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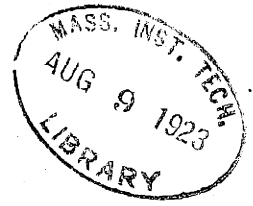
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*Econom.
Theor. course*



THE TRANSPORTATION FACILITIES

FOR

BOSTON'S FOOD SUPPLY

By

ALFRED PERLMAN

Course XV, 1

BOSTON, MASSACHUSETTS. JUNE 1, 1923.

Boston, Massachusetts,

June 1, 1923.

Professor A. L. Merrill,
Secretary of the Faculty,
Massachusetts Institute of Technology.

Dear Sir:

In accordance with the requirements for graduation, I hereby submit a thesis entitled, "The Transportation Facilities for Boston's Food Supply."

The writer wishes to express his appreciation for help extended to him in this study by Dr. R. J. McFall, Massachusetts Agricultural College, Mr. Eldon C. Shoup and Mr. Wilford W. Michaud of the New England Research Council, Professor W. E. Freeland of the Massachusetts Institute of Technology, and Messrs. F. F. Farrar and W. H. Walker of the Boston and Maine Railroad.

Respectfully yours,

Alfred J. Sherman

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INTRODUCTION

PURPOSE: This thesis is one of a series of studies concerning the marketing of Boston's food supply, now being conducted by the New England Research Council on Marketing and Food Supply. Its purpose is to make a study of the problems which must be dealt with in the transportation of perishable commodities, so that when all the studies now being conducted by the Council are gathered together, enough facts will be at hand to treat the problems involved in the marketing of Boston's food supply with due regard for every factor involved, including trucking, transportation, market facilities, etc.

This thesis has for its purpose the accumulation of data bearing upon the transportation of Boston's food supply, so that the problems of the railroad may be given due consideration in determining the marketing policies of the future.

SCOPE: This study includes an investigation of the physical and financial structure of the Boston and Maine Railroad, the carrier which was selected as the most important link in the transportation of Boston's food supply. This includes the volume of traffic carried, location and capacities of terminals, charges, and all other factors affecting the transportation of food.

The writer has taken the one railroad to illustrate the transportation problem rather than the three serving Boston, because in the limited time at his disposal more concrete problems may be handled by thus narrowing the field.

METHOD PURSUED: A preliminary study was laid out after reference to standard works on transportation, Moody's Report on Steam Railroads, Interstate Commerce Commission statistics and a number of governmental and civic reports.

Pre-
liminary
Study

The field investigation next conducted, consisted of interviews with railroad, municipal and government officials, representing the Boston and Maine Railroad, the Department of Public Works, the Public Utilities Commission, the Boston Chamber of Commerce, the United States Department of Agriculture, the Boston Produce Men's Association, Board of Engineers of the United States War Department. The field investigation also included an inspection of the yards and terminals of the various railroads in and about Boston, particularly those of the Boston and Maine Railroad.

Field
In-
vesti-
gation

REPORT

THE INTERCORPORATE AND FINANCIAL HISTORY: Moody's 1922 Report on Steam Railroads gives a very complete history of the railroad's intercorporate and financial relationships and is taken as the authority for the following statements:

The Boston and Maine Railroad as it exists today, developed, fairly late in life. It originally ran from a junction fifteen miles from Boston to a junction forty miles from Portland, Maine, but extensions were built to both of these cities. The B. & M. was not noted for its progressiveness, for as late as the eighties it had light rails with wood fish plates on its main line. Even at this time it was hampered by the lack of adequate terminal facilities.

In the middle eighties it began a policy of expansion by the unification of existing lines. It became the largest railway system in New England with lines radiating northward from Boston

Dividends were paid without interruption from 1842 to 1913, but earnings, especially in recent years, have been particularly susceptible to changes in industrial conditions, which charges, of course, have been reduced but little during periods of smaller earning power.

Divi-
dends

Various attempts have been made to gain control of the road, the Pullman Company, the American Express Company, and President McLeod of the Reading having made the attempt at different times. In 1907, the New Haven acquired a large interest which was vested in the Boston Holding Company and is now awaiting sale under court order.

Attempts
at
Control
of
Stock

At the annual meeting on July 27, 1922, substantially the old directorate was returned. The New Haven tried unsuccessfully to receive representation. Rumors that A.H. Smith of the New York Central would be proposed as chairman did not materialize.

The Fitchburg Division of the B. & M. provides a connection with the west and covers much the same ground as the Boston and Albany, the New York Central's New England outlet. The recent contentions over divisions of through freight rates may be a factor in the reported interest of the New York Central in the affairs of the B. & M.

The Boston and Maine Railroad was incorporated June, 1835, under laws of Maine, New Hampshire and Massachusetts, as a consolidation of the Boston and Portland R.R. of Massachusetts, the Boston and Portland R.R. of New Hampshire, and

Growth
of
the
System

the Maine, New Hampshire and Massachusetts R.R. of Maine. The original line extended from Wilmington to South Berwick and was opened on February 23, 1843. Further extensions were constructed from time to time and various subsidiaries acquired. The Boston and Lowell Corporation was leased to the B. & M. on April 1, 1887 for 88 years. This lease included the subsidiaries of the Boston and Lowell (See Appendix A). The Concord and Montreal R.R., and leased lines were leased for 91 years from April 1, 1895. The Fitchburg R.R. was leased for 99 years from July 1, 1900. More complete details of the length and terms of the various leases may be found in Moody's Report. This unification of existing systems rather than a comprehensive building of new lines has had an effect upon the physical layout to a very marked degree as shown later in this report.

The Boston and Maine Railroad very nearly reached the limit of its external expansion twenty years ago, and except for a slight increase in extra main track mileage (See Appendix L) the internal growth has been negligible. The equipment owned has steadily decreased during the last decade, and the company has been unable to handle the increased tonnage by more efficient use of its facilities alone. The traffic is heavy and well diversified altho the short haul is characteristic of its freight business.

The effect of this type expansion is shown very markedly in the physical condition of the road. Instead of a unified system

The
Effect
Upon the
Physical
Condition

as found in the western roads, each division has a different set of ruling grades, locomotion clearances and other limiting factors, so that a locomotive which may be used upon one division cannot be used upon another division and in some cases upon certain portions of the same division. The terminals show the same characteristics. In Boston the separate divisions have separate receiving yards, classification yards and delivery tracks. Instead of a unified terminal, there are four freight terminals under one system. That is, the accounting is done under the same roof, but the physical operation of the terminal is that of the operation by four separate railroads. This factor is brought out more clearly in the description of the yards and terminals, later in the report.

PHYSICAL RELATIONSHIPS: The principal gateways at which the Boston and Maine Railroad receives freight from other carriers are Mechanicville, N. Y., Rotterdam Junction, N.Y., White River Junction, Vt., Ogdensburg, N.Y. and Newport, Vt. At Mechanicville, interchange is made with the Delaware and Hudson, at Rotterdam Junction with the New York Central, at White River Junction with the Grand Trunk (Central Vermont), at Ogdensburg with the New York Central and at Newport, with the Canadian Pacific.

Inter-
change
with
other
Carriers

The charts and tables in Appendices B, C, D and E, show that the percentage of the loads delivered to the loads received is only forty-two per cent. This is for connections other than New England lines (See Appendix D) and varies only two per cent from the average of all the New England carriers. Financially, the ratio does not differ greatly however, since most of the traffic into New England consists of bulky, low-priced raw materials, while the traffic delivered as high grade merchandise or manufactures, for which the rates are relatively high.

The greatest volume of interchange is with the Delaware and Hudson at the Mechanicville Gateway (See Appendix E). It is upon this basis that Prof. Ripley considers the consolidation of the Boston and Maine with the Delaware and Hudson, in his plan for the consolidation of the railways submitted to the Interstate Commerce Commission. An alternative plan proposed to create one system out of all the existing New England carriers. A full discussion of both plans are to be found in the Interstate Commerce Commission's Report Number 12964 on the Consolidation of Railroads, from which Appendices B, C, D, and E have been taken.

Proposed
Con-
solida-
tion

PHYSICAL FACILITIES: The Boston and Maine Railroad is essentially a terminal road, with a serious shorthaul problem to face. There are other difficulties which add to the complexity of the problem.

Type
of
Road

The expansion of the road through unification rather than through the development of a well-planned system, resulted in a railroad which, altho under one management, is far from a homogeneous system physically. Each division is practically a separate railroad in spite of the consolidation of management. The condition of the bridges vary over different parts of the road, as do the limiting grades and curvature, so that engines may be used upon one division which cannot be used upon another portion of the road. This necessitates a complicated system of routing and does not permit a maximum efficiency in train loading as practised by the New York Central or the Hill roads. Much of the equipment is antiquated and the employees in the general offices work under adverse conditions of poor lighting and ventilation and, in a number of offices, particularly the freight claim department, an excess of noise and dust. The "esprit de corps" among the workers in the general offices, in spite of all these handicaps, is one to be marvelled at. Yet, all these factors cannot but take their toll of efficiency and economy in management and operation.

These factors present a serious problem, but the conditions of the terminals presents a far greater handicap to efficient operation. As pointed out above, the Boston and Maine is a terminal road and so

its terminal efficiency is the factor which will have the greatest effect upon the over-all efficiency of the road. Yet the layout of the Boston terminal has so been influenced by the type of expansion through which the road has passed, as to make the attainment of efficient operation an almost impossible result.

Thus, through no fault of management but rather because of the type of expansion through which the road has passed, the present management is faced with the task of administering to a system made up of a number of units having entirely different characteristics. The problem today is one concerned with unification, rather than expansion, unification to standardize the various units into the one unified system.

The railroad handles two classes of freight, time and preference freight. Time freight is scheduled at about twelve miles per hour and constitutes the greatest part of the freight moved by the railroad. It consists of raw materials, minerals, lumber, grain, building materials, machinery, low class merchandise, etc. In 1920 25.9 per cent of the total freight tonnage carried was made up of coal. (See Appendix H.)

Time
and
Prefer-
ence
Freight

Preference movement is classified according to Loree*, as follows:

* "Railroad freight Transportation" - Loree

1. Perishable freight and livestock
2. Less than carload freight
3. Carload freight requiring extraordinary movement

10.

This type of traffic consists of perishable articles or goods of high value, live cattle, refrigerated meats, dairy products, fruits and garden truck, milk, etc. This freight moves on a regular schedule and is given preference over time freight in yards and terminals. The tonnage that can be moved at preference speed is about one-third less than can be moved on the time freight.

The Boston and Maine runs two east-bound fast freight trains daily, No. 9050 and No. 9052. No. 9050 (R-BZ) handles from Rotterdam, rush and perishable freight for Boston, received in the New York Central train R-W2, filling out with hump cars. It picks up Boston cars at Mechanicville including perishables received from the Delaware and Hudson trains Nos. 495 and 497.

Fast
Freight
Ser-
vice

No. 9052 connects with the New York Central train B-Y2, and handles cars for Boston, being filled out with E. Deerfield classification when there are not enough cars for Boston. These are dropped at Mechanicville and the train is filled out with rush cars. Cars of perishable freight for points other than Boston are dropped at Mechanicville and moved in No. 9618.

No. 9052 connects with the Delaware and Hudson train No. 491 at Mechanicville. It picks up Whiting and Company's Milk at East

Deerfield (arriving in No. 9616) for Boston. At North Adams it picks up a straight Boston merchandise car.

Any perishable freight which misses these two trains, is sent along with the next train, being given preference in yard movement upon arrival in Boston.

The Boston and Maine uses no distinguishable symbols in marking preference freight. The Pennsylvania uses the Red Ball symbol, so that every employee may know at once the preference freight. Transportation officials of the B. & M. however, say that under the present system of chalk marking the movement of perishables is accomplished very satisfactorily.

Nos, 9051 and 9053 (B-M 1 and B-R 1) take care of the west bound merchandise and high class through inter-division freight. (See appendix K) .

Icing stations are located at Newport, Vermont, and Mechanicville New York, The Central Vermont also has an icing station at White River Junction. Icing

In Boston, owing to the number of receiving and delivery yards a central icing station is not practical and all the icing is done by private companies. According to Mr. Farrar, Assistant General Freight Agent of the Boston and Maine, the railroad pays these companies \$7.50 per car for this service and, because of the present

tariffs, is only allowed to collect \$4.00 per car for this service from the shipper. Hearings are now being held in an effort to remedy this situation.

Here, then, is a dollars and cents illustration of the cost to the railroad which is brought about through the disorganization of the terminal facilities.

The refrigerator service necessary for the transportation of perishables presents a much greater expense to the railroad than does the ordinary movement of freight.

Refrigerator
Service

Refrigerator cars are more expensive to build than the ordinary box car. They require icing stations along the line and in the warm periods of the year, require a large expenditure for ice. Additional inspectors are needed for this service, a more complicated system of accounting must be used, the cars must be kept clean, and time must be allowed for icing the cars in transit.

Refrigerator cars were first operated by privately owned companies. Most of these companies, however, have since sold out to the railroads over whose lines they have operated, so that the Star Union Line, once a privately owned fast freight line, is now a part of the Pennsylvania System and the Merchants Dispatch Transportation Company is owned by the New York Central Lines.

In 1909 report of the Commission on Metropolitan Improvements* gives a description of the Boston and Maine yards and terminals which, although fourteen years out of date, still gives an authentic picture of the situation which exists today. It follows in part: "The present freight terminal receiving yards of the Boston and Maine Railroad are located in Somerville, the yards being entirely separate, except for eastern and western division traffic, where one yard is used jointly.

"From these separate receiving yards, local freight moves forward to the corresponding local delivery station much as if the several divisions were in reality separate railroads. As a matter of fact, in the present system of operation of the Boston and Maine freight terminal properties, the four divisions maintain their identity largely to the same extent as before consolidation, the only coalition being one of management, and except for the convenience of dealing with one management, the public is forced to accept the rigid conditions today much the same as under the old regime.

"On account of this lack of effective consolidation and unification of the terminal properties, which should logically follow the amalgamation of managements, the cost of terminal operation is unwarrantably high, and some of the real benefits to a terminal

*Public Improvements for the metropolitan District. Report of the Commission on Public Improvements, Boston, 1919

community which should follow a consolidation of managements have been practically nil."

The existing Boston and Maine terminal yards are entirely inadequate, both in capacity and design, and expansion is impossible from the present locations. Receiving
Yards

These yards must be removed to some points outlying, beyond the location of the proposed clearing yard, so as to provide for forward movements from the receiving yards.

Freight trains from the four divisions of the Boston and Maine Railroad terminate in their respective pockets or small yards south of Washington Street, Somerville. These yards even now inadequate in capacity, were constructed for the several divisions they are supposed to serve when the divisions were independent corporations. As may be supposed, the result lacks any semblance of symmetry, the operation of the same is not economical and expansion along proper lines is impossible.

"An enlargement of freight terminal facilities for receiving and classification purposes will be absolutely essential in the near future, counting on a growth of business comparable to that of the last decade, and new areas, outlying further from the terminal

proper, should be developed, making the areas at present occupied for this purpose available for the development of passenger terminal facilities and possible future additions to local freight yards.

