

COST AND METHODS OF TRANSPORTING MEAT ANIMALS.

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HISTORIC PERIODS.

The advent of railroads marked a turning point in the growth of the live-stock industry. Scarcely more than a half century ago the carrying trade of the United States was practically limited to passenger traffic and to what is now known as "dead freight." Relatively few live animals were then carried, and even on boats, which were the chief carriers of bulky merchandise, suitable facilities were not provided for live stock. It was generally preferable to drive animals on foot, and this was the prevailing way of taking them to market.

The history of live-stock transportation in the United States since the establishment of railroad traffic may be divided into two periods. A marked characteristic of the first period was the injury caused to stock by lack of proper accommodations and by faulty methods of managing the traffic. The suffering and death of animals on the way and the unhealthy condition of many delivered at their destinations called forth much comment and many efforts for relief during the first few decades of live-stock traffic on railroads. The second period, the present, is characterized by the extension of railroads throughout the range country of the West, and by changes in roadbed, cars, and traffic methods which are continually making the transportation of live stock more humane and economical.

ELEMENTS OF COST.

Of the influences which during the last half century or more have affected the cost of marketing live stock, some of the most important were those relating to their transportation. The cost of transportation, as discussed in this article, includes not only charges for freight, feed, attendance, yardage, and other expenses of the road, but also losses in transit and other items involving more or less directly the expenditure of money, labor, and time in moving meat animals from their native farms or ranges to places of slaughter.

DRIVING AND HAULING.

CONDITIONS IN EARLY DAYS.

Prior to 1850 it was generally the practice to drive live stock to market on foot. At that time, over routes in many portions of the country, pasturage was free and cattle could be grazed along the way

as they were slowly driven to market. One route from the blue-grass region of Kentucky to New York City covered about 800 miles, and, according to a man who drove over it about the year 1847, the time consumed was a few days more than ten weeks. The particular route followed on one occasion by this man led from the neighborhood of Lexington, Ky., to the Ohio River just above Maysville, Ky.; thence northeasterly through Chillicothe; thence across the Ohio River below Wheeling, W. Va. The course then passed through Connellsville and Bedford, Pa., to Carlisle; thence to Harrisburg. Here the road turned southeasterly, passing within sight of Lancaster, through West Chester, to Philadelphia. From this point the cattle were driven northeasterly through Trenton, Princeton, and Newark to the Hudson River and were ferried across to New York City. The drove referred to contained 119 cattle, and three men were required to care for them. Another route from the neighborhood of Lexington, Ky., extended to Charleston, S. C., a distance of 550 to 600 miles. The way led southeasterly through Cumberland Gap to the French Broad River. Then the river was followed as far as Asheville, N. C. The route then turned again southeasterly, crossing the South Carolina line at Saluda Mountain, and thence passed on to Charleston.

In those days driving to eastern seaboard cities from points as far west as Iowa was by no means uncommon, and cattle from Texas were also among those on the road. A news item of 1855 mentions a drove of several hundred cattle from Texas passing through Indiana County, Pa., on the way to New York City. They had left Texas four months previously.

From about 1845 to 1855, and possibly at other times, large numbers of sheep were driven from Vermont into Virginia. A resident of Prince George County, Md., writing in 1854, said that in 1847 he commenced driving Spanish Merinos, mostly from Vermont, to Virginia, and that during the following five years he sold upward of 13,000 head.

Large numbers of hogs also were driven to market before the railroads were built. In 1827 the keeper of a turnpike gate near the Cumberland River certified that 105,517 hogs had during that year been driven through the gate on the way to South Atlantic States.

TRAILS WEST OF THE MISSISSIPPI RIVER.

Among the most important live-stock trails west of the Mississippi River were those which led from Texas. One trail extended to pasture lands in the Kansas River valley on the line of one of the Pacific railroads. Near Abilene, Kans., a station on this railroad, thousands of cattle were wintered annually in the late sixties and early seventies. Another destination of the cattle trails from Texas

was grazing lands along a railroad extending through the Dakotas and Montana. One of the routes from the Southwest to northern pastures over which cattle were driven from 1865 to 1884 led from the Gulf coast of Texas northward, passing west of San Antonio; thence to the Red River at Doan's Store, in Wilbarger County, Tex. Here the trail branched, one part going northward to a point now included in Beaver County, Okla., and thence west to the Colorado ranges. The other fork of the trail led northeasterly through Fort Sill Reservation, now in Oklahoma; thence across the Washita River at Anadarko, Okla.; thence northeasterly to the Canadian River, which was crossed, and the route extended through Fort Reno and Kingfisher, and thence northward, following here the same general route as the present railroad, through Caldwell and Wichita, to the Kansas River just above Abilene.

The increase in farming and the accompanying restriction of the open range, together with the westward extension of the railroads, tended to move the northern terminus of a trail westward. This movement was going on when railroads from the North and East reached southwestern Texas and New Mexico.

The largest number of cattle driven in any one season from the Southwest to northern ranges has been estimated at 416,000 head.^a This was in 1884, about the time of the opening of a through railroad line over that route, and from that year the number moving over the long trails rapidly diminished.

