which they respectively embrace, but the various associations are able, by nego-

tiation with each other, to accomplish results in the management of long distance traffic that would otherwise be altogether impossible.

In order to correctly apprehend the relation which they bear to the governmental regulation of carriers, it is necessary first to understand precisely what is undertaken by the federal law under which all interstate commerce is now carried on. When this is properly appreciated it will be perceived that the work of the associations is directly in line with the administration of the law; in fact, that they owe their existence at the present time to the effort and desire of the carriers to transact their business in conformity with the statute; and that as a practical matter the act to regulate commerce would not be workable without the intervention of railway associations.

The object proposed by Congress, in enacting the Interstate Commerce law, may be perceived by ascertaining the then existing evils which that legislation proposed to remedy. The introduction of the bill was preceded by a long investigation, which resulted in the formulation of an able report discussing broadly the general subject of the internal commerce of the country, its importance and the methods employed in carrying it on; and which embraced a concise and summary statement of conclusions entitled "The Causes of Complaint Against the Railroad System." The points covered by this indictment were eighteen in number, and there is scarcely one of them which is not comprehended within the significant word "discrimination." It was charged that local rates were unreasonably high as compared with through rates; that both were unreasonably high at non-competing points; that unjustifiable discriminations were constantly made between individuals; also between articles of freight

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and branches of business of a like character ; also between localities ; also by the use of secret special rates, rebates, drawbacks and concessions ; also by secret cutting rates and fluctuations, demoralizing to legitimate business ; also by the granting of free passes ; by undue advantages afforded to business enterprises in which railway officials were interested ; and otherwise as was set forth with particularity and detail.

Examined in the light of this report it is easy to perceive that the fundamental purpose of the Interstate Commerce law is the prevention of discrimination in every form. The first five sections of the statute declare the principles that are to regulate the internal commerce of the country, and the subsequent sections provide machinery for the enforcement of the rules thus first laid down. These rules are three in number : First, all railroad charges shall be reasonable and just ; second, no unjust discrimination between persons by means of special rates, rebates, drawbacks, or other devices shall be permitted ; third, no undue or unreasonable preference or advantage shall be given to any person, locality or description of traffic, in the establishment of tariffs.

These provisions comprise the foundation principles of the Interstate Commerce law ; the famous fourth section being merely a declaration that the charge of a greater sum for a shorter than for a longer distance, shall constitute a preference or discrimination in favor of the more distant point, unless conditions and circumstances exist which make the service dissimilar ; and the fifth, or anti-pooling section, was undoubtedly the result of a belief on the part of its authors that the pooling system, by stifling competition, tended to make rates unreasonably high.

The leading feature of the administrative portion of

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tive relations with each other. Harmonious action between carriers was an absolute necessity in order to enable them to take the first step in obedience to the administrative sections of the Interstate Commerce law. This cause compelled the continuance, for the purpose above described, of such associations as had previously been in existence, and the development of a system for the conduct of traffic, in which the existing associations play an important part. The Interstate Commerce Commission, in its first annual report, recognized this feature of the situation in carefully chosen words, as follows :

#### VOLUNTARY ASSOCIATION OF RAILROAD MANAGERS.

“ Nearly every railroad in its origin has been independent of all others, and in the early history of such roads they were commonly provided for as local conveniences, with no provision of the great highways of trade and communication which they have since become. It was in many cases thought to be important that a road should be kept as distinct in its business from all others as possible, and at their termini in some instances they are not allowed to have the same freight or passenger stations with other roads, lest the local draymen and hackmen should be deprived of a profitable employment.

When the great possibilities of railroad service came to be better understood these primitive notions of local benefits gave way before a more enlightened public sentiment, and the fact was recognized that the public interest would be best subserved by making the connection between the roads as close as possible, in order that the commerce between different sections and localities might go on steadily and uninterruptedly. The railroad com-



panies perceived also that their interest lay in the same direction. \* \* \*

To make railroads of the greatest possible service to the country, contract relations would be essential, because there would need to be joint tariffs, joint running arrangements, an interchange of cars and a giving of credit to a large extent, some of which were obviously beyond the reach of compulsory legislation, and even if they were not, could be best settled and all the incidents and qualifications fixed by the voluntary action of the parties in control of the roads respectively.