"It is unfortunate that the four divisions of the Boston and Maine system cannot be terminated in one receiving yard outlying from the present terminals without resorting to the construction of connecting lines from the several main line systems to a central yard, through lands and property of expensive and well established character. A careful analysis of the cost of these connections, and the interest on the investment, as against the additional cost of operating and maintaining separate terminal yards over one central yard, would alone determine the proper course.

The above report was submitted fourteen years ago, yet it describes the situation as well as if written today. And the condition of the terminals is well worth studying for, even to the average railroad, the greatest expense in the movement of freight is found to lie in the terminal costs. This may easily be shown to be true by the figures of the Railroad Committee of the Chamber of Commerce of the United States which show that the average freight car spends its time as follows:*

*Port of New York Annual, 1920

37% of time in hands of shipper or receiver
 43% of time moving from point of loading or
 unloading to the terminal where it is put
 into a train or on a moving transfer track.
 11% of its time in a train moving from one
 terminal to another
 9% of its time laid up for repairs
100% Total time

16.

Loree* breaks up the average freight car trip in a different manner,
 as follows:

Road movement	1.49	days
Delay in road movement	.15	"
Movement to and delay on interchange tracks	2.48	"
Movement through intermediate yards	1.55	"
Movement to and delay on storage tracks	.75	"
Movement to and delay on repair tracks	1.34	"
Movement for and loading and unloading	5.74	"
Reconsigning, hold "to order," etc.	.50	"
Delay because of Sunday and holidays	.90	"
	14.90	days

These figures are approximate and are modified as improvements are
 made. Yet, upon a terminal road, such as the Boston and Maine, the
 time spent in the terminals would be even greater than that shown
 above, so that the greatest need for economy, and so for intensive
 study, lies here in the terminal operation.

*Railroad Freight Transportation - Loree Page 264.

The delivery yards are located as follows:

17.

Local Name	Location	Delivery Yards
Minot Street	Boston	
East Cambridge	Cambridge	
Mystic Wharf	Charlestown	
Warren Bridge	Boston	
Warren Bridge	Charlestown	
Rutherford Avenue	Charlestown	

The total car capacity of the various yards, as shown by the War Department* is as follows: Classification tracks 4665, storage tracks 4292, house tracks 817, team and delivery tracks 382, industrial 28, and repair and service 150, making a total of 10,334. For a detailed statement by yards see Appendix M.

Yard Capacity

The classification tracks are used principally for receiving cars and trains from other points and roads, for making up trains, for sorting cars to be switched to points within yard limits, or to other lines, and for forwarding cars or trains.

Storage tracks are those used for the storage of empty cars, for loaded cars awaiting reconsignment orders and for cars of merchandise, etc., waiting for a favorable market before being ordered into the house or delivery tracks. It is here then that grapes and other fruits are held when the market does not seem favorable enough.

*The Port of Boston Massachusetts, Port Series No. 2, Page 76

The house tracks are tracks alongside of the freight houses 18.

Team and delivery tracks are those upon which cars are set for unloading carload freight and also tracks leading to or upon piers and wharves.

Industrial tracks are those serving a private factory or warehouse and not for public use.

Repair and service tracks are those set aside for the repair of cars and locomotives and for the storage of refuse and ash cars, etc.

The produce market is located in House 18 which faces Lynde Street, in yard 18. Stalls in this house are rented to the produce men, and service rendered by the railroad, the house being warmed to about 40°F in the winter to keep the temperature above that of freezing.

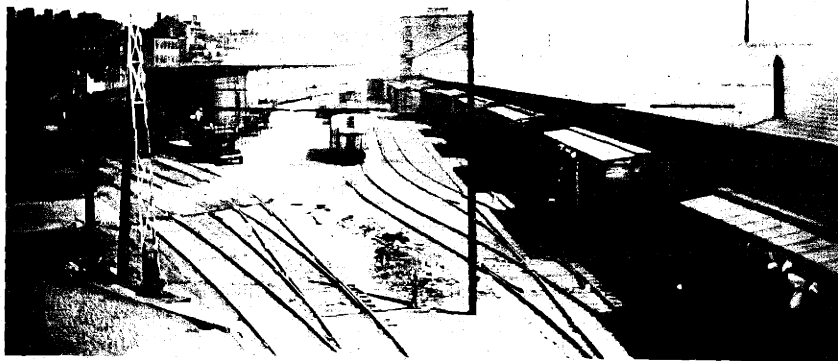
The
Produce
House

The cars of produce are set on the house track, normally, during the night. This operation, according to one of the operating officials of the railroad, takes two engines twelve hours to accomplish. This length of time is necessary because of the work which must be done in order to spot the cars before the proper doors. A new difficulty is being added by the use of the forty

foot car in place of the thirty-six foot car for which the house was designed. This throws out the line, so that at times it is impossible to set the car in the desired place.

19.

The bulk of the potatoes come in over the Portland Division being received from the Maine Central at Portland. During the summer months, however, potatoes arrive from the south over the New Haven, interchange taking place at Worcester, Northampton and in Boston via the Union Freight Railroad.



The above photograph shows the Produce House on the left and House 17, which is mentioned later in the report, on the right.

The potatoes arrive in large part in bulk and are sacked as they are unloaded. They are handled in such a manner, however, that holding a car until demurrage charges accrue is a very rare thing. A large portion of the potatoes are reloaded and shipped to New York when sacked. During some seasons they are sent as far as Michigan and Indiana.

The remaining produce, such as lettuce and celery, is teamed from the bulk tracks located in yards 12 and 13.

The greater bulk of the western fruit arrives in trains No. 9050 and No. 9052. (See Appendix K) The cars are dropped in Yard 14 and then moved over the diamond to Yard 13. (The diamond here mentioned is described in detail later in the report.) In Yard 13 the cars are set on the house tracks beside House 12 and House 13.

Transportation
of
Fruit



House 12.

These house trucks are located on one side of the house while a space shown in the above photograph is reserved on the other side of each house for wagons and trucks into which the fruit is loaded after having been sold at auction. This space is usually ample in the summer, but the unfavorable conditions which are found in winter sometimes cause the trucking space to become congested. This condition is being dealt with, however, in the report now under preparation by Messrs. Nauman and Wilson.

21.

The
Fruit
Houses

All loading and unloading of the fruit is done by hand. The fruit is unloaded from the cars by stevedores hired by the private auction companies. When unloaded, the boxes are piled upon the floor of the fruit house where they may be inspected by prospective buyers. The stevedores begin unloading the cars at 4 P.M. and work all night so that the cars are all unloaded at 9 A.M. when the auctioning of the fruit is begun.

Methods
of
Loading
and
Un-
loading
Fruit

The auction is held upstairs in House 12. The fruit is auctioned off by private auction companies and is then loaded into the wagons and trucks for distribution by the buyers. There is an irregularity of volume through the fruit house in accordance

with the demands of the market. On Monday it may run 75 cars with only 40 on Tuesday.

The evil complained of by some roads, of shippers using freight cars for storage, is not very pronounced in the perishable business of the Boston and Maine. There are certain times during the year when irregularities in shipments cause such a condition, as during last year's grape season, but the use of freight cars for storage is not, according to officials of the railroad, a regular practise among the shippers of perishables to Boston.

Use
of
Freight
Cars
for
Storage

There are three principal points of interchange between the railroads entering Boston, The New Haven interchanges with the Boston and Albany at the South Terminal after midnight.. The Boston and Albany and Boston and Maine interchange at East Cambridge and East Somerville, over the Boston and Albany Grand Junction branch. The Boston and Maine and New Haven interchange via the Union Freight Railroad, an inner belt line which is now being studied by Messrs. Glendinning and Bundy.

Switching

Much of the interchange between the New Haven and the Boston and Maine moves through junction points west of Boston. In this way the railroads attempt to obviate switching in the congested

Boston district. The most important interchange points

23.

are Lowell, Fitchburg, Concord Junction, Northampton, Springfield and Worcester.

Next to the terminal problem, the problem of adequate and efficient interchange is the one which effects most greatly the handling of perishables entering Boston. It is also a vital factor in the determination of a proper market location, for a market which cannot be easily reached by perishables coming from all the railroads cannot claim to be properly located.

Yet the interchange problem is one which seems to be as far from a proper solution as is the terminal problem. From the railroad viewpoint things are coming through all right. There is some congestion upon the Union Freight Railroad and some delay and inconvenience in the use of South Station as a point of interchange. Yet, upon the public, the situation has a greater effect. The present system of interchange brings to them losses through increased trucking and increased congestion of the streets.

This leads to the question of lighterage. It is interesting to note that in 1909 the Metropolitan Improvement Commission recommended the use of lighters stating that, - "The commission recommends very strongly the more general introduction and use

Light-
er-
age

of lighters in the transfer of packages freight from one water terminal to another. What more than anything else makes Boston's streets congested is the mode of transportation between terminals. As an illustration of the disadvantage of transporting coastwise freight from one water terminal to another by trucks and teams rather than by lighters, it was testified before the commission that one coastwise transportation line finds it necessary to have in Boston 600,000 square feet of floor space, while in Baltimore, where it handles more than twice the amount of freight handled in Boston, it requires only a floor space of 300,000 square feet. It was brought out that the excessive space thus needed in Boston is wholly the result of congestion caused by teams.

"In view of the far greater economy in moving freight by water as compared with carting it through the city streets, it is difficult to understand why the use of lighters for that purpose has been almost wholly ignored in Boston. The inner harbor is especially well adapted to their use. The towage would be short, while the route for carting is both long and crowded. The development of terminals on the opposite sides of the harbor and along Atlantic Avenue seems to require a general lighter service. The only apparent explanation of the nonuse of lighters in Boston is to be found in the former attitude of some of the railroads, which,

having first arranged the facilities of their water terminals wholly with reference to deliveries of freight to trucks or wagons, have neglected subsequently to provide suitable arrangements for transshipment to and from lighters." 25.

In 1917 the Joint Sub-Committee on Lighterage of the Boston Chamber of Commerce published a report giving the cost of lighterage installation and operation and the return on lighterage service. This report also comments favorably upon the installation of lighterage service, particularly to establish a flat Boston rate for the entire waterfront.

Clapp, in his book, "The Port of Boston," also recommends the installation of lighterage service.

In 1922 the War Department published a report having, in part, the following conclusions, - "The conditions affecting the movement of traffic within the port need improvement, and it is believed that the most available remedy is the establishment of a joint or unified lighterage and floatage system."

The authorities all seek the installation of a system of lighterage, yet the railroad says that lighterage has been tried and

found wanting. Furthermore, railroad officials contend that there is not enough potential business to warrant the installation of such service, and even if installed it would not increase the present efficiency in interchange. They also contend that there is no need for such lighterage service since all the piers are connected by rail.

PROPOSED CHANGES: One of the proposed changes in the Boston terminal, which is being brought forward by the Produce Exchange, is the conversion of House 17th which is shown in the photograph on page 19, into a produce house to supplement the present produce house. The produce men propose to leave the present routing of western produce as it now stands. They offer a plan by which the southern produce, which now travels through the congested New York gateways of the New Haven, is to be brought from the Potomac Yards to Mechanicville over the Delaware and Hudson and moved from Mechanicville to Boston via the Boston and Maine. They also propose that, to eliminate the present expense of spotting the cars at the produce house, the New house be operated on the principal of the fruit house, in which there are no

Con-
ver-
sion
of
House
17

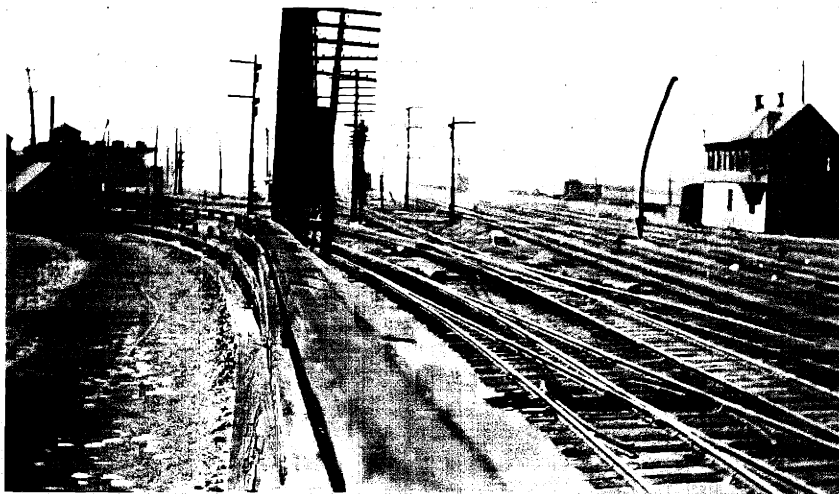
private stalls such as exist in House 18.

The plan has many merits from the marketing and trucking viewpoint, as brought out in Messrs. Nauman's and Wilson's report, yet the railroad viewpoint is not as bright. From an operating standpoint, the difficulty lies in the increased switching necessary and the already overcongested condition of the diamond. Mr. Farrar, Assistant General Freight Agent of the railroad states that with the proposed routing, the time necessary for the transportation of the southern produce would be increased. However, Mr. Farrar is consulting with officials of the Delaware and Hudson, and this whole question is still open.

A more comprehensive plan of terminal improvement has been under consideration since the Mellon administration on the New Haven.

It has for its purpose the creation of enough space for one large, central yard, so that the present scattered terminal facilities may be unified into one efficient system. Under present conditions of operation, perishables must pass over the crowded diamond to get from the receiving tracks in Yard 14 to the house tracks in Yard 13. After six o'clock in the morning when passenger trains begin running, it is virtually impossible to get these perishables over the diamond since they must cross over the tracks which are the main approach to the passenger terminal.

Miller
River
McLean
Asylum
Pro-
ject



Location of the Diamond

With a well designed terminal, this difficulty could be obviated. The type of development through which the railroad has passed, however, accounts in good measure for the present layout.