The valley of a river was often found a convenient course, although not always a direct one, over which to drive sheep from their native ranges to pastures along the railroads which reached eastern markets. One route from Oregon led up the valleys of the Columbia and the Snake rivers, across the mountains of Idaho, and down the valley of the Platte to shipping points in Nebraska.

COST OF TRAILING OR DRIVING.

Cattle driven to Abilene, Kans., from Texas ranges, an average distance of some 700 miles, spent about two months on the trail. It has been estimated^b that the average cost of bringing cattle over this trail was \$2 per head, in addition to a loss of 20 per cent, due to stampeding, stealing, and other misfortunes of the road, making a total of \$2.40 per head, or somewhat less than the freight rate over about the same route in 1908.

According to one estimate, the wages and cost of subsistence of eight men engaged in trailing 350 cattle from range to shipping point in 1908 would average \$72, or about 20 cents per head. Another

^a Bureau of Animal Industry, Annual Report, 1887, p. 333.

^b U. S. Commissioner of Agriculture, Report, 1870, p. 350.

estimate of cost of trailing from range to shipping point for the same year was from 5 to 25 cents per head, including the cost of the roundup but not allowing for losses on the trail.

The trailing of sheep involves relatively less expense. It has been stated that less than half the number of men will be required for a given number of carloads of sheep than for the same number of carloads of cattle. The cost of trailing sheep in 1908, not including losses on the way, has been estimated as about \$130 per month for a flock of 2,000 to 3,000 sheep, or from one-half to four-fifths of 1 cent per head for a trail of average length.

Over long distances the commercial advantage of the railroad over the trail is well illustrated by the readiness with which the latter is abandoned whenever railroad service is available. One important advantage in favor of the railroad is the saving of time. From southwest Texas to the most remote ranges of the North but a few days' haul now intervenes, while under the old conditions two or three months of trailing were necessary. The decline in the supply of free pasturage and inaccessibility to water along the way over a number of the old routes, due to the settlement of the country, have added much to the difficulty of trailing.

HAULING HOGS IN WAGONS.

Throughout the States where hogs are raised in largest numbers they are usually hauled to shipping points in wagons. In 1906 an estimate of the cost of hauling live hogs to market was made by this Department, based upon data furnished by county correspondents of the Bureau of Statistics. Three hundred and sixteen counties, 291 of which were in the North Central and 25 in the South Central States, reported that the average distance hogs were hauled from farm to shipping point was 7.9 miles and the average time seven-tenths of a day. The average weight of a load was 1,941 pounds, and the average cost was \$2 per load, or 10 cents per 100 pounds.

PRIMITIVE TRANSPORT SERVICE.

AN EARLY SHIPMENT.

One of the first shipments of cattle by rail from Kentucky to eastern markets, made in 1852, is described by the shipper as follows: One week was consumed in driving the cattle, 100 in number, from the neighborhood of Lexington, Ky., to Cincinnati. Here they were loaded in box cars and shipped by rail to Cleveland, whence they were taken by steamboat to Buffalo. After a stay of several days at Buffalo, the animals were driven to Canandaigua, N. Y. Thence they were hauled in immigrant cars to Albany, where they were unloaded in the freight house. After spending two days in a feed yard near Albany the stock was taken by boat to New York.

The freight on these cattle from Cincinnati to Buffalo was at the rate of \$120 per car, and the total expense from Kentucky to New York was \$14 per head.

OLD ROUTES FROM TEXAS.

Among the routes over which cattle were moved from Texas to eastern markets about 1870, three will serve as illustrations. One way led by coastwise steamer to New Orleans, whence the animals were taken northward on river boats. At Cairo, Ill., the railroad journey was begun, northward to Chicago, thence to the East. A second route from Texas was over a trail to shipping points on Red River, whence the cattle were forwarded on steamboats to Cairo, thence to be shipped by rail northward. A third route followed the trails from Texas to feeding grounds along the railroads in Kansas and in regions farther north. From stations along these railroads the animals were forwarded to eastern markets.

RIVER TRADE.

Statistics of the receipts and shipments of meat animals at St. Louis will illustrate the relatively small importance of steamboats as carriers. At St. Louis the total number of cattle received by rail during the three years ending 1867 was 207,000 and the number received by river 65,000. During the three years ending with 1907 the number of cattle received by rail was 3,783,000 and the number by river 46,000. So it appears that in the earlier period, when railroads were just beginning to handle this traffic, they carried more than three times as many cattle into St. Louis as the established river service, and forty years later the cattle traffic by rail was more than eighty times that on the river.

Of the sheep received at this market, the railroads brought twice as many as steamboats in 1865-1867, and forty-five times as many in 1905-1907. River boats carried 18 per cent of the hogs received at St. Louis in 1865-1867 and less than 4 per cent in 1905-1907.

SOURCES OF SUPPLY OF LIVE STOCK.

NUMBER OF MEAT ANIMALS, 1840-1900.

The number of cattle, not including calves, in the United States east of the Mississippi River increased from 14,000,000 in 1840 to 19,000,000 in 1900, but the average per 1,000 population in 1840 was 861 and in 1900 only 349 head. On farms and ranges west of the Mississippi there were 33,000,000 cattle in 1900, an average of 1,584 head per 1,000 population. This average was 2,153 in 1890 and 1,713 in 1880.