Agreement upon these and kindred matters became, therefore, a settled policy; short, independent lines of road seemed to lose their identity and to become parts of great trunk lines, and associations were formed which embraced all the managers of roads in a state or section of the country. To these associations were remitted many questions of common interest, including such as are above referred to. Classification was also confided to such associations, it being evident that differences in classification were serious obstacles to a harmonious and satisfactory interchange of traffic. But what perhaps more than anything else influenced the formation of such associations and the conferring upon them of large authority, was the liability, which was constantly imminent, that destructive wars of rates would spring up between competing roads to the serious injury of the parties and the general disturbance of business.

Accordingly, one of the chief functions of such associations has been the fixing of rates and the devising of means whereby their several members can be compelled or induced to observe the rates when fixed. And in devising these means the chief difficulty was encountered,

Agreements upon rates were voluntary arrangements which could be departed from at pleasure, and if they had behind them no sanction, they were not likely to stand in the way of a war of rates when the provocation to one seemed sufficient. Accordingly, the scheme of pooling freights or the earnings from traffic was devised and put in force through the agency of these associations, as a means whereby steadiness in rates might be maintained. The scheme was one which was made use of in other countries and had been found of service to the roads.

The pooling system was looked upon with distrust by the public, mainly because it seemed to be a scheme whereby competition between the roads could be obviated and rates for railroad service put up or kept up to unreasonable figures. But if railroad managers supposed that by this scheme they were to stop competition among themselves, the result has not answered their expectations.

Competition has still gone on; each road striving to obtain as large a share of the business as possible, and no agreement among them could altogether prevent a yielding to the pressure of shippers for lower rates. \* \* \*

The pooling of freights and of railroad earnings so far as the commission has knowledge or information on the subject, came to an end when the act took effect. But as pooling was only one of several purposes had in view in forming railroad associations, the leading associations have not been dissolved, but have been continued in existence for other objects. Among these objects are the making of regulations for uninterrupted and harmonious railroad communication and exchange of traffic within the territory embraced by their workings. Some regulations in addition to those made by the law, are almost, if not altogether, indispensable. Thus, while the seventh

section of the act forbids the carriers preventing shipments from being continuous by the device of changing time schedules, carriage in different cars, etc., it has not undertaken to provide for the making of such time schedules as would facilitate the continuous shipment, or to prescribe rules for the loading and movement of cars for that purpose. However desirable this might have been, if it were practicable to make rules which, while general in their nature, should be sufficiently definite of enforcement as laws, it was doubtless perceived by Congress that these and many other matters of detail, though they might be of high importance, could not be wisely and effectively dealt with by general legislation, but that such legislation must chiefly be restricted to provisions for regulation and to prevent abuse.

“Moreover, these matters of detail, to a considerable extent, involve the element of contract, and also of credit, when one company becomes the agent for another in the sale of tickets and the collection of freight moneys; and they then require the assenting minds of parties, and the number of parties whose minds are to be brought into accord being commonly very considerable, an association of officers or agents is made the means of bringing about the desired unity of action, and is also made a common arbiter, to prevent frequent and serious disturbances.

“Classification also, as has been said, is not by the act taken out of the hands of the carriers, though a certain power of supervision is vested in the commission; and classification is not only best made by joint action, but if it were not so made and the methods of the roads thereby brought into harmony, it would probably

become indispensable, however undesirable it might otherwise be, for the law to undertake to provide for it. Moreover, when classification is made and put into effect it becomes necessary to make provisions for inspecting or some sort of supervision of its application, in order to prevent its being employed as a device for giving preferences as between shippers. A fraudulent classification, through connivance of the agent in making out deceptive shipping bills, has often been resorted to for this purpose; and as the fraud affects the competing carriers as well as the shippers who are discriminated against by means of the cheat, the carriers and the public alike are interested in such a supervision of the work of all the roads as will be likely to detect the fraud. Self interest on the part of the carriers will impel to this supervision, and it is most generally done through some common agency. If it shall be fairly done as between the carriers themselves, it will tend to the protection of the public; and the benefits will be on the same line with those the act undertakes to establish or provide for."