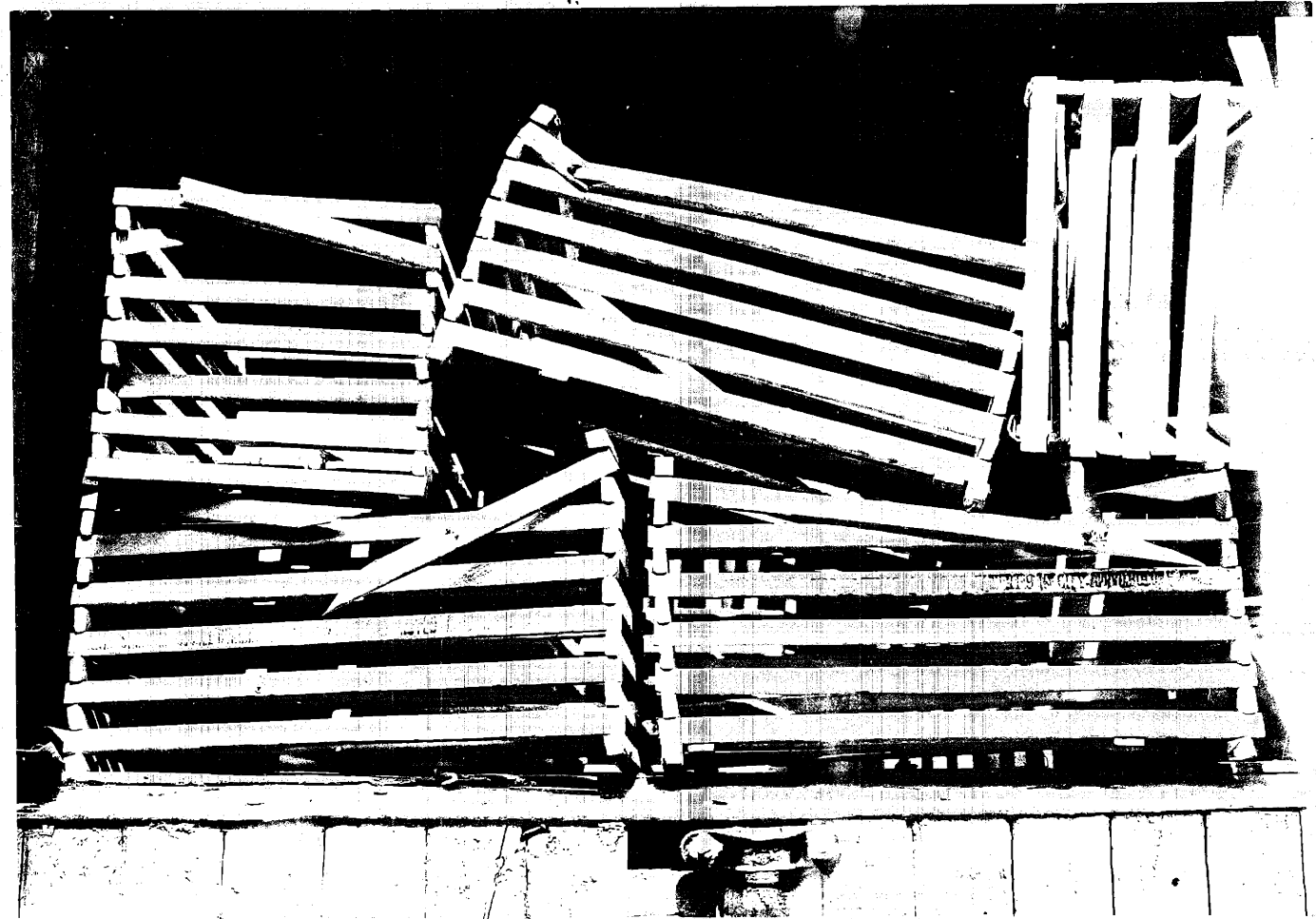
The Diamond

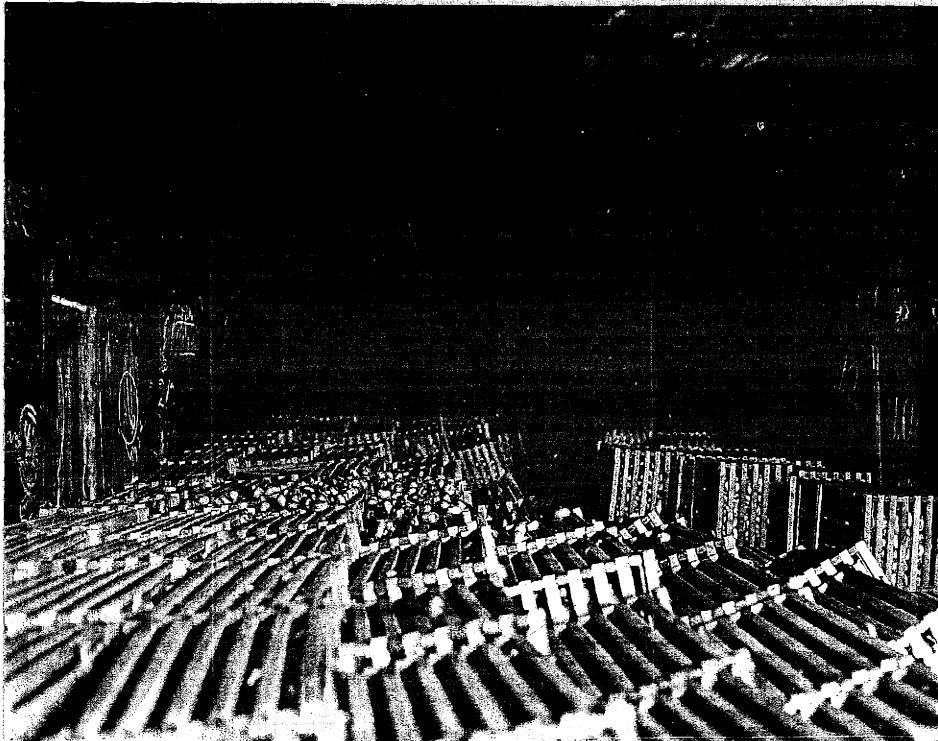
Many suggestions have been brought forward in seeking a remedy. The difficulty in arriving at a solution lies in the fact that after leaving the vicinity of the diamond, the four divisions spread out in the shape of a fan, and any attempts to locate a central yard for all of the divisions in some spot outside the present yard limits, where enough room can be found, have met with the problem of the cost of re-locating the various divisions through densely populated districts. The cost of such a plan would be so great that railroad men have hunted for another solution. An alternative solution has been offered in the Miller River-McLean Asylum project. (See Appendix P.). The railroad already owns the McLean Asylum Yard, which contains a large amount of dirt which must be cleared before the land may be used to advantage. This space, however, would not be adequate to care for the total needs of the railroad. And so it has been proposed that the surplus material in the McLean Asylum Yard be used to fill in the Miller River which is comparatively little used.

This improvement would not only allow space for the unification of the present freight terminals, but would also obviate the necessity for the present costly maintenance of a passenger terminal

which is built over the water, with the resultant expense for the renewal of the timber which this construction now entails.

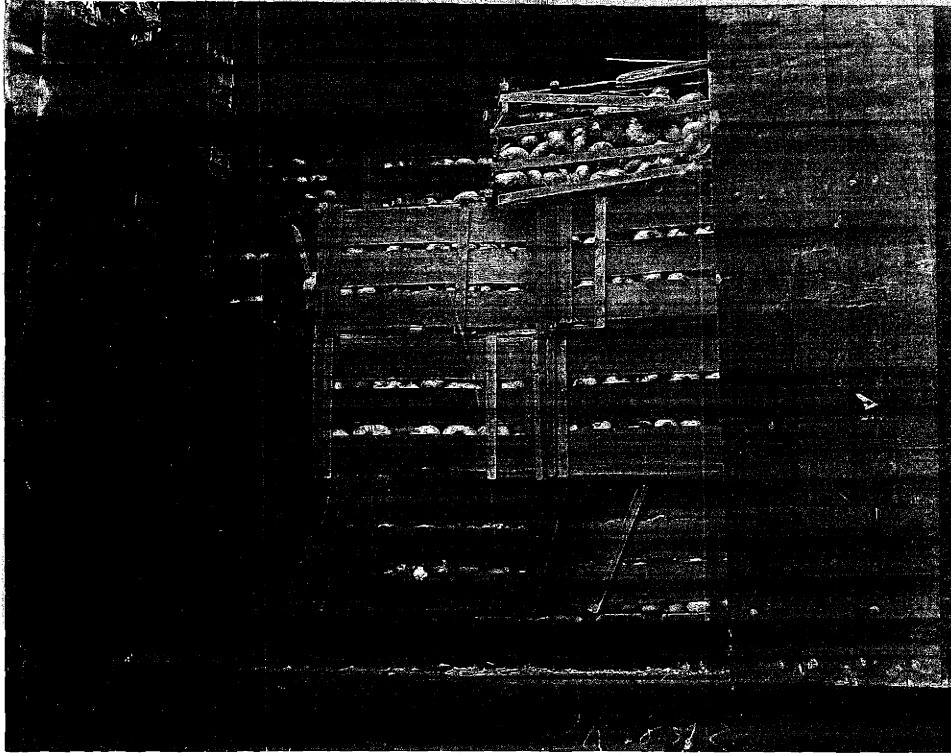
PREVENTION OF LOSSES IN TRANSIT: The claim prevention organization of the Boston and Maine Railroad is one of the most progressive departments of the road. It acts upon the principle that goods damaged in transit present an economic loss which should be prevented even if the railroad does not have to pay damages for the loss. In this way a considerable amount of service is offered to the shipper. When goods are reported to have been damaged in transit, an inspector is sent out to determine the cause of the damage and photographs are taken of the contents of the car so that a further analysis may be made. To protect perishables against unfavorable weather conditions, a bulletin is sent to every station agent showing the temperature at which damage occurs due to hot weather and due to freezing for each type of perishable. The allowable variation in temperature is shown for unprotected shipments, shipments in ordinary box cars and those in refrigerator cars. With this information at hand, the agent knows by consulting a weather forecast, that he should notify the consignee to unload





3.

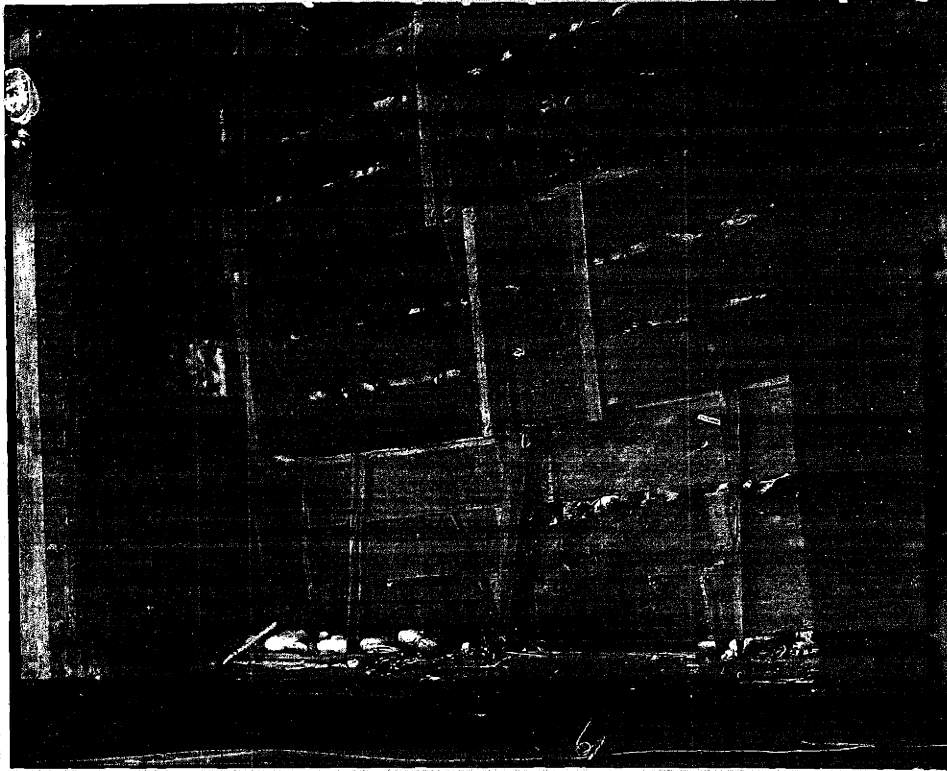
The next three photographs show the effect of loading these crates upon their sides. The forward and backward motion of the car has



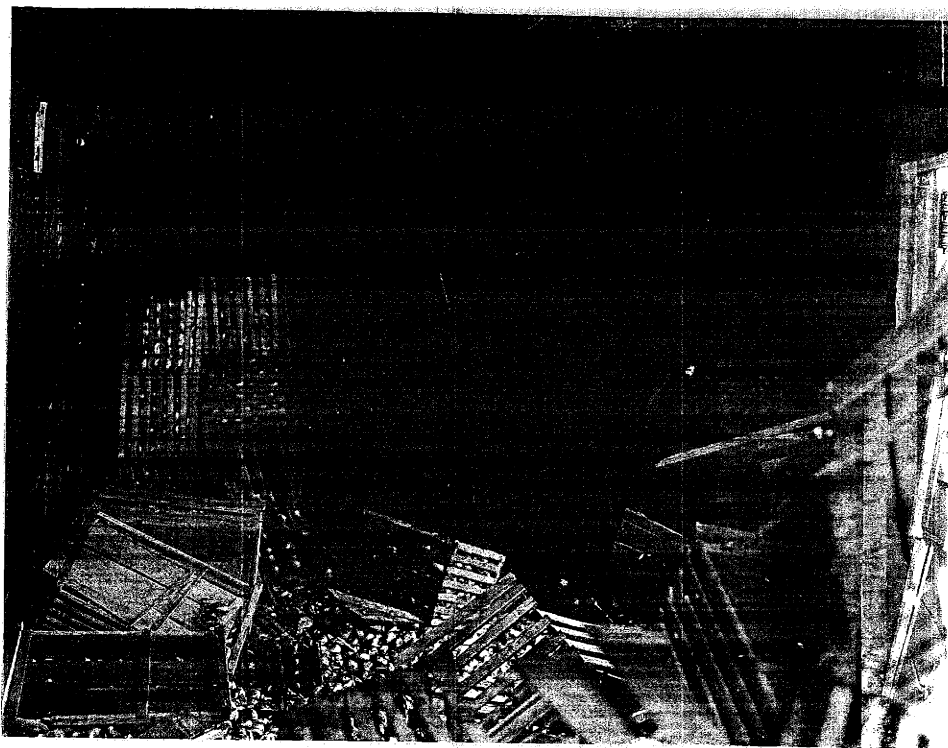
4.



5.



a shearing effect upon the crates which shows very clearly in these photographs.

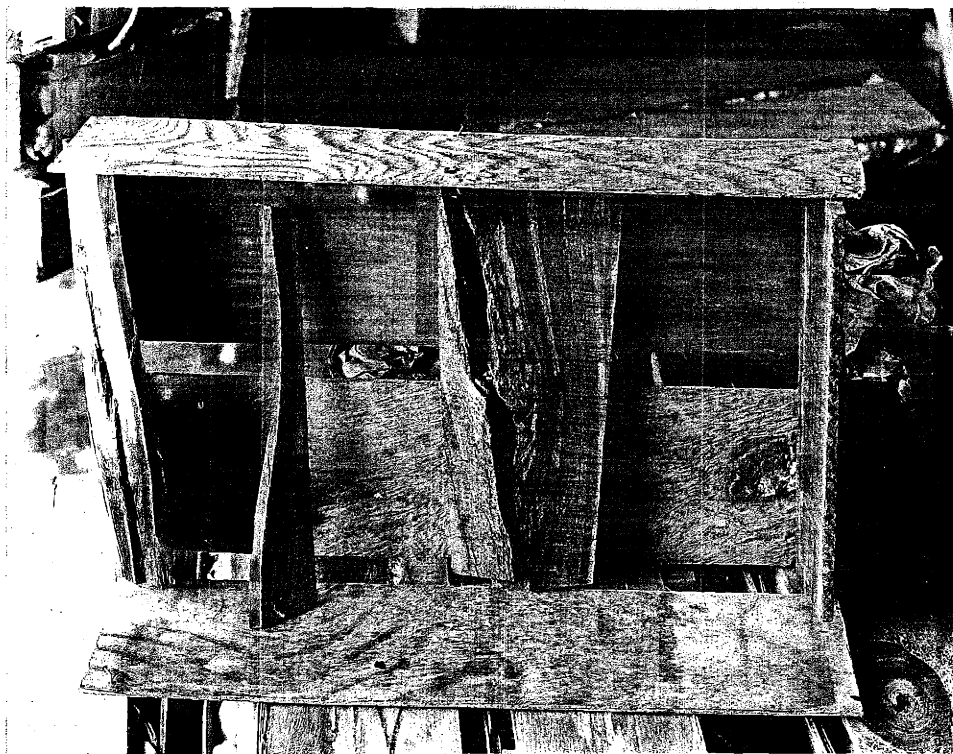


Number 7 shows such a car after it has been half unloaded, and gives some idea of the waste which such causes occasion.