The average number of swine per 1,000 inhabitants east of the Mississippi River decreased from 1,496 in 1840 to 556 in 1900. The aver-

age west of this river was 1,540 in 1900 and 1,881 in 1880. The corresponding averages for sheep, excluding lambs, per 1,000 population east of the Mississippi River were 1,162 in 1840 and only 230 in 1900; in the West there were 1,298 sheep per 1,000 population in 1900 and 1,938 in 1880, a decrease of one-third in twenty years.

LOCATION OF RANGE COUNTRY.

Of the relatively large supply of meat animals west of the Mississippi River, a considerable fraction of the cattle and sheep is on ranges. With the development of the country, grazing lands have been more and more restricted by the extension of agriculture. The regions in which permanent grazing lands, or ranges, are to be found are shown on figure 1. These regions include some highly cultivated lands, especially on the Pacific coast and in irrigated sections of the "Great American Desert." The lines between cattle and sheep ranges, also the eastern boundary of the entire range country, are indicated on this map only approximately.

Of the grazing regions in which cattle predominate, the largest extends northward from the mouth of the Rio Grande, with but one interruption, to the Canadian border, and westward for varying distances from a line corresponding roughly with the one-hundredth meridian. A second group of ranges on which cattle are greatly in excess of sheep extends along the Pacific coast from the Mexican border to the Columbia River; while a third group reaches from southern Utah through western and southern Arizona into southern New Mexico. Of the other ranges used chiefly for cattle, one group is located in the southwestern corner of Texas, another is in Wyoming south of Yellowstone National Park, a third touches the eastern shore of Great Salt Lake, and a fourth includes parts of northern Nevada and southern Oregon.

The principal region in which the grazing lands are used chiefly for sheep is shaped roughly like the letter "T," with the top extending westward from central Wyoming to central Washington, and the stem reaching south from Montana to southern Nevada. Two other groups of sheep ranges are in central Montana and central New Mexico, respectively.

Other parts of the range country, as shown on the accompanying map (fig. 1), include grazing lands of both cattle and sheep.

ROUTES AND MARKETS.

IMPORTANT ROUTES.

It has been noted above that the per capita meat supply east of the Mississippi River has been rapidly decreasing and that part of the meat consumed in this region is drawn from the farms and ranges of

the West. For this reason the general tendency is for long-distance shipments of live stock from the West toward the East, even as it was in the earliest days of the western live-stock industry. The old routes from the ranges of the Southwest to northern grazing lands

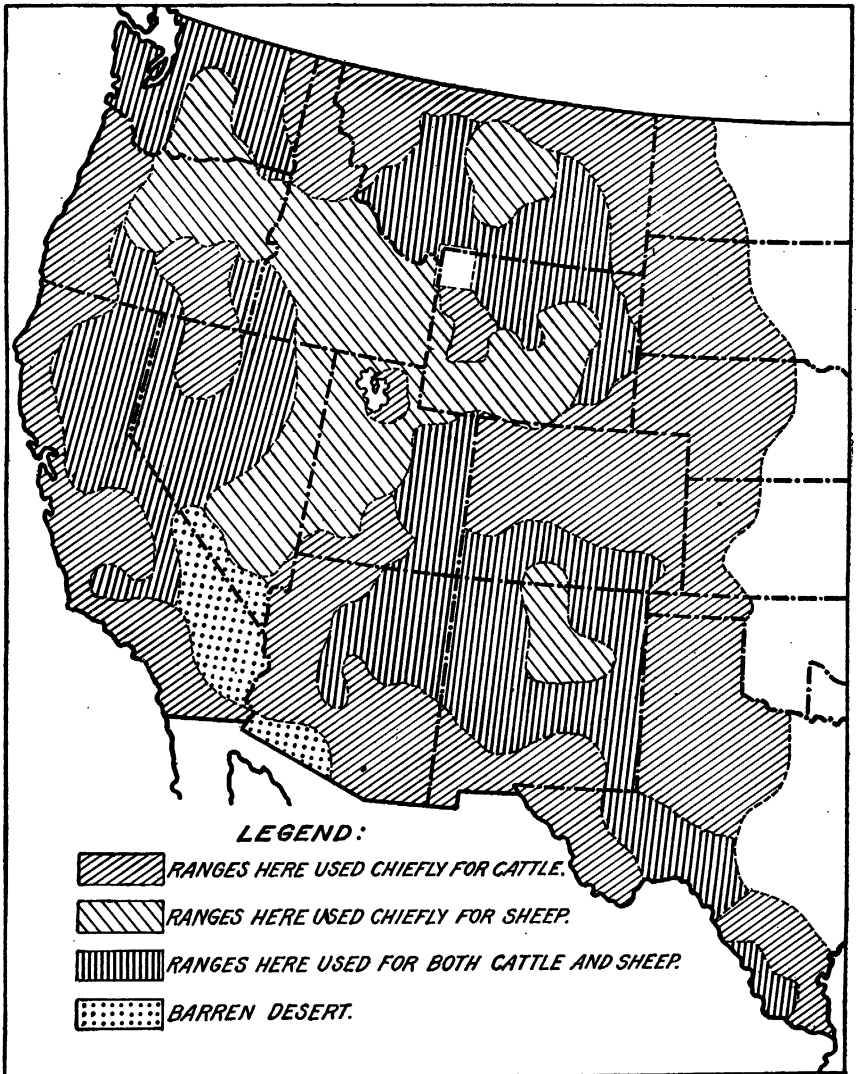


FIG. 1.—Location of range country.

are still followed, the railroad taking the place of the trail. From the big markets along the Missouri River, and also from Chicago and St. Louis, live-stock routes lead to the Atlantic coast, a large number of shipments passing through Cincinnati, Pittsburg, or Buffalo.