#### JOINT TRAFFIC.

It will be observed that the traffic which lies within the scope of association control may be considered under two distinct relations, as joint traffic and as competitive traffic. Joint traffic is defined in the act to regulate commerce as "where passengers and freight pass over continuous lines or routes operated by more than one common carrier, and the several common carriers operating such lines or routes establish joint tariffs of rates or fares or charges for such continuous lines or routes." The general nature of the work of the associations in

respect to joint traffic has been already indicated. Through their agency arrangements of all kinds are consummated under which joint service is made possible, and constant improvements in its extent and facilities are brought about. The principal subjects of negotiation and concerted action are the following: rates, classification of freight, apportionment of earnings and inspection. Other points relating to through traffic, such as time table arrangements, exchange of cars and settlement of traffic balances are usually adjusted by individual connecting lines.

Lines where traffic originates are expected to establish and publish through rates to points of ultimate destination, but such rates must necessarily be made by agreement between the various lines composing such through routes, and the necessary agreements would be too infinite in number to be practically possible without the assistance of associations. The present extremely complicated system is the result of long years of negotiation and contest. The effect of rates which exist in one section of the country upon those made between very distant points, can be appreciated only by careful study. Certain principles in the relation of rates to each other and in the use of established differences, sometimes called differentials, have been worked out, usually by some arbitration or agreement, founded upon just reasons and presenting a medium between the claims of competing points. These adjustments are found in every section of the country and are made upon the broadest principles. While one community and another, upon a narrow view of its geographical situation, has from time to time made complaint of an alleged unfair adjustment of its rates, instances have been very few in

which the lines have been unable to demonstrate that the tariffs, in fact, were just and reasonable, upon the requirements of the whole situation involved. Through rates are almost invariably somewhat less than the sum of the local rates, and are necessarily established by concerted action in view of the relation of rates at one point to those at others. The mileage rate of the shortest line is taken as the maximum. No line, however circuitous, can expect to participate in the traffic if its rates are higher; and cases are found where the effort is made to attract travel to longer routes by the employment of a lower rate than is charged by direct routes between the same points.

Much has been said in relation to the importance of a uniform classification of freight throughout the land. A common classification even in a single state requires concerted action. Every article of merchandise must be taken up and considered with relation to the various considerations embraced in the establishment of its just and reasonable classification; in addition to this the development of the traffic of every line must be kept in mind, and the classification of each commodity must be sufficiently low to permit of its free movement. Prior to the passage of the act to regulate commerce thirty-seven different classifications were in use in the territory of the Central Traffic Association. The great bulk of interstate traffic throughout the United States is now handled under four classifications. The progress which has been made in this direction would have been impossible but for the fact of the existence of railway associations, in which the subject has been efficiently handled. At the present time a conference of representatives of all the associations is in existence, meeting

from time to time and engaged in the work of still further simplifying and harmonizing the present differences, with a view, if possible, to ultimately establish a single uniform classification of freight.

The subject of the apportionment of receipts from joint traffic between the various lines which unite to form through routes is one of the utmost importance to the carriers, but in which the general public has little interest. Shippers are concerned solely with the question of the rate which they are required to pay as an aggregate through rate from the initial point to the point of destination. The division thereof between the various roads which unite in performing the service is of no consequence to the public, although of great consequence to the carriers. These divisions have been and are a constant subject of negotiation and modification. In determining the share of a through rate which any given link will receive, a great variety of elements are taken into account. A common basis where the lines participating in the division are relatively equal is that of mileage, under which the through rate is prorated according to the length of the various roads. This basis, however, is by no means universal. Weak lines, or roads where the traffic is light and expenses are high are accustomed to claim and are usually conceded an additional allowance in the division of the earnings upon through traffic. Sometimes this concession takes the form of an arbitrary allowance for an expensive bridge, or for a mountainous haul; sometimes an arbitrary mileage is assigned, one and a half, twice or even thrice the actual mileage of the line in question; sometimes an arbitrary division of the total through rate is awarded, under which a short branch line, or feeder, may receive one

third or even one half of the total income ; sometimes the adjustment is made upon the relative local rates charged in different sections of the country, so that roads where traffic is thin and low rates are impossible, divide with other lines having a heavy tonnage and low freight charges upon the basis of the sums received by each respectively for their local traffic. These matters are necessarily the subject of frequent negotiation, and are often adjusted between large sections of the country east and west, or north and south, by concerted action through the associations which represent the lines in the various sections involved in the question. It often occurs that lines are willing, for the sake of increasing their own traffic, to concede to their connections a larger share in the earnings of joint business than would naturally accrue to them. Lines having more than one outlet are sometimes able to sell their traffic to the highest bidder. Some standard is usually adjusted for a considerable extent of territory, designed to effect an equitable distribution of the results of joint traffic between the lines of which various through routes are composed. Were it not for the existence of associations where understandings already reached are maintained, and necessary changes are effected from time to time, confusion would at once arise and chaos would speedily follow.