These photographs, as well as those following, are all of last year's shipments. Mr. Walker, reports that since these photographs were taken a marked improvement has been shown in the condition of the cars arriving in Boston and that this year's shipments of onions have been received in much better condition.

The following four photographs

36.

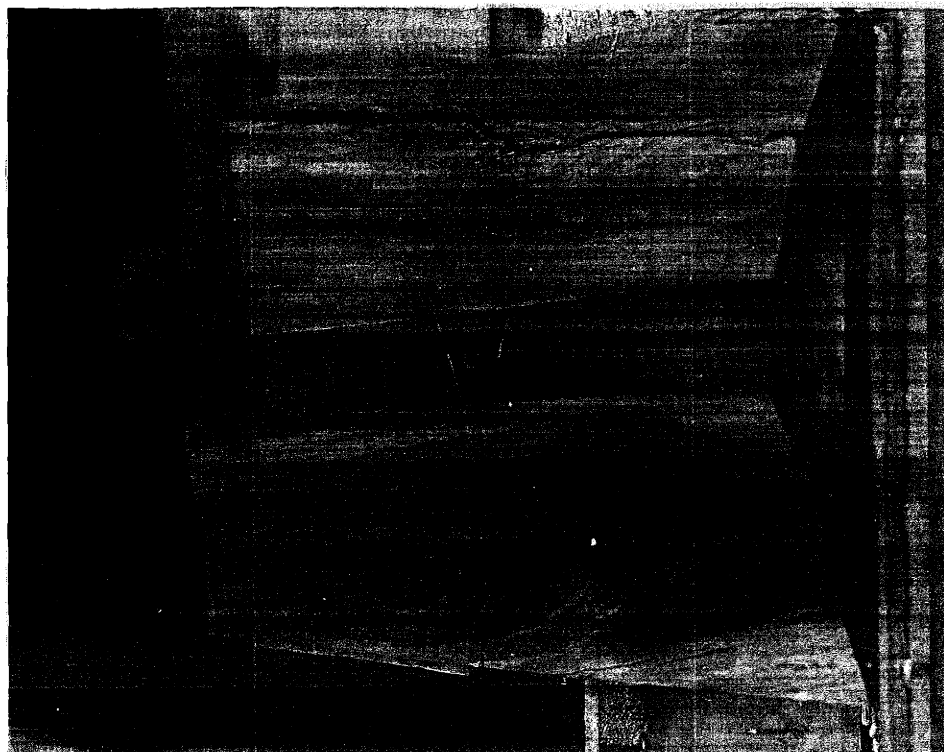


Tomatoes

8.



9.

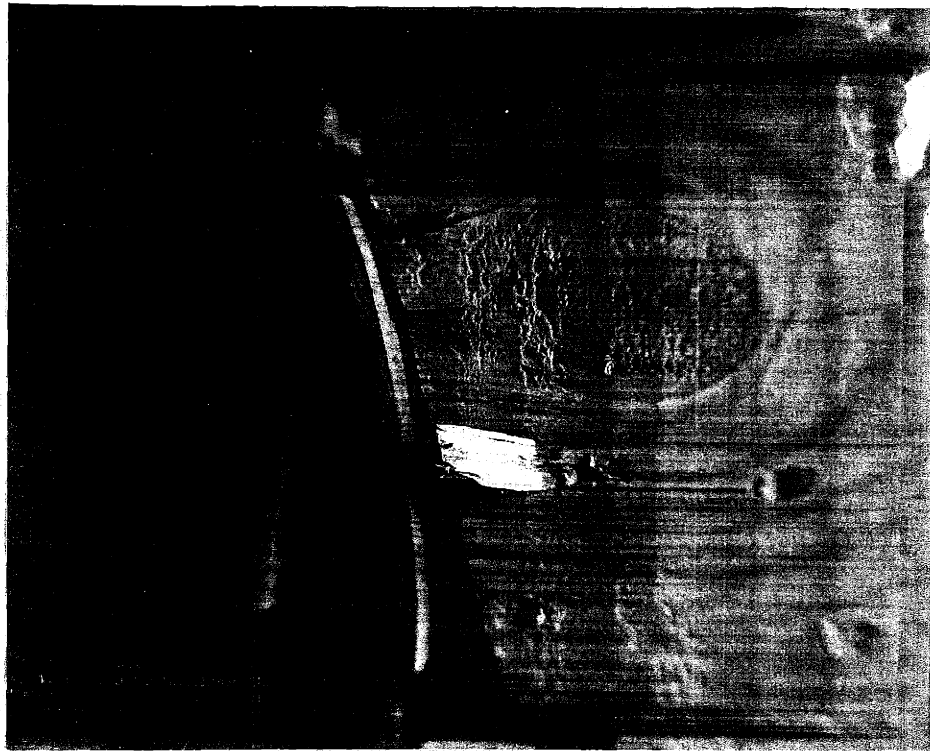


10.



11.

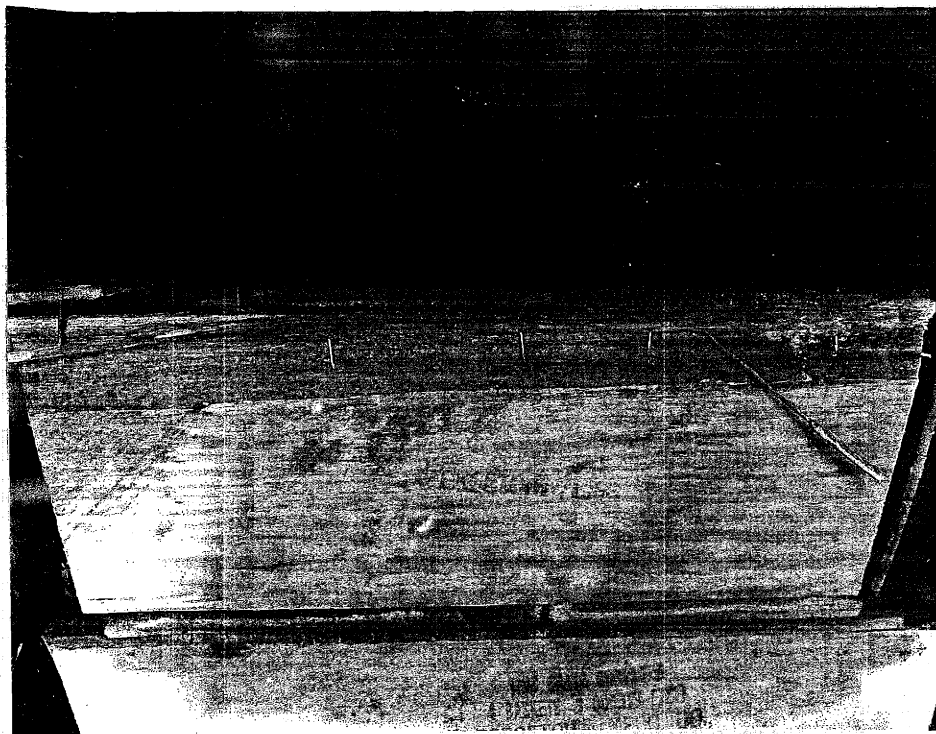
show some of the wood which is being used in tomato crates. 38.
The photographs speak eloquently and need no explanation. It
is difficult to understand, however, how a few cents saving on
wood can compensate a grower for losses running into the
hundred of dollars on the rest of his shipment. Photographs



12.

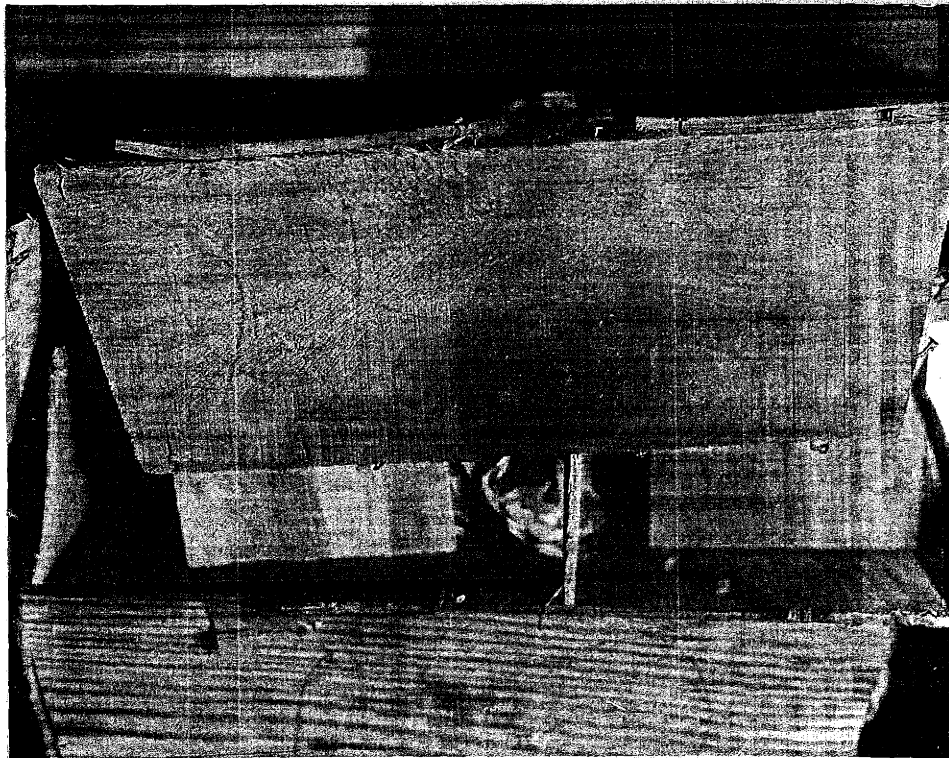


13.



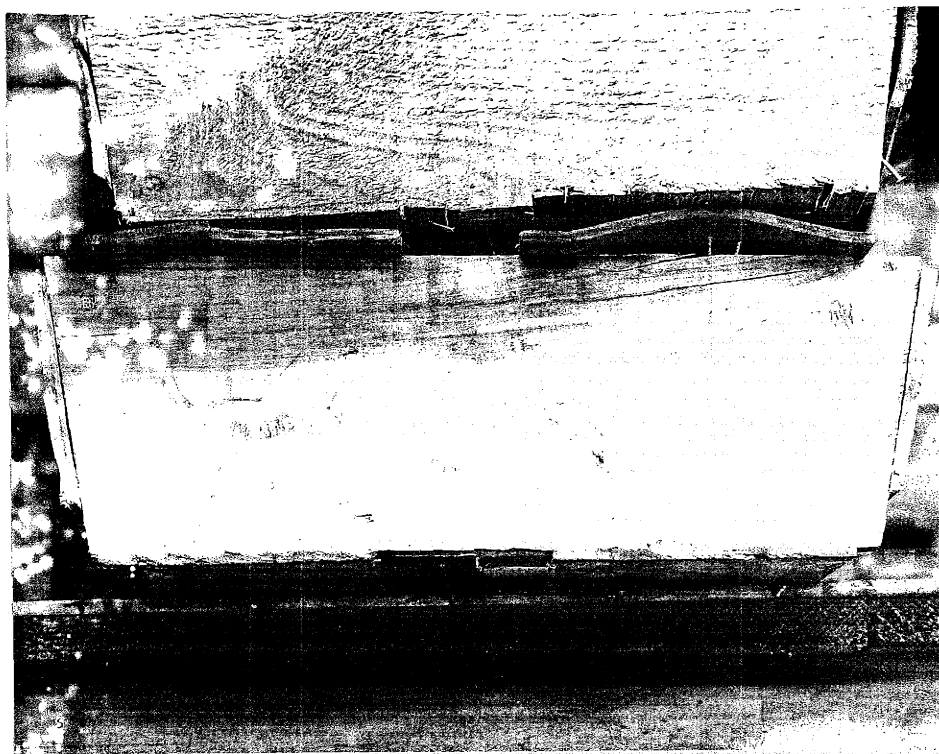
14.

twelve, thirteen and fourteen show some typical examples of 40.
poor nailing. The last mentioned photograph shows that not one
of the four nails driven into the top of the container has been
driven correctly. The right side shows only one nail near the
top. Number fifteen shows this type of nailing as well as the

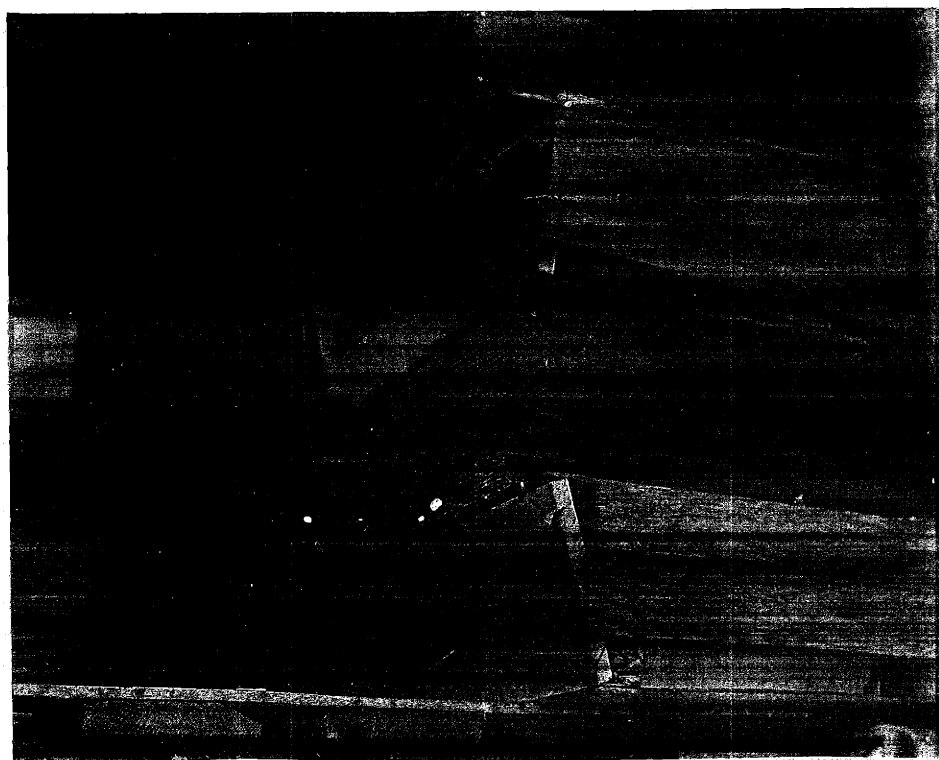


15.

faulty wood mentioned upon the previous page. The next photograph
shows another fault in the tomato containers. The sides and
bottom are not sawed flush with the end, so that a shearing effect
results which brings about the condition shown in number 17.