In addition to the through routes of live-stock shipments, many lines of local traffic center at each market. The number of animals received at a market from various local shipping points within the radius of a day's hauling is sometimes larger than the number coming over long-distance routes.

ILLUSTRATION OF TRAIN SERVICE.

An example of the complex nature of live-stock movements is furnished by a service consisting of one or more through trains made up at Jackson, Mich., and run to Buffalo via Detroit and Niagara Falls. These are composed of cars from four local trains which come to Jackson from as many different directions. One train leaves Bay City at 10.30 a. m. and is due in Jackson at 6 p. m. the same day; another from Ceresco, about 8 miles east of Battle Creek, is due to arrive half an hour later, having spent five and one-half hours on the way. A third train from Grand Rapids is due at 7 p. m., and the fourth leaves Battle Creek at 10.30 a. m., proceeds southwest as far as Fairfax, then turns northeastward and runs to Jackson, the entire running time being scheduled as eight and one-half hours. The through trains for Buffalo are expected to leave Jackson about 9 p. m., or two hours after the last local is due. The distances traversed by these local trains range from 37 to 115 miles and their average rates of speed, including stops, from 6.8 to 15.8 miles per hour.

SHIPMENTS OF CATTLE AND SHEEP IN TEXAS.

The importance of the local shipments of cattle within the State of Texas is illustrated by figures covering practically all of the railroads of the State for the six months ending May 31, 1908. According to these returns the total number of cattle shipped during those months was about 350,000 head, more than two-fifths of which were consigned to points within the State and less than three-fifths to points beyond. Of the 130,000 to 140,000 sheep received by railroads in Texas during this period, four-fifths were carried beyond the State line.

LIVE-STOCK MOVEMENT AT KANSAS CITY.

An illustration of live-stock movement through a large center is afforded by conditions at one of the chief markets. Of the total number of steers received at the Kansas City Stock Yards in 1907, 59 per cent came from the State of Kansas, 15 from Oklahoma, 11 from Missouri, 6 from Texas, and nearly all the rest from Colorado, New Mexico, and Nebraska. The small part credited to Texas may be explained by the fact that Texas cattle are often sent to pastures and feed lots in Kansas, there to be fattened before shipment to the packing houses.

Of the sheep received at Kansas City, 29 per cent came from Colorado, 22 from Kansas, 10 from Missouri, 9 from Texas, and the rest from a number of other regions. This market was furnished by Kansas with 67 per cent of the hogs received in 1907, by Missouri with 27 per cent, Oklahoma 10, and Nebraska 5.

The destinations of cattle shipped from Kansas City in 1907 were distributed over many States. Missouri received 12 per cent, or more than any other State; Kansas 10, Illinois 5, Iowa 4; a large number of other States received smaller amounts, and 15 per cent was consigned to the various large markets. The number credited to each State does not include shipments to large centers, such as Chicago or St. Louis.

RECEIPTS AT LARGE MARKETS.

At the four largest cattle markets in the United States the average number of cattle received yearly during 1905-1907 was 8,000,000 head, of which the receipts at Chicago were 3,300,000; Kansas City, 2,300,000; St. Louis, 1,300,000; and Omaha, 1,100,000 head. Chicago is the largest market for hogs also, an average of about 8,000,000 head per year having been received there during the three years ending 1907. Markets whose receipts of hogs averaged in these years from 2,000,000 to 4,000,000 head per year included Kansas City, St. Louis, Omaha, and in 1905 Buffalo.

The number of sheep received at Chicago during the three years ending 1907 averaged 4,600,000 per year. Omaha's receipts were next in size, averaging 2,000,000 head; then came Kansas City, with 1,500,000; then, for the two years ending 1906, Buffalo averaged 1,300,000; and New York, 1,100,000.

Receipts of calves were smaller than those of any other class of live stock, the average annual number at Chicago during 1905-1907 being 400,000; at Kansas City, 260,000; at Fort Worth, 230,000; and for 1905-6 at New York, 390,000.

DISPOSITION OF CATTLE AND SHEEP.

A live-stock center serves at least two important purposes: It is a meeting place for dealers, and it is also a place of slaughter on a large scale. The degree to which each of these two functions is developed at a given market is generally shown by the relative number of animals shipped as compared with the number received. A group of markets whose chief business is forwarding cattle includes Denver, St. Paul, Buffalo, and New York, each of which shipped at least 70 per cent of the number received during 1905-6.