The advantages to shippers and passengers arising from the through billing of freight, and through tickets under the coupon system, need not be enlarged upon.

The importance of the inspection of freight is found in the fact that, without it, advantages would be continually obtained by shippers as against each other. It becomes necessary, therefore, to establish bureaus not controlled by individual roads, which would be under the constant



inducement of permitting preferences in order to obtain traffic, but organized under associations of carriers where interest requires that the rules of shipment be universally and equally applied to all. This inspection service includes the examination of freight at various points for the purpose of ascertaining that it is properly classified; that the established rates are duly applied, and that the weight is accurately given. The law is very stringent in its requisition that all rates, rules and regulations shall be strictly observed, and even imposes a penalty upon shippers who misdescribe their freight for the purpose of obtaining lower rates. Notwithstanding these provisions of the statute, the monthly reports of the various inspection bureaus now in operation, and which should be largely increased, show hundreds of cases of discrimination and fraud which are corrected by the carriers through their agency.

#### COMPETITIVE TRAFFIC.

Coming now to the field of competitive traffic, a branch of the subject is reached in respect to which great sensitiveness exists in the apprehension of the public. There can be no doubt, however, that this feeling largely arises from a failure to clearly understand certain principles which lie at its foundation, or at least from the fact that the subject is usually viewed from one side only. The desirability of the preservation of competition will not be denied, but it should not be forgotten that in transportation there may be too much competition, as well as too little; for example, competition between railroads and water lines, which proceeds to the extent of driving the latter out of existence as channels of commerce, can

hardly be claimed to be for the best interest of the public at large; and the same thing may be true of competition between competing railroad routes.

In other words, competition as a fact cannot be preserved unless the necessary agencies for competition are maintained. To turn loose upon the same field of operations several wealthy corporations, with the requirement that they must forever compete and that under no circumstances shall concerted action be allowed, would presently result in the extinction of one or more of them. This has been so often practically demonstrated in cases where competition between rival roads has driven the weaker to the wall and resulted in its absorption by lease or other form of combination, and the extinction of the competition originally proposed, that its statement has become a truism.

Again, adequate railway service requires the maintenance of the road and its equipment in the most perfect and efficient form, together with the constant provision of employes of the highest skill obtainable. Good public service cannot be rendered unless the rates are adequate to its support, and adequate also to insure the continuance in the field of the necessary capital. Whenever carriers fail to harmonize their conflicting interest by the adoption of corresponding tariffs a war of rates ensues, and in every rate war the public as well as the carriers must suffer. It is a common idea that competition means lower rates and nothing more. On the contrary, competition may exist, and does exist, where rates are well maintained. The very fact that different routes are open, of itself presents the essential element of competition. The facilities and advantages of competing routes are the subject of selection by shippers and passengers while rates may

be alike on all. It cannot be denied that the public generally is more interested in safe and efficient railway service than in extremely low railway rates. Rates may easily be so low as to render such service impossible. The public is best served by rates which are reasonable, uniform and firmly maintained. This is precisely what the act to regulate commerce demands. English tribunals have affirmed healthy competition to be that in which various transportation routes are kept open which are "practically independent of one another, fairly alternative, and reasonably calculated to keep one another in check."