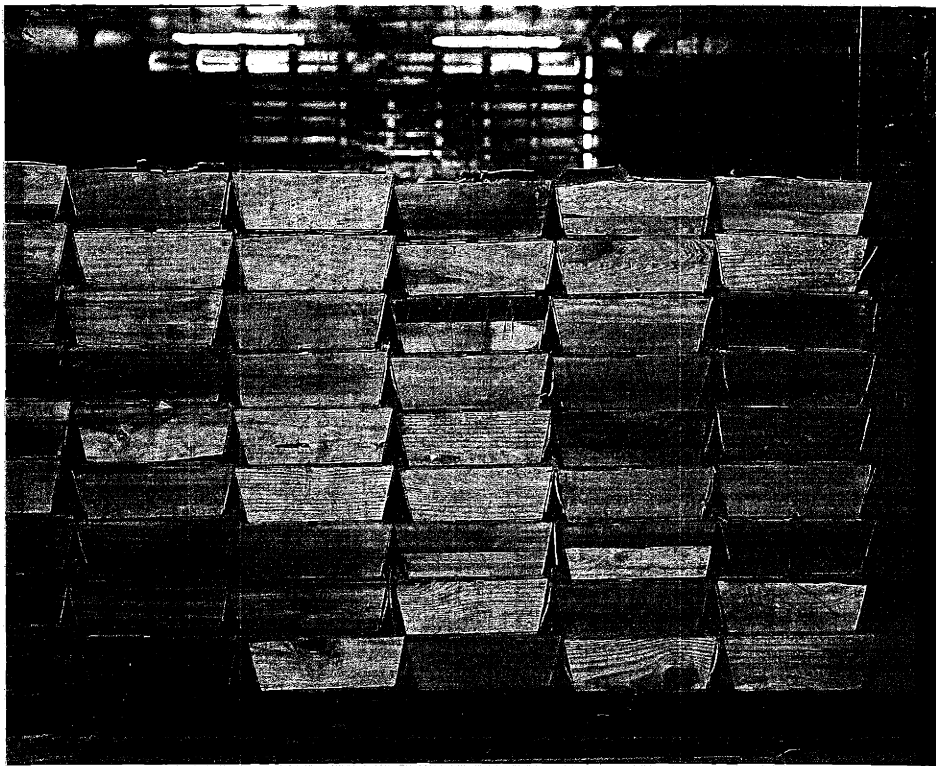


16.



17.

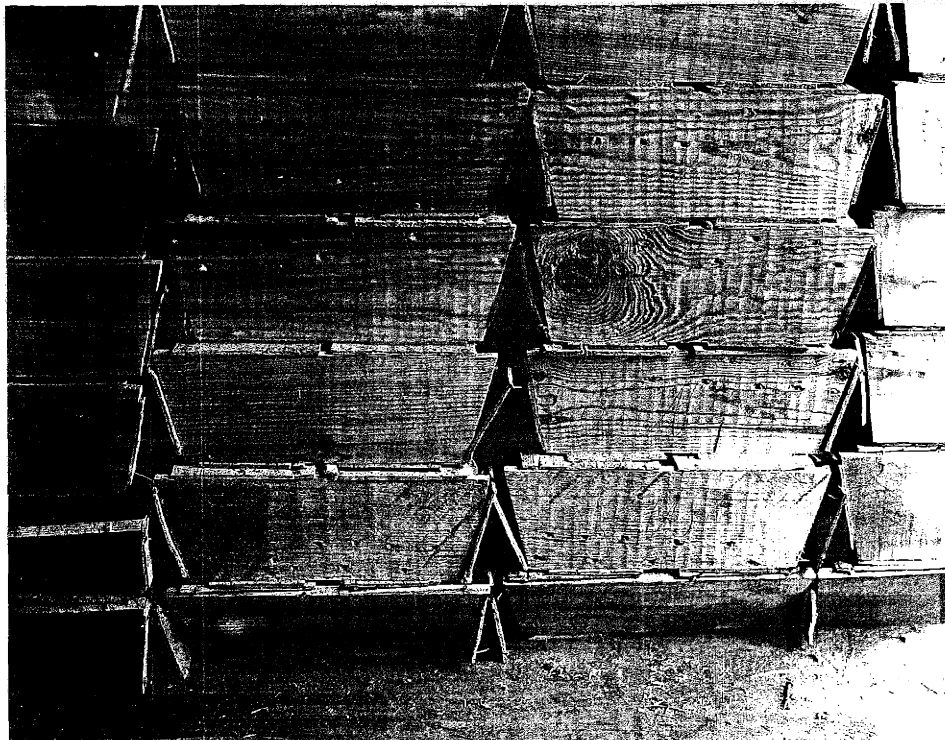
Number 18 shows a car of tomatoes immediately after the bulk-heads have been removed. The containers have not been touched yet it may be easily seen from an inspection of the photographs that due to a number of causes enumerated above, this shipment could not be moved from the car in its present condition.



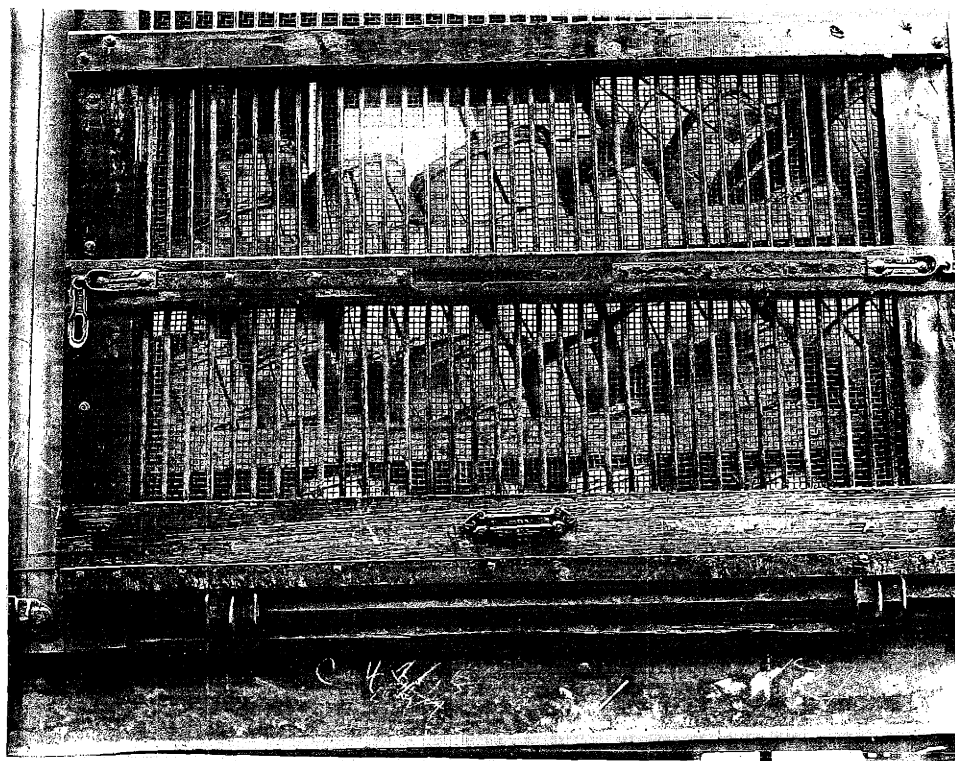
18.

Photograph nineteen shows a close-up of the same shipment.

43.



19.



20.

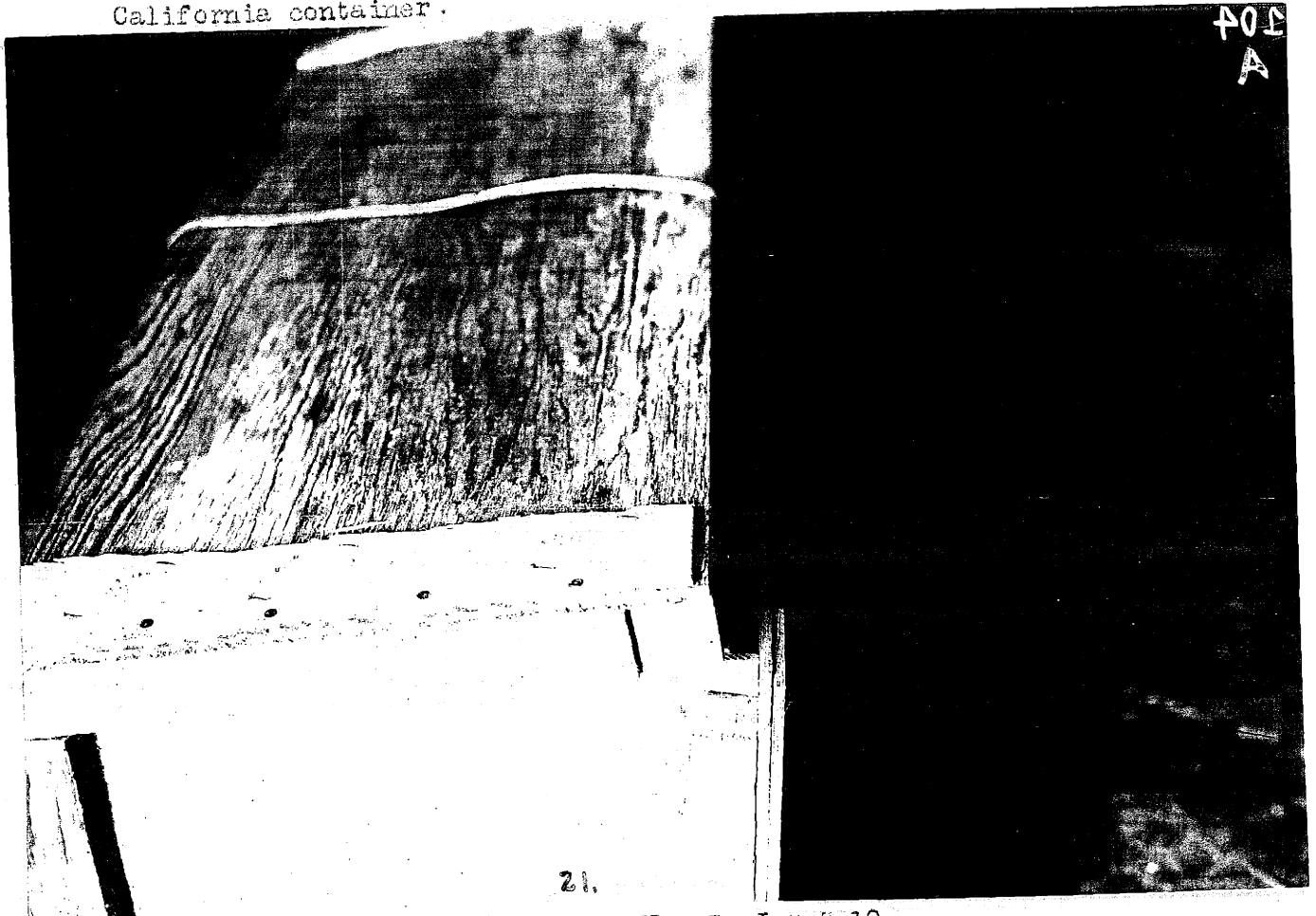
Number twenty, a photograph of a car of cucumbers from Alabama, shows the way some of the produce is loaded, without a thought of making the containers secure.

44.

Cu-
cubers

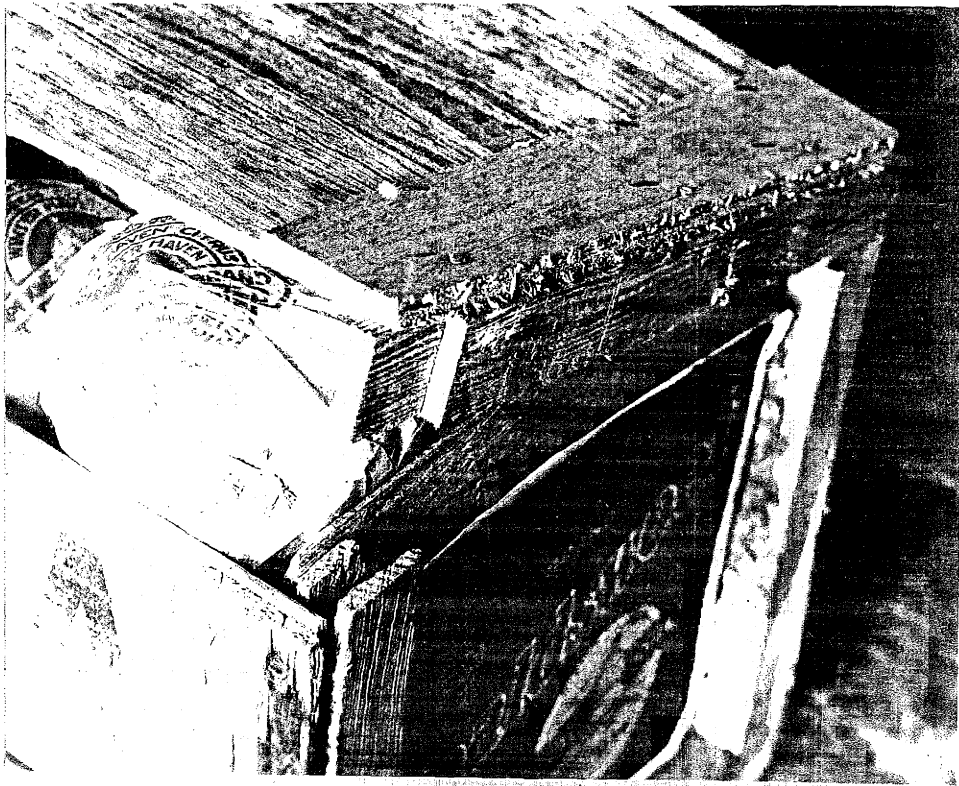
There have also been a number of cases of carelessness in the packing and shipping of oranges as the following pictures show. Very little trouble has been occasioned by the California shipments, the Florida oranges giving the greatest trouble. The Florida specifications* allow a greater bulge and the construction of the container is not as simple as that of the California container.