Centers whose shipments during this period were less than 70 per cent but more than 50 per cent of the number received included Sioux City, Pittsburg, Philadelphia, Boston, and Baltimore. The largest cattle markets are in the class which slaughter more than

one-half of the number received. Besides Chicago, Kansas City, St. Louis, and Omaha, this third group included, in 1905-1907, Indianapolis, Fort Worth, Louisville, Cincinnati, and St. Joseph.

The important centers which shipped out 50 per cent or more of the sheep received included, in 1905-1907, Louisville, Denver, St. Paul, Cincinnati, Omaha, and, in 1905-6, Pittsburg, Buffalo, Baltimore, and New York. Of the sheep received in 1905-1907 at Kansas City, 71 per cent were retained; at Chicago, 72; at St. Joseph, 74; and at St. Louis, 85 per cent.

RESHIPMENTS OF HOGS RELATIVELY SMALL.

The combined yearly receipts of hogs at thirteen principal markets in the United States averaged 25,000,000 head in 1905-1907, and of this number 20,000,000, or 80 per cent, were retained for slaughter. At St. Louis 73 per cent of the hogs received during this period were slaughtered, at Chicago 77, at Omaha 93, and at Kansas City 96 per cent.

CATTLE EXPORTS.

Most of the meat animals exported from the United States are cattle which are shipped principally through North Atlantic ports. The average number exported yearly from the United States increased from 139,000 during the fiscal years 1878-1882 to 514,000 in 1903-1907, and the exports from the Atlantic coast grew from 90,000 to 354,000 in the same time. During the year ending June 30, 1908, Boston exported 107,000 cattle, New York 76,000, Philadelphia 46,000, Baltimore 30,000, Portland, Me., 22,000, and Detroit 18,000. Exports of sheep and swine from the United States are relatively unimportant, their average value in 1903-1907 being only 4 per cent of the cattle exports.

STOCK YARDS AND FEEDING STATIONS.

FACILITIES.

The facilities for handling live stock at large markets may be illustrated by the capacity of the Union Stock Yards at Chicago. These yards in 1907 covered an area of 500 acres and contained 13,000 inclosures. Separate accommodations, except at unloading and loading platforms, were provided for each kind of stock; sheep and hogs were kept in sheds of two or more stories each, while cattle occupied open pens, each holding from one to several carloads. The inclosures at the loading and unloading platforms each held slightly more than one carload of stock. These yards could hold at one time 75,000 cattle, 125,000 sheep, 300,000 hogs, and 6,000 horses and mules. The movement from one part of the yards to another was facilitated by overhead viaducts and by miles of alleyways among the pens. The water system which supplied the pens had a reservoir holding

10,000,000 gallons and pumps whose daily capacity was 8,000,000 gallons.

In addition to the large stock yards, there are minor feeding stations along the routes from local shipping points to large markets. The area devoted to feeding purposes at these stations varies from small feed yards, where only hay and grain are furnished, to large pastures of 1,000 to 3,000 acres, such as are found at some points west of the Missouri River. Facilities at feeding stations vary greatly. At some places scarcely more than a chute is available, while at others there are platforms and chutes for unloading and loading, pens for feeding and watering, scales, and other appliances for handling the stock.

HANDLING TRAFFIC.

The time and labor required to unload live stock from a train at a stock yard and to place the animals in a convenient location for selling is an element in the cost of transportation. Live-stock trains are so run as to arrive at Chicago or other centers in time for the animals to be fed, watered, and weighed before the morning market opens. On reaching the yards a train is stopped alongside a platform across which are a number of chutes. The distance between the gateways of pens is approximately equal to an average car length, so that each car door on one side of a train may be opposite a gateway, and the stock may be readily moved from the train across the platform and into the pens. As each car is unloaded a record is made of the number of animals as they enter the chutes, and another record is made when they are driven from the unloading pens. These records include also the names of the consignor and consignee, the numbers of cars and chutes, and other data necessary to identify the stock. Each consignment is kept separate as it is driven from the place of unloading along alleyways and over viaducts to the cattle pens, hog houses, or sheep barns, where the animals are fed and watered and where sales take place.

The owner of stock is usually represented in the market by a commission man. Buyers may be divided into at least four classes. One consists of men employed by the local packing houses; another is purchasing for farmers and feeders; a third represents the exporters, and still another class consists of speculators or traders who buy cattle, classify, and sell them to packers, exporters, or feeders. By the middle of the afternoon the market is usually over, and the animals that have been sold for shipment are generally driven to the loading chutes and placed on trains which leave the same afternoon or night. Those purchased by local packing houses are promptly slaughtered.

At Chicago the movement from cars through the chutes and pens to the alleyways beyond is estimated to average for all stock one

minute per carload. This includes counting the animals, making the required records, and waiting in the unloading pen for a place in a procession of consignments moving through the adjoining alleyway. The actual movement from car to chute requires little time, a train of 40 to 50 cars being unloaded easily within fifteen minutes.

CHARGES FOR YARDAGE AND FEED.