Looking at the question of competitive rates as affected by the requirements of the act to regulate commerce, it will easily be seen that some degree of concurrent action between the competitors is indispensable. Although in denouncing discrimination the act in terms applies to individual carriers, a moment's reflection will show that discrimination in rates between competing carriers is equally prejudicial to the public interest. Suppose, for example, that there were only two lines of road between New York City and Chicago, and that the charges upon one were twenty per cent. lower than upon the other. So far as volume of traffic is concerned, the immediate result would be to turn all business to which a choice of the two routes was open, upon the road giving the lowest rate, but so far as the manufacturing public is concerned, every establishment situated upon the line of the other road would at once be placed at a disadvantage impossible to overcome. Nor is this confined to rates alone. If, for example, one trunk line from the eastern seaboard to the west, transports sugar at its net weight, deducting the weight of the barrels, while the

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regulations in force upon the other lines demand that the gross weight shall be employed in applying the same tariff rate, the refineries upon the latter roads are placed at a disadvantage sufficient to exclude them from the territory reached by the other line; or if one line returns without expense tank cars furnished by shippers of oil, while another line exacts a charge for the return of such cars, the refineries located upon the latter line are discriminated against to an extent which would soon close their works. Hundreds of instances like the foregoing might be readily enumerated, in which the failure to apply similar rules and regulations, as well as similar tariffs, by competing lines of road would result almost immediately in the destruction of important industries. It is absolutely essential that discrimination be prevented by the formulation of rules, regulations and tariffs between competing lines, which shall work out exact justice to the patrons of all. This is one of the results accomplished through the agency of railroad associations. It may be said that by preserving absolute independence of action the desire to secure competitive traffic would compel the line which wished to maintain a higher rate to reduce its charge to the basis fixed by its rival; but this would not necessarily follow, and if it did not follow the result would be a series of reductions, causing great disturbance to business, and ultimately resulting in the elimination of one or the other of the competitive agencies.

Again, enlarging the field of vision, and taking the case of carriers from different competing points to the same markets, or from different markets to the same field of distribution, discrimination necessarily produces a similar result to that above described. One point or

the other is excluded, and the public is wronged. The only remedy possible is the establishment of a corresponding or a relatively equivalent rate to or from the different points in question which will prevent unjust discrimination, preference or advantage, and serve the whole public equably.

And once more, consider a complicated network of roads which operates through a wide sweep of territory in which the products are all competitive and all markets are common; the law leaves them to fix their rates each for itself; without co-operation the transportation charges would immediately become grossly discriminative, and in the end almost certainly would become inadequate to sustain the service, while inflicting great wrong upon innumerable communities.

Association among competitive carriers for the adjustment of their rates and their traffic regulations, is required by sound public policy. It makes possible the handling of traffic which is competitive as between individuals and between localities, without preference and without discrimination. It is required upon similar considerations to those under which towns, cities, states and the nation itself are organized for concerted action in matters of common interest, and for the prevention of anarchy. It establishes rates co-ordinated with the value of the service, which are necessarily adjusted to the expenses of the shortest routes. It assists to preserve all existing lines in competitive existence. It affords an organized support to the enforcement of the regulative statutes. Association is the servant of the law. Without it there can be no adjustment of tariffs made which will conform to the administrative provisions of the act. The law implies associate action as a necessary pre-requisite to obedience.

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One of the objects of association among competitive carriers, therefore, is the establishment of a forum, or meeting place, where rates, rules or regulations governing the transportation of all commodities can be arranged by concurrent action, and where all the elements attending the fixing of rates by one or more of the lines may be given full force in reaching the resultant. In this correlation of forces, the most direct and economical route dominates the rest. If the ruling rate thus fixed is not a reasonable one, the act to regulate commerce provides control.

An inspection of the actual work taken up by the associations at their meetings will show that the raising of rates is not, by any means, their important function. Undoubtedly one of their leading principles is the maintenance of rates upon a durable and permanent basis. Proposed changes in tariffs are discussed in association meetings, and are acted upon with care. Considerations based upon the exigencies of business and the stimulation of traffic are those most frequently urged, while the necessity for the maintenance of revenue counterbalances, to some extent, the pressure that is constantly brought to bear for reductions here, there and everywhere. The scale of rates throughout the United States, as is well known, has been constantly shrinking through a long term of years. At times a general scheme of advancing rates may be devised and agreed upon, for the purpose of putting an end to a rate war or of taking advantage of an outside condition like that which arises upon the annual closing of lake navigation; but such advances as are accomplished are usually trivial, arising from the lining up of rates previously reduced to meet some special emergency, or from the removal of some

factor of disturbance. The general tendency is always in the direction of lower rates. In respect to this matter the association system is conservative. It tends to check unnecessary reductions, but it is inadequate to stem the tide in its universal ebb. It is estimated that the rate changes considered at association meetings constitute almost one-half of the business presented; and that about ninety per cent. of such proposed rate changes are propositions for reduction, which are so accomplished as to prevent the preferences and discriminations that would ensue if each line were to make reductions for itself.