Or-
anges

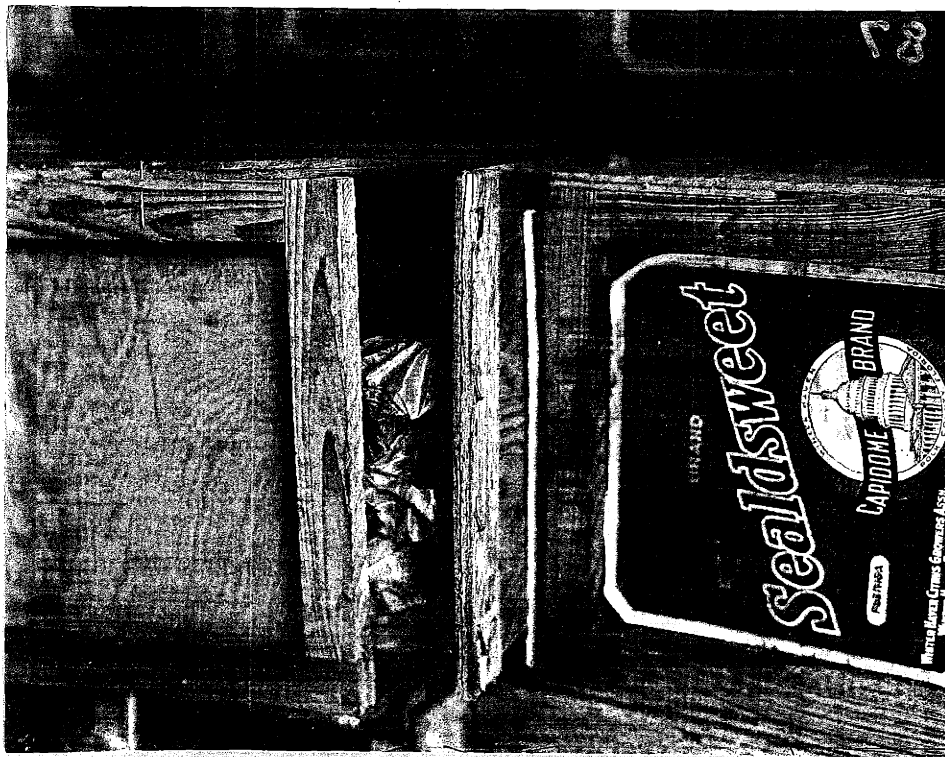


21.

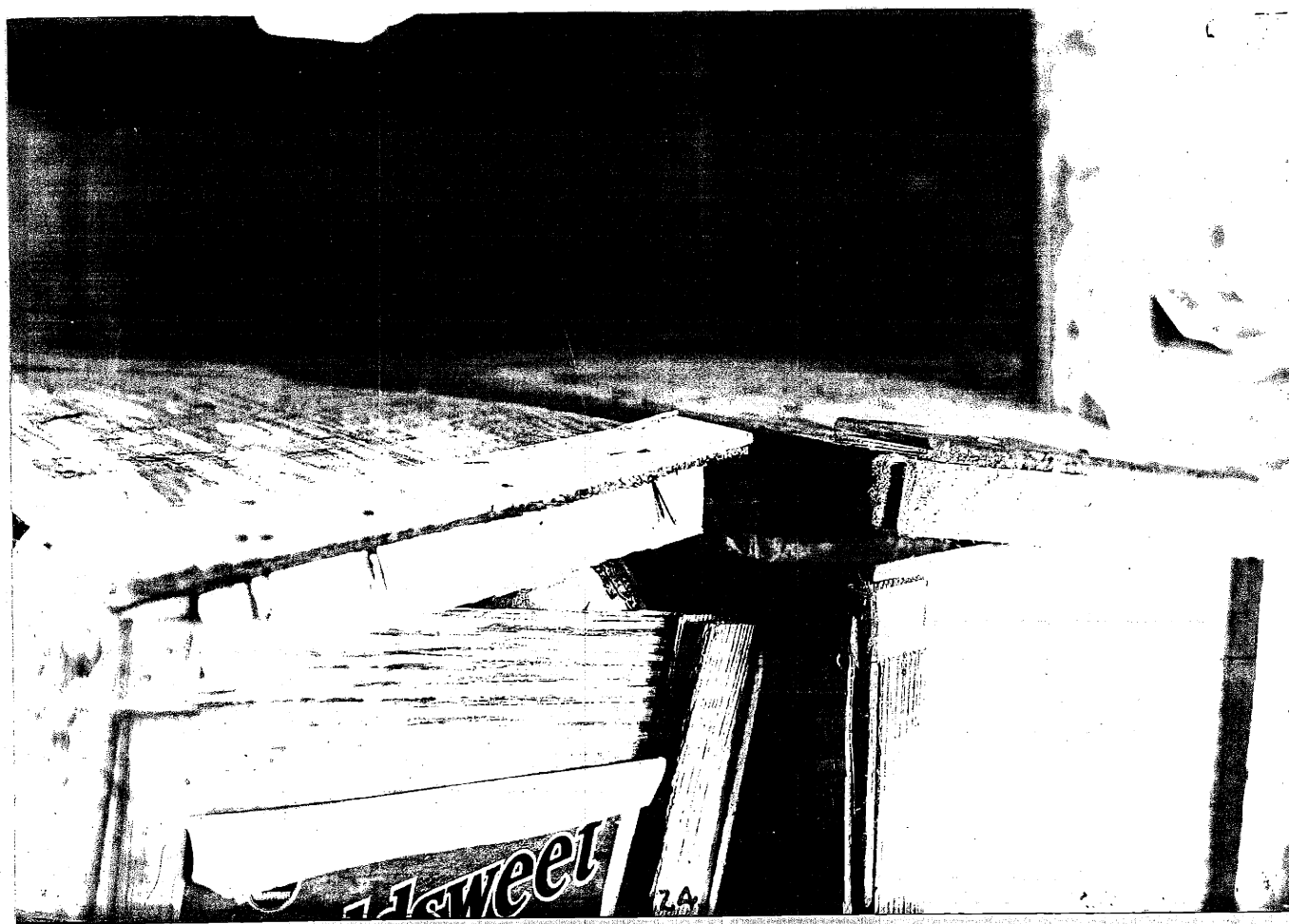
*J. E. Crosland's Loading Rules No. 3, I.C.C.10



22.



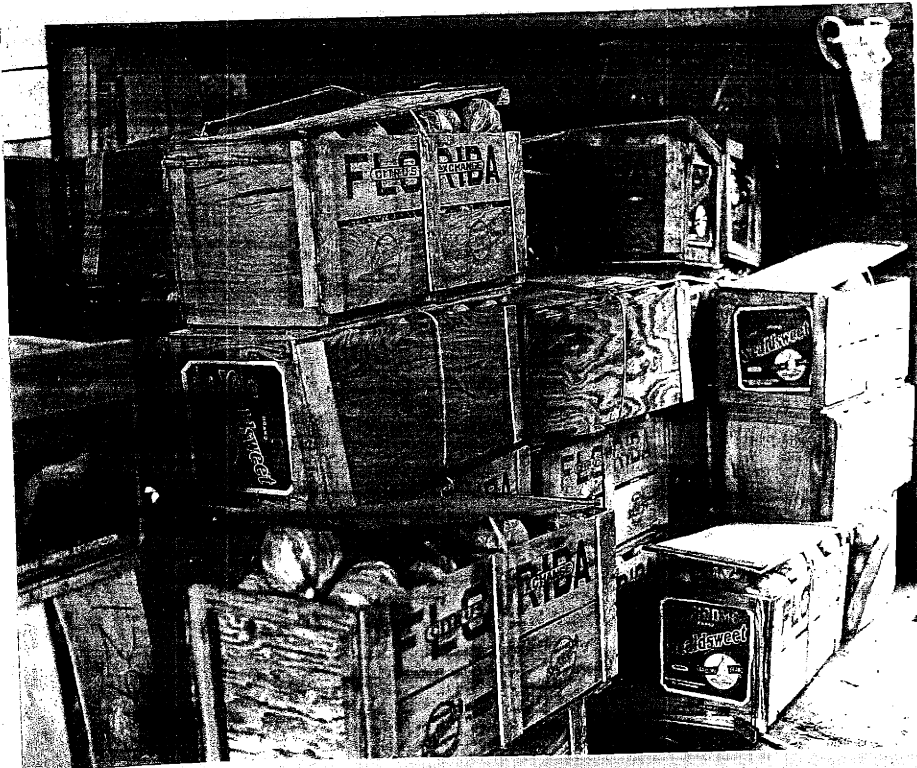
23.



The above photographs show the defective nailing found in a great number of Florida shipments. It appears more difficult to nail these containers correctly than it does to nail the more simply constructed California container. And with the large bulge defective nailing is quick to add its quota of ullages or cause a large expense for coooperage. Photographs twenty-five and twenty-six illustrate a sight which may be seen at the fruit house any day.



25.



26.

or the B. & A., Grand Junction branch connection to the 49.
 Hoosac Wharves or Mystic Wharf, to \$17.50 per car for Switch-
 ing
 switching fruit from connection with the Union Freight Charges
 Railroad or the Boston and Albany to the Boston and Main
 freuit shed. The charges of switching also vary as the move-
 ment is or is not in connection with a line haul, and as the
 traffic is competitive or non-competitive.

Between its stations in Boston or Charlestown and station on its
 lines in Cambridge, Chelsea, Everett, and Somerville, line haul
 class rates are assessed instead of flat switching rates. These
 rates are in cents per hundred pounds, as follows:

Classes:	1	2	3	4	5	6
Rates:	35½	30	24	18	12½	10

Rates shown on the map (See Appendix N) are those established in
 connection with a line haul on non-competitive traffic and are
 shown in cents per hundred pounds above the line and the minimum
 charge per car below. If no line haul is involved, rates are
 usually higher.

Class rates apply to points with this reference mark.
 The rate shown is the fourth class rate in cents per hundred pounds
 above the line and minimum charge per car based on 20,000 pounds below.

Class rates apply to points with this reference mark.

50.

Rate shown is arbitrary rate to the Boston and Albany or the New Haven connection plus fourth class rate from such a connection, above the line, and minimum charges per car, based on 20,000 pounds, below.

The shaded portion indicates the district in which, generally, these charges are absorbed in the through rate on carload freight except bulk grain, originating at, or destined to points west of the Hudson River, Rutland Railroad or Montreal.

The Boston and Maine Railroad being in the official classification territory, the so-called "free-time" of 48 hours is allowed De-
murrage
from the first 7 A.M. after the car is placed for unloading. Upon the expiration of this "free-time" \$2 per day is charged for the first four days of car demurrage and \$5 for each succeeding day.

Consignees holding cars on the delivery tracks at Minot Street, Warren Bridge, Rutherford Avenue, or East Cambridge, must pay Track
Storage
a track storage charge in addition to the regular demurrage charges of \$1 per day for the first three days upon which demurrage accrues and \$2 per day for each succeeding day.

Per diem charge is a rental charge, made to induce railroads having Per
Diem
foreign cars to return them to the home road. The Boston and Maine Charge

CONCLUSIONS

52.

The present layout of the Boston terminal of the Boston and Maine Railroad is greatly in need of revision. The "bottle-neck" which causes the most serious difficulties is at the diamond between Yards 13 and 14. There are a number of solutions to the terminal problem but all are dependent upon the financial status of the road, and money for these improvements cannot be obtained at present.

The results of this layout are an increased per diem burden because of the time the cars are kept in terminal service, an increased cost for icing cars as shown in the report and a greater switching cost than would be necessary were the yards more unified. These are but a few of the results of the present layout. There are more, too numerous to mention, all contributing to increased costs or less efficient service.

The conversion of House 17 into a produce house to supplement House 18, does not appear, under present conditions, to be a favorable project, from the railroad's viewpoint.

The question of lighterage is one which should be settled by a commission having authority to act upon its findings. Almost every

authority who has made a study of the Port of Boston has re- 53.
commended the installation of a system of lighterage. Yet, the
railroads still feel that such a project is unnecessary, and so
no action has been taken upon these recommendations.

The need for greater care upon the part of the shippers in packing
and loading perishables is evident, since in spite of the work of
the United States Bureau of Markets and the Interstate Commerce
Commission, in attempting to standardize containers and to educate
the shipper as to the proper methods of packing and loading, the
losses due to improper packing and loading run into the hundreds
of thousands of dollars upon this railroad alone each year.

RECOMMENDATIONS

It is recommended that a commission be appointed to study the question of lighterage, the said commission having, if possible, the power to act upon its findings.

It is further recommended that the United States Bureau of Agricultural Economics issue a bulletin showing the results of carelessness in the packing and loading of perishables, with a view toward obtaining a more rigid inspection of containers and carloading before shipment.

A P P E N D I C E S

COMPONENT PARTS FORMING THE PRESENT BOSTON AND MAINE SYSTEM

OLD BOSTON AND MAINE RAILROAD

Boston and Maine
Boston and Maine Extension
Boston and Portland
Andover and Haverhill
Andover and Wilmington
Danvers Railroad
Dover and Winipесаaukee
Kennebunk and Kennebunkport
Lowell and Andover
Manchester and Lawrence
Medford Branch
Methuen Branch
Newburyport Railroad
Georgetown Branch
Orchard Beach Railroad
Portland and Rochester Railroad
York and Cumberland Railroad

EASTERN RAILROAD SYSTEM

Eastern Railroad proper
Portland, Saco and Portsmouth
Portsmouth, Great Falls and Conway
Portsmouth and Dover
Great Falls and South Berwick Branch
Rockport Railroad
South Reading Branch
Marblehead and Lynn
Wolfeboro Railroad
Essex Branch
Newburyport City Railroad
Worcester and Nashua Railroad
Nashua and Rochester Railroad
Worcester, Nashua and Portland Railroad

BOSTON AND LOWELL SYSTEM

57.