Charges at stock yards include two general items: One is the use of the yards, together with the scales, and the other is the feed. In the Middle West a common rate for the first item, or "yardage," is for cattle 25 cents per head, calves 10, hogs 8, and sheep 5 cents. At Buffalo in 1908 "yardage and scale" was for cattle 15 cents, calves 8, hogs 6, and sheep 4 cents. The stock yards in San Francisco grant free use of the yards for twenty-four hours after unloading. After the expiration of this time the charge for each twelve days or fraction thereof for cattle is 25 cents per head, hogs 6, and sheep 5 cents.

The charge for feeding stock in a number of the larger stock yards in 1908 ranged from \$1 to \$2 per 100 pounds of hay, \$1 to \$1.50 per bushel of corn, and 60 cents to \$1 per bushel of oats.

Minor feeding stations fix rates for hay and grain not greatly differing from those in force at large stock yards. For pasturing sheep en route to the East from Wyoming, Idaho, and Oregon the rates per head at feeding stations ranged in 1908 from 0.5 to 1.5 cents per day.

SHIPERS OR ATTENDANTS.

In the absence of complete service at some unloading points over a given route it is necessary for attendants or "shippers in charge" to accompany stock trains to assist in unloading, feeding, watering, and reloading the animals; but on through shipments between large centers, such as Chicago and Buffalo, it is not usual for shippers to accompany the stock. In the early days attendants were much more necessary than at present. When cars were overcrowded and the animals thrown down, one of the principal duties of the shipper was to aid them to their feet.

NUMBER OF UNLOADING POINTS ON A GIVEN ROUTE.

Legal requirements are such that thirty-six hours may be taken as the maximum running time between feeding stations. From southern Idaho to Omaha three or four unloading points are usually necessary, one from Omaha to Chicago, and one from that point to Boston or New York. From Chicago to Pittsburg the schedule time of important live-stock trains on two routes, in July, 1908, was twenty-five to twenty-nine hours, and the average rates of speed from 17 to 19 miles per hour, including stops. From Kansas City to Buffalo

via St. Louis and Detroit the time was fifty-six and one-half hours and the average rate about 18 miles per hour. For traffic moving as fast as this, unloading points could be nearly 650 miles apart.

CARRYING CAPACITY OF RAILROADS.

NUMBER OF LIVE-STOCK CARS.

The total number of live-stock cars owned by railroads in the United States in the year ending June 30, 1907, was 69,997. Besides these a considerable number were owned by private car companies. The average capacity of a stock car in 1907 was 29 short tons, and the total for all the stock cars owned by railroads was 2,013,170 tons. This capacity is the weight of dead freight that the car is permitted to carry and not the weight of the live stock that can be comfortably loaded therein.

DOUBLE-DECK CARS.

Double-deck live-stock cars were first used upon railroads in the United States before 1860. The advantage of a double-deck car depends largely upon the size of the individual shipment. When a single consignment of small animals is large enough to load two ordinary single decks, the use of one double-deck car will be a saving to the carrier. Freight rates are frequently lower in double than in single-deck cars.

Of a total of 44,000 live-stock cars owned in June, 1908, by 17 principal live-stock carrying railroads, 7,800, or 18 per cent of the total, were fitted with double decks. If this percentage applied to the total number of stock cars owned by railroads in this country in 1907, there were then about 13,000 double and 57,000 single-deck cars.

AVERAGE CARLOADS.

From reports of stock yards and railroads it is estimated that an average number of meat animals to the carload at Kansas City and Omaha is for cattle about 25, hogs in single-deck cars about 75, and sheep about 120 per deck. Allowing as an average 25 cattle per car, the 57,000 single-deck cars owned by railroads in 1907 would carry at one time 1,425,000 head, and the total weight of these cattle, at 955 pounds per head, would be 680,000 tons, or 41 per cent of the total dead-weight carrying capacity of the cars. If 680,000 tons of dead freight were substituted for the same weight of live stock, only 23,000 instead of 57,000 cars would be required. Taking as an average number of sheep 120 per deck, the 57,000 single and 13,000 double-deck cars would carry at one time 9,960,000 head of sheep, which at an average of 100 pounds per head would weigh 498,000 short tons. The full capacity of these cars being 2,013,000 tons, the equivalent in dead freight to 70,000 carloads of sheep could be carried on 17,000 cars, thus saving 53,000, or 76 per cent, for other service. The 70,000

cars, if loaded with hogs of an average weight of 220 pounds and numbering 75 head per deck, would contain the equivalent of only 24,000 full carloads of dead freight.

RAILROAD FREIGHT CHARGES.

The first railroad freight rates on live stock were quoted in dollars per car, regardless of the weight or number of the animals carried. This method of charge has been blamed for much of the trouble due to crowded cars, but with the establishment of charges depending upon weight, dealers have no longer much inducement to load too many animals in one car. From Chicago to New York, as early as 1879, rates on live stock were quoted in cents per 100 pounds, and nine years later rates from the Missouri River to Chicago and St. Louis were changed in the same way. In 1908 the rates over most of the leading routes east of the Rocky Mountains were quoted in cents per 100 pounds. West of the Rocky Mountains and over routes from the southwestern ranges through Denver northward in 1908 rates were still expressed in dollars per car.

CATTLE IN 1908.

For a large number of shipping points and destinations the principal items of transport cost for cattle from Texas ranges to Chicago via Montana are shown in the statement below.