At the present time the usual rate question is in respect to relative rates. It is claimed that the rate at some point is too high when compared with the rate at some other point, or that the rate on a given commodity is too high in comparison with the rate upon some analogous article, or upon the same article from other sources of supply. A complaint that rates are excessive in themselves, or as compared with the value of the service, is very seldom seriously made.

#### CO-OPERATIVE MANAGEMENT.

Certain distinctions that exist between the business of transportation and other branches of industry, in respect to the practical effect of associated management, cannot properly be overlooked. There is no governmental regulation of the price of lead, or sugar or oil. Manufacturing and mining combinations, presumably intended to restrict production and increase profits, are regarded with suspicion by reason of the fact that no control exists upon the prices to be charged. The regulation

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of the tariffs of common carriers, on the contrary, has become an established feature of our legislation and jurisprudence. The danger apprehended in the one case is altogether absent in the other.

Another marked difference between railroads and other business enterprises lies in the fact that if the latter find their work unprofitable, it is open to them at any time to close their doors. The loss involved is, of course, serious; and a struggle for continued existence is often maintained until bankruptcy ensues; but the result of a lockout or a failure is confined to the owners and the operatives of the particular plant involved; the public are supplied from other sources. In the case of a railroad under similar circumstances the operations of the road can seldom stop. The road must stay in existence, and the courts assume its operation when bankruptcy has destroyed the value of the original investment. New capital is brought in through receivers' certificates, and the wheels continue to turn. If the discontinuance of a line is determined upon, the public as well as the owners and operatives suffer. Some competitor or some larger system has usually found it for its interest to assume the operation of bankrupt roads; but several instances of abandonment have actually occurred, and others are in sight; cases even exist where state officials are seeking by legal process to compel the maintenance of worthless branches, for the benefit of the local communities through which they run.

Again, the tendency to lower rates in railroad service under the stress of unregulated competition has a violence of which citizens engaged in other branches of business are wholly ignorant. It resembles the rush



of the cataract. The education of the freight agent has been in the direction of maintaining tonnage at almost any cost. The net results are shown in the accounts of the operating department, which is separately organized. One effect of the law has been to extend the scope of all reductions by making general what was formerly restricted, localized and often secret. Where, in the days before the law, a single rate was cut, the freight agent must now reduce a tariff; and while he points with pride to the increasing tonnage of the line, the loss of net revenue may be excused as a result of the operation of the statute.

It has become a common criticism upon the present form of congressional regulation of railway traffic, that while it prevents discrimination and protects the public, it altogether fails to protect the carriers. It presents no method of restraint upon impecunious, extravagant, speculative or unreasonably aggressive railway management; it leaves the doors of competition open to the most circuitous routes; it puts the strong lines at the mercy of the weak, and makes it possible for a road that should never have been built to fix rates which all other competing roads must perforce accept.

And this, in truth, is an obvious defect. The Congress has assumed the task of making provision against rates which are unreasonably high, and rates which are not relatively equal, without providing for the prevention of rates unreasonably low, or for the protection of investments which now form an immense proportion of the country's wealth, represented by securities which are not found alone in the vaults of capitalists, but which in many cases, constitute the only source of income for the comparatively poor and the otherwise hopelessly

dependent. The scheme of governmental regulation will not be rounded and complete until this omission is supplied.

State ownership, or direct national control of the railway system of the country, is at times suggested as a remedy; but this may be at once dismissed as chimerical. No greater injury could befall our republican institutions than the establishment of a branch of the public service which would throw open to the field of politics the railway service of the land.

Legislative regulation in the direction of the prevention of rates unnecessarily low is not impossible, although it has not been seriously considered. If it were simply to take the form of a provision that rates once established should not be reduced, except at stated periods or after prolonged announcement, it would materially improve the existing situation in some respects. Such restrictions, however, might at times operate unjustly, and occasionally would divert traffic for a time into unreasonable channels. So long as carriers are independent, and some of them irresponsible, occasions will arise where prompt action may be necessary.