Boston and Lowell
Nashua and Lowell
Salem and Lowell
Central Massachusetts
Connecticut and Passumpsie Rivers
Lexington and Arlington
Lowell and Lawrence
Manchester and Keene
Massawippi Valley
Middlesex Central
Peterboro Railroad
Stanstead Branch
Stoneham Branch
Stony Brook Railroad
Wilton Railroad
Boston, Concord and Montreal
Concord Railroad
Concord and Portsmouth
Nashua, Acton and Boston
Mystic River Railroad
Northern Railroad N.H.
St. Johnsbury and Lake Champlain
Vermont Valley

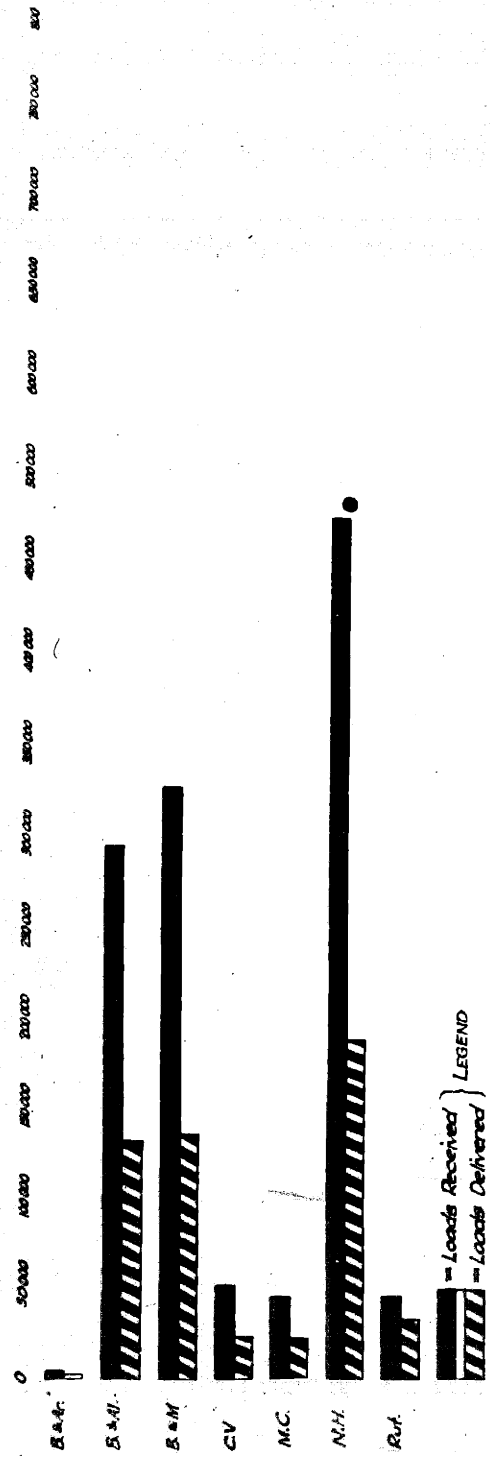
FITCHBURG SYSTEM

Fitchburg Railroad proper
Boston, Barre and Gardner
Boston, Hoosac Tunnel and Western
Brookline and Milford
Brookline and Pepperell
Cheshire Railroad
Hoosac Tunnel and Saratoga
Monadnock Railroad
Peterboro and Shirley
Southern Vermont Railway
Troy and Bennington
Troy and Boston
Troy and Greenfield and Hoosac Tunnel
Vermont and Massachusetts
Winchendon Railroad
White Mountains Railroad
New Boston Railroad
Pemigewasset Valley
York Harbor and Beach Railroad
Connecticut River Railroad

Mount Washington Railway
Sullivan County Railroad
Mechanicsville and Fort Edward

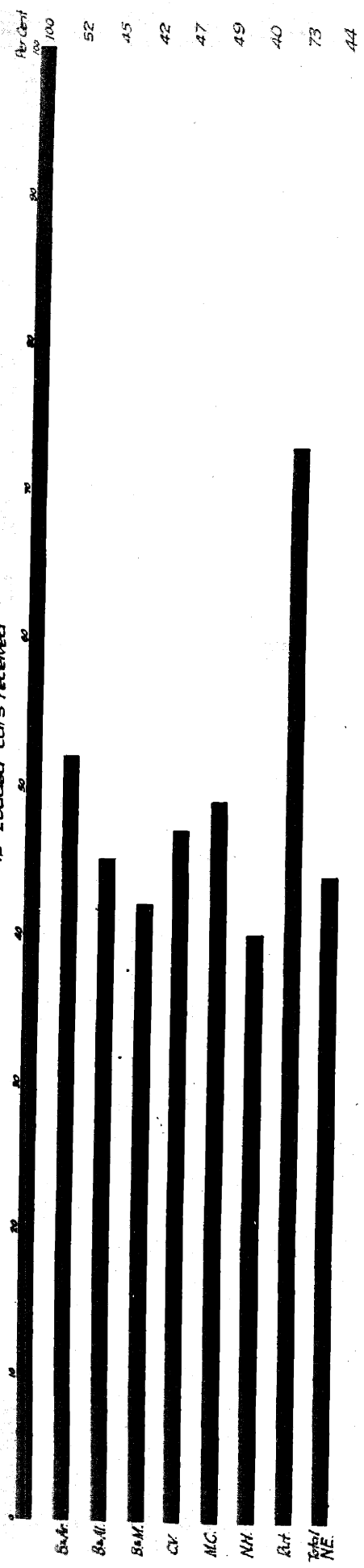
58.

Loaded Freight Cars
 Coming into and going out of New England
 during Calendar year - 1920
 Showing Total Receipts and Total Deliveries
 through all portways with other than
 New England Lines.



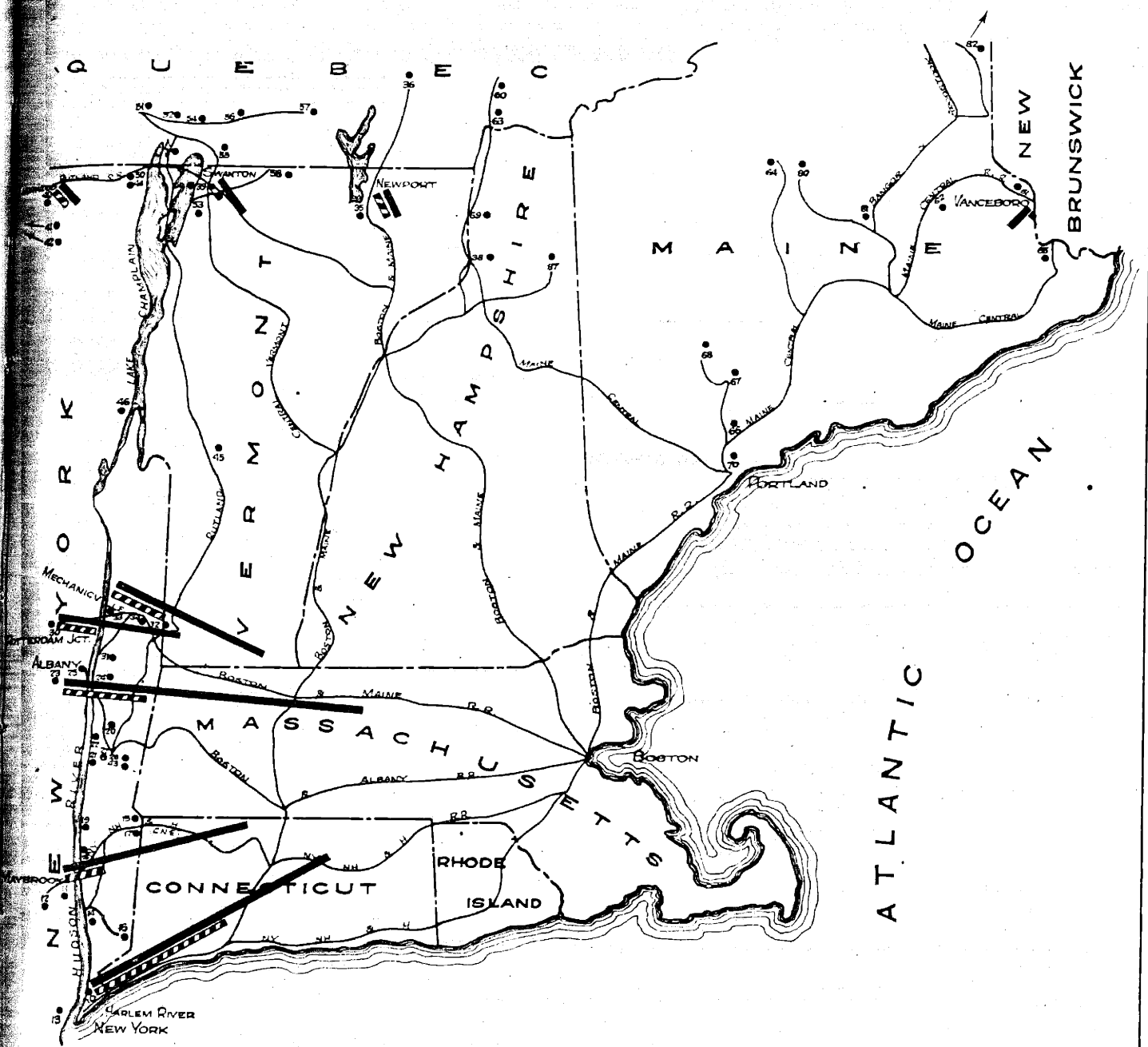
Total Received
 Total Delivered

Above Figures expressed in
 Percentage of Loaded cars delivered
 to Loaded cars received



BOSTON AND MAINE R.R.
 President's Office

Oct. - 1920.



Loaded freight cars coming into and going out of New England, Calendar Year 1919
 Shown graphically for gateways where more than 20,000 loaded cars were received or delivered. (Figures contained in attached statement.)

▬ Loads Received.
 ▨ Loads Delivered.

Numerals refer to gateways listed on accompanying statement.

APPENDIX C

BOSTON & MAINE R R
 PRESIDENTS OFFICE
 OCT. 1920

Appendix D

Detail of loaded and empty cars interchanged during the calendar year 1919 at gateways where the loaded movement is in excess of 20,000 cars.

Gateway.	New England line.	Connecting line.	Cars received.			Cars delivered.			Percent- age relation; loads delivered to loads received.	
			Loaded.	Per cent of grand total.	Empty.	Total.	Loaded.	Empty.		Total.
Harlem River	N. H.	C. N. J.	40,213	.....	1,329	41,542	26,322	12,420	38,742	65
Do.	do.	L. V.	44,923	.....	364	45,287	8,380	37,677	46,057	19
Do.	do.	L. I.	9,779	.....	10,717	19,966	22,741	671	23,412	245
Do.	do.	Penn.	155,508	.....	5,012	157,520	77,662	75,772	153,434	50
Total Harlem River			249,923	20	14,422	264,345	135,105	126,540	261,645	54
Maybrook	N. H.	Erie	54,858	.....	670	55,528	11,253	59,332	69,585	21
Do.	do.	L. & N. E.	23,163	.....	80	23,243	496	32,781	33,277	2
Do.	do.	L. & H. R.	92,167	.....	772	92,939	22,005	67,154	89,159	24
Total Maybrook			170,188	14	1,522	171,720	33,754	158,267	192,021	20
Albany (including West Albany & Rensselaer)	B. & A.	D. & H.	14,715	.....	355	15,100	7,655	4,266	11,921	52
Do.	do.	N. Y. C.	262,521	.....	2,760	265,281	94,601	161,134	255,735	36
Total Albany			277,236	22	3,115	280,351	102,256	165,400	267,656	37
Rotterdam Junction	B. & M.	N. Y. C.	106,792	9	3,491	110,783	35,516	37,243	92,759	33
Mechanicville	do.	D. & H.	154,754	12	6,900	161,654	53,112	122,155	175,267	34
Norwood	Rut.	N. Y. C.	22,300	.....	2,627	24,927	15,832	8,014	23,846	71
Do.	do.	N. & S. L.	770	.....	369	1,139	1,584	191	1,775	206
Total Norwood			23,070	2	2,996	26,066	17,416	8,205	25,621	75
Swanton	B. & M.	G. T.	179	.....	1	180	365	83	448	204
Do.	C. V.	do.	38,647	.....	1,075	39,722	14,309	18,149	32,458	37
Total Swanton			38,826	3	1,076	39,902	14,674	18,232	32,906	38
Newport	B. & M.	C. P.	27,371	2	2,474	29,845	25,545	8,479	34,024	93
Vanceboro	M. C.	do.	25,507	2	1,982	27,489	3,680	12,755	16,435	14
Total gateways above			1,073,677	88	38,508	1,112,185	421,058	677,276	1,093,334	39
Grand total of New England lines			1,244,855	100	70,750	1,315,605	542,764	751,683	1,294,367	44

Appendix E

Loaded and empty cars interchanged by the Boston & Maine Railroad with connecting lines other than New England lines during the calendar year 1919.

Map No.	Gateway.	Connecting line.	Cars received.			Cars delivered.			Percentage relation; loads delivered to loads received.
			Loaded.	Empty.	Total.	Loaded.	Empty.	Total.	
30	Rotterdam	N. Y. C.	106,792	3,991	110,783	35,516	57,243	92,759	33
31	Troy	do.	14,276	1,511	15,787	15,269	2,127	17,396	107
	Total		121,068	5,502	126,570	50,785	59,370	110,155	42
32	Eagle Bridge	D. & H.	2,513	16	2,529	1,434	124	1,558	57
33	Mechanicville	do.	154,754	6,900	161,654	53,112	122,155	175,267	34
31	Troy	do.	2,455	101	2,556	572	1,978	2,550	23
	Total		169,722	7,017	166,739	55,118	124,257	179,375	35
34	Johnsonville	G. & J.	1,305	90	1,395	1,340	472	1,812	103
35	Newport	C. P.	27,371	2,474	29,845	25,546	8,479	34,024	93
36	Sherbrooke	do.	4,293	711	5,004	897	55	952	21
	Total		31,664	3,185	34,849	26,442	8,534	34,976	84
37	Berlin	G. T.	2	1,547	1,549	167	860	1,027	8,350
38	Groveton	do.	624	1,128	1,752	1,562	261	1,823	250
36	Sherbrooke	do.	7,612	1,032	8,644	882	1,824	2,706	12
36	Swanton	do.	179	1	180	365	83	448	204
	Total		8,417	3,708	12,125	2,976	3,028	6,004	35
36	Sherbrooke	Q. C.	4,476	217	4,693	222	5,304	5,616	5
	Grand total		326,652	19,719	346,371	136,883	201,055	337,938	42

U. S. I. C. C.

APPENDIX F

RECEIPTS OF FOODSTUFFS IN
BOSTON DURING 1921

1921, Beans (bushels) 60 lbs. should be 100 lbs.	B & M	B & A	New Haven	Sea	Total
January	8,388	11,466	2,416	496	22,766
February	13,390	6,337	5,149	288	25,164
March	8,860	3,586	5,532	6,043	24,021
April	5,719	3,477	2,919	516	12,631
May	5,227	333	6,587	207	12,354
June	2,658	5,517	3,147	324	11,646
July	6,934	4,042	398	2,334	13,708
August	1,410	1,642	398	2,334	5,784
September	4,277	2,313	1,826-#336	3,591	12,007
October	2,595	990	5,693	23,908	33,186
November	3,857	2,242	5,017	14,485	26,611
December	5,926	42	9,689	439	16,096
	69,251	41,987	49,771	54,965	
			Grand total		215,974

Arrivals on B & M, Mystic.

APPENDIX G

STATEMENT SHOWING NUMBER OF CARS OF PERISHABLE
COMMODITIES ARRIVING AT BOSTON, WARREN BRIDGE,
MINOT STREET ON WHICH BOSTON AND MAINE R.R.
RECEIVED ROAD HAUL DURING YEAR ENDING
DECEMBER 31, 1922.

COMMODITY	TOTAL
Bacon	1
Bellies	1
Beef	502
Calves	8
Ham	87
Lamb	17
Lard	109
Meat	4581
Misc. P.H.Products	13
Oleo & Lard Sub.	16
Pork	71
Provisions	60
Sausage	2
Sheep	4
Veal	4
	<hr/>
Total	5476
Butter	1062
Butter and Poultry	46
Butter, Poultry and Eggs	33
Butter and Eggs	87
Butter and Cheese	21
Cheese	209
Eggs	1451
Evaporated Milk	6
Miscellaneous Dairy	444
Poultry	595
Poultry and Eggs	241
Turkeys	12
	<hr/>
Total	4207

Apples	793	
Bananas	1	
Canteloupes	1079	
Cherries	16	
Dates	1	
Fruit Misc.	135	
Grapes	3390	
Grapefruit	784	
Lemons	491	
Melons	93	
Oranges	1859	
Oranges and Grapefruit	11	
Oranges and Tangerines	1	
Peaches	162	
Pears	435	
Pineapple	4	
Plums	116	
Prunes	39	
Quince	4	
Strawberries	2	
Tangerine	<u>24</u>	
	Total	9440

Artichokes	25	
Beans	18	
Beets	7	
Cabbage	149	
Carrots	23	
Cauliflower	127	
Celery	29	
Cranberries	1	
Cucumbers	27	
Egg Plant	1	
Endive	1	
Garlic	5	
Lettuce	152	
Onions	874	
Peas	19	
Peppers	3	
Potatoes	563	
Rhubarb	4	
Spinach	16	
Squash	31	
Tomatoes	108	
Turnips	15	
Vegetables	<u>39</u>	

Total 2237

STATEMENT SHOWING NUMBER OF CARS OF
PERISHABLE COMMODITIES RECEIVED AT WARREN
BRIDGE-MINOT STREET EX BOSTON AND ALBANY
RAILROAD.