Principal items in the average cost per head of moving steers from Texas to ranges in Montana, North Dakota, and South Dakota, and thence to Chicagó, June, 1908.^a

Item of cost.	Low.	High.
STOCK CATTLE.		
Trailing (driving) from ranges to local shipping points, Texas.....	\$0.05	\$0.25
Freight, Texas to Montana, North Dakota, and South Dakota, at \$100 to \$187 per car.	2.86	3.91
Feed en route at \$2 per car at each of three or four unloading points.....	.17	.23
Shippers in charge, estimated at \$2 per car.....	.06	.06
Trailing from railroad station to ranges, Montana, North Dakota, and South Dakota.	.05	.25
Total of items given, Texas to Montana, North Dakota, and South Dakota.....	3.19	4.70
BEEF CATTLE.		
Trailing, ranges to shipping points, Montana, North Dakota, and South Dakota.....	.05	.25
Freight, Montana, etc., to Chicago, at 35 cents to 65 cents per 100 pounds.....	3.85	7.26
Feed en route with an assumed average of \$2 per car at two to four unloading points..	.16	.32
Shippers in charge, estimated at \$2 per car.....	.08	.08
Switching charges, Chicago, at \$2 per car.....	.08	.08
Feed, stock yards, Chicago.....	.25	.25
Yardage at Chicago.....	.25	.25
Total, Montana, etc., to Chicago.....	4.72	8.49
Total, Texas to Chicago via Montana, etc.....	7.91	13.19

^a The estimates of cost from Texas to Montana, etc., apply to stock cattle averaging 35 head per 36-foot car, and the estimates of cost from Montana, etc., to Chicago apply to the same cattle after they have attained an average weight of 1,100 pounds each and average 25 head per car.

The average cost per head of shipping steers over a particular route is given by one of the prominent cattlemen of northwestern Texas as follows:

	Per head.
Freight from Texas to Fallon, Mont., \$125 per car, 40 head per car.....	\$3. 125
Hay, \$8 per car.....	. 20
Shipper in charge, \$2 per car.....	. 05
Average losses in transit, \$5 per car.....	. 125
Total, Texas to Fallon.....	3. 50
Cost Montana to Chicago, including freight, hay, shipper's expense, and yardage	5. 90
Total, Texas to Chicago, via Fallon, Mont.....	9. 40

For transporting steers from northwestern Texas to feed lots west of the Missouri River and, after fattening, to London, England, via Chicago, the following estimates are made:

Principal items in the average cost per head of moving steers from Texas to feed lots in Kansas, Colorado, and Oklahoma, and thence to London, England, June, 1908.^a

Item of cost.	Low.	High.
STOCK CATTLE.		
Trailing, ranges to shipping points in Texas.....	\$0. 05	\$0. 25
Freight, Texas to feed lots in Kansas, etc., at \$26 to \$78 per 36-foot car.....	. 87	2. 60
Feed en route at one to three unloading points, at an assumed average of \$2 per car.....	. 07	. 20
Yardage at station near feed lot.....	. 00	. 25
Unloading at destination and driving to feed lot.....	. 05	. 05
Shippers in charge.....	. 05	. 07
Total, Texas range to feed lots in Kansas, etc.....	1. 09	3. 42
BEEF CATTLE.		
Driving from feed lot and loading on car.....	. 05	. 05
Freight, feed lots in Kansas, etc., to Chicago, at 27 to 55 cents per 100 pounds.....	3. 38	6. 88
Feed en route at two or three unloading points; assumed average, \$2 per car.....	. 20	. 30
Shippers in charge; assumed average, \$2 per car.....	. 20	. 20
Switching charge, Chicago, at \$2 per car.....	. 10	. 10
Yardage and feed at Chicago.....	. 50	. 50
Total, feed lots in Kansas, etc., to Chicago.....	4. 43	8. 03
Freight, New York to Chicago, at 23 cents per 100 pounds.....	3. 50	3. 50
Feed en route at one unloading point.....	. 25	. 40
Feed at New York.....	. 25	. 50
Total, Chicago to New York.....	4. 00	4. 40
Ocean freight, New York to London.....	6. 60	7. 20
Hay, 14 days, including 3 or 4 days at London.....	2. 50	4. 50
Shippers in charge.....	. 50	. 60
Total, New York to London.....	9. 60	12. 30
Total of items specified, Texas range to London.....	19. 12	28. 15

^a The estimates of cost from Texas to feed lots apply to stock cattle averaging 30 head per 36-foot car; and the estimates of cost from feed lots apply to the same cattle after they have attained an average weight of 1,250 pounds and average 20 head per car.

SHEEP IN 1908.

From Texas and New Mexico to feeding grounds in Colorado and Kansas, thence to Chicago, the total cost of moving sheep, including trailing, freight, feeding, and shippers' wages, averages 50 cents to \$1.50 per head; and the additional cost to New York, from 35 to 45 cents per head.

HOGS IN 1908.