The theory of the law up to the present time has been that railway owners, having the rate making power in their own hands, are competent to protect their revenues. If the premises were correct the conclusion would follow; but the theory is applied to a situation where independent action by six hundred different carriers is preserved; and it is not true, as a practical matter, that any one of them can control its own rates. On the contrary, the rates of every line are, to a greater or less degree, at the mercy of its rivals. There is but one way in which the prosper-

ity, or even the prolonged existence, of independent railway corporations can be maintained under existing legislation; namely, through co-operation among railways themselves in preserving their tariffs from destruction.

This co-operation may take two forms; associate action, subject to the regulation of the law, or consolidation of titles and control.

Railway consolidations, or "trusts," as they are often unthinkingly termed, are among the popular bugbears of the day. Some of the distinctions which differentiate them from the "trusts" that have been formed in other directions, have been alluded to above; and it is safe to say that no consolidations or combinations among railroads are imminent at the present time which are likely to operate otherwise than favorably to public interests. But the public mind is aroused upon the general subject, and, while usually just, it is not ready to distinguish. It is undeniable that the present time is not a favorable one for the unification of competing roads in common ownership, or even in joint control. The American system has been established upon a contrary basis, involving the maintenance of competitive conditions. As a last resort, and in default of any other solution of the question, actual immense consolidations may eventually arise. At the present time their necessity has not been demonstrated to the public eye, and their formation would arouse antagonism in many quarters. As has been well said, however, unless railway managers can associate, railway owners must combine.

When revolutions of this character occur, the movement is usually sudden and unexpected. The association experiment, which is now in progress of trial, is unmis-

takably in the nature of a breakwater against the so-called railway "trust." If this fact can be clearly recognized, and the usefulness of railway associations sustained, while their power is strengthened, the existing system, for a time, at least, can be preserved. In order to secure this result it is necessary that the public should understand the nature of their work and their value, and that their results should receive some governmental sanction. Central bureaus, with power to establish and adjust reasonable rates through large sections of territory where traffic is competitive, are indispensably required. This is going far beyond the work of the present associations, but the matter can be arranged by the roads among themselves, through the employment of a reasonable amount of good sense and as much good faith as usually pertains to ordinary business transactions, provided that their tariffs continued to be recognized as *prima facie* just, though subject to proper revision and control, and their arbitrations are supported by authority for the enforcement of awards. In controversies between man and man an award of arbitrators may be made the basis of a suit at law, and a judgment is rendered in order to compel the payment of money so found due. A money judgment, however, is not appropriate to awards between competing carriers. They relate to the establishment of rates, the adjustment of divisions, and the preparation of rules and regulations for the conduct of traffic. They deal with the future, not the past, and mandatory process is required for their execution. It is believed that an amendment to the sixteenth section of the act to regulate commerce might very properly provide that the courts of the United States sitting in equity should entertain jurisdiction of awards rendered in arbitrations between

carriers, or between associations of carriers, respecting interstate commerce, and should have power to enforce them by any appropriate process, subject to the rules which govern the consideration of awards for the payment of money in courts of law

This idea is not novel; in 1885 the Railway Commissioners of the state of Kansas used the following significant language:

“Since the violent fluctuations of rates, consequent on rate wars between rival lines, result, usually, in discriminative benefits to a few at the ultimate expense of the public, means should be taken to at least moderate this disturbing element to the business interests of the country. As a means to this end, we venture to suggest that contracts or agreements between rival companies to carry on interstate traffic upon given rates, providing those rates are reasonable and just, should be invested with a legal status and be enforceable with appropriate sanctions.”

In the same year a somewhat similar thought was thus stated by Hon. T. M. Cooley:

“The question then presents itself whether the final solution for the ‘railroad problem’ is not likely to be found in treating the railroad interest as constituting in a certain sense a section by itself of the political community, and then combining in its management the state, representing the popular will and general interests, with some definite, recognized authority on the part of those immediately concerned; much as state and local authority are now combined for the government of municipalities.”

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The wisdom of these pregnant utterances has been demonstrated by the result of the experiment which has been conducted for nearly three years upon narrower lines. The statesman who can effect the required coordination of governmental regulation with associated railway management, will prolong for many years the American system of universally competitive railway service. Without some such provision the statute is incomplete. The only other natural solution of existing difficulties appears to be through actual consolidations of ownership, by which all traffic in great sections of the country can be brought under the control of a single mind.