The cost of moving live hogs, weighing about 200 pounds each, from farms in Illinois, Indiana, Wisconsin, Missouri, Iowa, Minnesota, and South Dakota to Chicago includes the following items: Hauling in wagons from farm to shipping point, 20 cents per head; freight, from 20 to 70 cents; shippers' wages, feed, yardage, and similar items, 30 to 60 cents; making a total of 70 cents to \$1.50 per head.

OCEAN TRANSPORTATION.

LOSSES ON SHIPBOARD.

Since 1891 cattle shipping across the Atlantic from the United States and Canada has been attended with comparatively small loss. In 1892, out of 98,731 cattle shipped to Europe from Montreal, 646, or about seven-tenths of 1 per cent, were lost at sea, and in the following three years the percentages of loss grew less. The number lost in any one voyage was rarely more than three or four.

The rate of insurance in 1908 on cattle shipped from New York to England was quoted at one-fourth of 1 per cent, of which one-tenth of 1 per cent was on account of the risk due to the ship's chance of being lost, and three-twentieths of 1 per cent for the risk of the cattle dying in transit. On this basis it may be assumed that the average loss of cattle on the trans-Atlantic routes is less than 5 in every 2,000 shipped. Prior to the establishment of satisfactory steamship facilities and to the present Government inspection, insurance rates on cattle, according to a prominent New York exporter, varied from 2 to 10 per cent, thus indicating that the losses in those days were from eight to forty times as great as at present.

FREIGHT COSTS FROM THE UNITED STATES.

Ocean freight rates in 1908 from the United States to England were quoted at \$6 to \$7.20 per head for cattle, and 72 cents (3 shillings) per head for sheep. Twenty years ago, according to an exporter, rates on cattle reached \$9.60. The actual rates paid are subject to private contracts, the terms of which are not usually made public. Other items of cost of ocean transportation are attendants' wages and feed for the stock. En route from New York to England the foreman of attendants is paid about \$50 or \$60 per trip, experienced

hands from \$25 to \$30, and inexperienced men often no money wages, their passage being earned by work on shipboard. Sometimes, however, the exporter pays at the rate of \$3 per man to secure these men through shipping agents. The total cost of labor from New York to London or Liverpool is estimated at 50 or 60 cents per head for cattle and about 10 cents per head for sheep. Enough hay is provided to feed the stock throughout the ten or eleven days on the ocean and for several days at the landing place in England.

RATES FROM ARGENTINA.

Before the United Kingdom prohibited the importation of cattle from the River Plate freight rates from Argentina to England sometimes reached as high as \$28.50 per head and as low as \$16.80. During the few months in 1903 when the quarantine was suspended in England rates ranged from \$18.32 to \$22.58 per head.

Unfavorable conditions, sometimes involving serious loss, are reported to have existed on the long voyages from Argentina to England before this traffic was stopped. With improved accommodations, however, many of these difficulties might be overcome, but long voyages necessarily require more food and greater cost for attendance than the short ones from United States ports to London or Liverpool.

ECONOMY IN TRANSPORTING MEAT RATHER THAN LIVE ANIMALS.

RAIL.

It costs the carrier less to transport a given amount of meat than the live animals necessary to produce that meat. Seven carloads of live cattle yield on an average 5 minimum carloads, 20,000 pounds each, of fresh beef, or 2 carloads of 49,000 pounds each. Packing-house products other than fresh meat are carried in still larger loads and the saving to the carrier as compared with live-stock transportation is correspondingly greater.

From Chicago to New York in 1908 the freight and other expenses of the road on an export steer of average weight (1,250 pounds) were \$4 to \$4.40, while the freight on the average amount of fresh beef yielded by the animal, 700 pounds, would amount to only \$3.15, not including the expense of icing. From Kansas City to New York the corresponding difference between live and dead freight is still greater, amounting possibly to \$2.25 or \$2.50 per head.

OCEAN.

The total cost of shipping a live steer from Chicago to Liverpool, including freight, feed, and attendance, is estimated at \$13.60 to \$16.70, or considerably more than double the cost of shipping the average weight of fresh beef yielded by the animal.

Over the long voyage from Argentina to England the difference in cost between live cattle and dressed meat would be great. Compared with the freight rates on live cattle, quoted in 1903 when the last exports over this route were made, the cost of shipping fresh meat is small. A rate quoted by a leading steamship company carrying dressed beef from Argentina to England in 1908 was equivalent to \$7 for the average quantity yielded by an export steer, or about one-third of the freight and a still smaller fraction of the total transport cost for the live animal, which total included, besides freight, the risks of passing through the Torrid Zone and the expense of feed and attendance for a voyage of more than three weeks.

CONCLUSION.

The growth of economy in the transportation of meat animals has taken place along at least three general lines. One is the saving to the railroads and steamships handling the traffic, which phase of improvement is reflected in lower freight rates. The size and efficiency of cars and vessels have been increased and cheaper methods have been devised for handling traffic in stock yards. A second phase is the reduction of loss in transit, a saving which may be credited to mechanical improvements, to legal regulations, and to the change over a large number of routes whereby the freight charge depends upon the weight of the live stock shipped and not upon the number of cars used. The third direction of this growth of saving is found in the tendency to transport meat instead of live animals. This movement is illustrated by the establishment of new slaughtering centers nearer the sources of supply than are the older meat-packing cities east of the Missouri River.