COMMODITY	TOTAL	
Beef	4	
Ham	2	
Meat	3	
Pork	9	
Total		18
Butter	1	
Eggs	1	
Poultry and Eggs	2	
Total		4
Apples	83	
Apricot	1	
Canteloupes	5	
Fruit	52	
Grapes	1059	
Grapefruit	12	
Lemons	19	
Melons	2	
Oranges	96	
Peaches	12	
Pears	58	
Plums	7	
Prunes	6	
Total		1412
Artichoke	1	
Carrots	1	
Cauliflower	1	
Lettuce	2	
Onions	9	
Squash	1	
Total		15
GRAND TOTAL		1449

COMMODITY	TOTAL	
Chicory	10	
Fish	10	
Miscellaneous	24	
Pickles	30	
Sauerkraut	<u>15</u>	
Total	89	
GRAND TOTAL		21449

CARS PERISHABLE COMMODITIES RECEIVED AT WARREN
BRIDGE-MINOT STREET EX UNION RAILROAD.

63.

COMMODITY	TOTAL	
Ham	3	
Pork	<u>5</u>	
Total		8
Butter	2	
Cheese	1	
Poultry	<u>1</u>	
Total		4
Apples	73	
Canteloupes	12	
Dates	1	
Fruit	8	
Grapes	125	
Grapefruit	206	
Lemons	21	
Melons	1	
Oranges	341	
Oranges & Grapefruit	56	
Peaches	2	
Pears	20	
Pineapples	1	
Plums	1	
Prunes	<u>1</u>	
Total		869
Cabbage	13	
Cauliflower	1	
Lettuce	2	
Onions	4	
Potatoes	1	
Spinach	1	
Tomatoes	2	
Vegetables	<u>1</u>	
Total		25
GRAND TOTAL		906
GRAND TOTAL ALL CARS PERISHABLE COMMODITIES		23,804

APPENDIX H

REVENUE FREIGHT TONNAGE BY CLASSES
 OF COMMODITIES TAKEN FROM THE
 1920 REPORT OF THE
 INTERSTATE COMMERCE COMMISSION

(Page 33)

ITEM	Boston & Maine R.R.	
	Tonnage originating on road.	Total Tonnage
<u>Products of Agriculture</u>		
Wheat	1,701	67,552
Corn	7,885	176,104
Oats	14,083	227,588
Other Grain	10,223	59,146
Flour and Meal	48,154	328,359
Other mill products	31,285	393,958
Hay, straw and alfalfa	26,686	225,475
Tobacco	5,022	9,350
Cotton	-----	285,529
Cotton seed and products, except oil	1,077	27,488
Citrus Fruits	3,253	55,783
Other fresh fruits	33,179	125,753
Potatoes	28,019	548,977
Other fresh vegetables	43,634	75,813
Dried fruits and vegetables	2,380	26,176
Other products of Agriculture	14,034	61,095
Total	270,620	2,694,146

Boston & Maine R. R.

ITEM	Tonnage originating on road	Total Tonnage
Animals and Products		
Horses and Mules	5,530	9,226
Cattle and Calves	22,241	58,124
Sheep and goats	729	12,264
Hogs	915	15,519
Fresh meats	5,477	153,087
Other packing-house products	31,313	85,593
Poultry	412	12,522
Eggs.	1,162	23,721
Butter and cheese	1,660	25,718
Wool	49,482	90,560
Hides and leather	59,546	177,610
Other animals and products	36,918	76,715
Total	215,390	745,659
Products of Mines		
Anthracite coal	-----	3,174,787
Bituminous coal	-----	3,877,384
Coke	98,990	102,122
Iron ore	6,512	9,920
Other ores and concentrates	14,776	41,005
Base bullion and matte	504	808
Clay, gravel, sand, and stone	681,716	951,055
Crude petroleum	3,404	18,832
Asphaltum	751	15,495
Salt	10,934	100,855
Other products of mines	24,697	100,072
Total	842,284	8,392,335

Boston and Maine R.R.

ITEM	Tonnage Originating on road	Tonnage Total
Products of Forests		
Logs, posts, poles and cordwood	87,449	158,244
Ties	7,242	52,343
Palp wood	152,888	355,778
Lumber, timber, box shocks, staves, and headings	877,002	2,298,708
Other products of forests	91,367	148,579
Total	1,215,948	3,013,652
Manufacturers & Miscellaneous		
Refined petroleum and its products	-----	598,462
Vegetable oils	1,529	8,172
Sugar, sirup, glucose, and molasses	82,915	126,749
Boats and vessel supplies	756	1,832
Iron, pig and bloom	25,824	202,814
Rails and fastenings	7,749	37,974
Bar and sheet iron, structural iron and iron pipe	85,042	377,598
Other metals, pig, bar and sheet	7,892	52,790
Castings, machinery and boilers	182,274	297,032
Cement	18,880	298,322
Brick and artificial stone	190,950	265,715
Lime and plaster	5,654	145,409
Sewer pipe and drain tile	5,919	15,044
Agricultural implements and vehicles other than autos	21,152	33,404
Automobiles and autotrucks	22,925	77,524
Household goods and secondhand furniture	5,145	13,002
Furniture (new)	25,924	32,804
Beverages	13,676	27,924
Ice	495,915	499,512
Fertilizers (all kinds)	170,993	213,079

Boston & Maine R.R.

ITEM	Tonnage Originating on road	Total Tonnage
<u>Manufactures & Miscellaneous</u>		
Paper, printed matter and books	330,645	842,251
Chemicals and explosives	156,401	311,840
Textiles	115,780	155,992
Canned goods (all canned food products)	20,076	96,077
Other manufactures and miscellaneous	<u>1,699,088</u>	<u>3,239,498</u>
Total	3,693,104	7,970,820
<hr/>		
Grand total, carload traffic	6,237,346	22,816,612
Merchandise-All L.C.L. freight	1,801,814	4,370,062
<hr/>		
Grand total, carload and L.C.L. traffic	8,039,160	27,186,674

APPENDIX IClassification of Freight Tonnage
(Years Ending December 31)

	1912*	1913*	1914*	1915*	1916*	1917	1918	1919	1920	1921
Products of Agriculture	15.69	14.81	15.37	15.85	15.2	12.8	11.4	12.9	9.9	14.12
Products of Animals	4.24	4.30	4.07	3.93	4.7	4.3	4.8	5.1	2.7	3.07
Products of Mines	46.41	26.35	25.68	25.87	24.9	30.3	32.2	25.0	30.9	30.48
Products of Forests	12.63	12.54	15.41	12.13	14.2	15.3	14.8	14.6	11.1	11.42
Manufactur- es & Misc.	41.03	42.00	39.47	42.22	41.0	37.3	36.8	42.4	45.4	40.91

*Years ended June 30.

1921

74.

Flour (barrels)	B & M	B & M	B & A	B & A	New	Water	Totals
		Mystic		Jct.	Haven		
January	41231	14,467	7723	1475	15523		80424
February	51854	2,405	8301	350	18548		81958
March	50022	5,508	9785	2925	12795	28	81063
April	51368	2,885	11006	2733	12770		80762
May	53410	1,450	17385	4430	11220		87895
June	44250	14,190	14575	2950	10740		86705
July	52327	3,930	18145	1756	6545		82703
August	78625	675	17480	3745	14265	85	114875
September	73925	4,620	15685	3530	15305		113065
October	56360	4,010	20805	3405	16065	1000	101645
November	73029	5,865	13975	6960	17890		117719
December	42875	6,525	10060	5660	11135	25	76280
	669276	66,530	165430	39919	162801	1138	(1,105,094.00)

1922

January	39520	21,765	10190	2190	12760	25	86450
February	54580	28,135	13855	2190	18605		118365
March	39970	35940	10215	4895	14030		105050
April	50120	25080	9960	2700	10355		98215
May	47660	1240	16360	5856	11295		82411
June	44169	2730	15891	3425	10630	4725	81570
July	43830	6485	15975	6150	13705		86145
August	58755	7510	17700	6645	16480	1865	108955
September	57160	12950	15915	6705	16985		109715
October	51060	31715	21815	4880	19810		129280
November	51840	8300	20320	9585	18775	250	109070
December	68865	19940	17520	6815	13860	280	127280
	607529	201790	185716	62036	177290	7145	(1,241,506.00)

CHEESE

1921 (Cheese) (Boxes)	B & M	B & M : Mystic	B & A	B & A : Jct.	New Haven	Union Freight	Ex- press	Sea	TOTALS
January	3745		1547	1000	538		1066	315	8211
February	5560		4239		1670	1070			12539
March	4800		5426	800	1632	7	1777	50	14492
April	9993	326	2975		838	516	1534	190	16372
May	15112	134	4908	706	380	2118	1437	947	25742
June	27304		13880	4000	2087	6226	1344	901	55742
July	26023		14237	600	3008	3869	1200	812	49749
August	13877		14089	1900	287	1506	1027	719	33405
September	12458		4636	350	850	6510	974	1091	26869
October	15017		3532	400	2070	6036	1169	834	29058
November	12223		5355		1919	5358	1472	212	26539
December	5561		1515	3250	2158	1120	1182	95	14881
	151673	460	76339	13006	17437	34336	14182	6166	(313599.00)

EGGS

1921 Eggs Cases	B & M	B & A	B & A	Jct.	New Haven	Union Freight	Express	Sea	TOTALS
January	17638	26939	1670		239	39619			81105
February	54210	39785	8293		605	30446			133339
March	74382	54536	12193		30140	23046			194297
April	87200	65923	26826	5727	124400	17821			327897
May	103703	60144	13187	13745	79944	20332			291055
June	83077	61663	10457	2705	12206	19984		18	190110
July	65187	42211	5901	314	6109	16755		757	137234
August	53846	38781	5134		8821	19046			125628
September	38162	34089	2742		3712	19031			97736
October	36503	23314	6205	1269	2500	17210		566	77567
November	18838	16710	4463		1293	11108			52412
December	19176	9603	2589	1000	2068	14502			48938
	651922	473698	24760	99660	272037	243900	1341		(1767318.00)

APPENDIX J

FREIGHT TRAFFIC INTERCHANGED BY NEW ENGLAND RAILROADS WITH TRUNK LINE AND CANADIAN ROADS (BY JUNCTIONS) for the six alternate months, December 1918 to Oct. 1919. The six months' figures are converted into a constructive year on the basis which the freight revenue for these months bore to the total freight revenue of the twelve months ended October 31, 1919. (52.25%)

Junction	M E R C H A N D I S E				C O A L				T O T A L - M E R C H A N D I S E & C O A L			
	Tons	Total Freight	New Eng. Prop'n	Proportion to Other Lines	Tons	Total Freight	New Eng. Prop'n	Proportion to Other Lines	Tons	Total Freight	New Eng. Prop'n	Proportion to Other Lines
1 Beacon	220,693	\$ 450,185	\$ 220,034	\$ 240,151	82,074	\$ 226,567	\$ 86,092	\$ 140,475	302,767	\$ 686,752	\$ 306,126	\$ 380,626
2 Belvidere	12,605	59,815	14,986	44,829	35,624	113,276	60,860	52,615	48,229	173,090	75,646	97,444
3 Bethlehem	32,230	271,352	69,502	201,850	97,422	260,879	80,823	160,050	97,422	306,278	80,823	180,050
4 Brownville Junction	42,602	258,140	111,548	145,592	31,223	34,926	25,031	8,895	63,453	306,278	95,533	210,745
5 Campbell Hall	112,361	694,603	235,723	398,880	101,936	32,801	18,398	14,403	53,747	129,941	129,946	160,995
6 Chatham	908,786	5,004,845	2,836,837	2,168,008	27,410	77,252	32,879	44,173	214,297	1,009,543	429,837	579,706
7 Communipaw	36,387	230,245	76,425	213,820	2,935,945	8,788,923	4,031,606	4,757,317	936,166	5,082,097	2,869,716	2,212,381
8 Danville Junction	575,615	3,243,329	1,315,868	1,927,471	2,395,945	8,788,923	4,031,606	4,757,317	36,587	290,245	5,347,464	6,884,788
9 Easton	18,089	125,886	31,243	94,643	18,089	125,886	31,243	94,643	18,089	125,886	31,243	94,643
10 Farnham	190,147	918,141	731,786	186,355	3,416,007	10,080,179	4,076,584	6,003,595	7,833,605	39,257,720	15,768,880	24,488,840
11 Fresh Pond	4,217,538	23,877,541	11,632,296	18,186,245	3,416,007	10,080,179	4,076,584	6,003,595	65,896	275,545	113,101	162,444
12 Harlem River	65,896	275,545	113,101	162,444	1,400,908	4,178,738	2,044,124	2,134,614	48,204	106,763	63,496	43,267
13 Lenoxville	48,204	106,763	63,496	43,267	6,839,044	20,444,124	2,044,124	2,134,614	129,683	641,518	142,425	499,093
14 Mattawamkeag	993,996	9,190,705	2,301,661	6,839,044	3,235,990	11,101,516	4,994,963	6,106,563	5,354,446	25,127,278	9,509,579	15,617,646
15 Maybrook	129,683	641,518	142,425	439,093	63,413	129,478	30,881	98,597	803,747	8,541,914	2,255,699	6,276,215
16 Mechanicville	2,115,436	14,025,709	4,514,616	9,511,093	6,276,215	43,902	1,898,312	1,898,312	180,441	1,086,125	1,277,813	608,312
17 Milltown	803,747	8,541,914	2,255,699	6,276,215	1,453,170	867,436	283,653	597,843	619,631	3,515,862	1,192,869	2,323,013
18 Newport	150,441	1,086,125	1,453,170	867,436	86,026	182,497	55,710	126,787	55,723	296,450	153,843	142,587
19 North Stratford	26,263	296,450	153,843	142,587	142,587	142,587	142,587	142,587	92,288	350,232	113,424	236,808
20 North Wood	8,577	428,420	182,606	245,814	80,577	428,420	182,606	245,814	80,577	428,420	182,606	245,814
21 Noyan Junction	545,214	4,796,705	1,336,256	3,460,449	3,868,563	25,513,587	7,922,094	17,601,493	645,214	4,796,705	1,336,256	3,460,449
22 Phillipsburg	26,263	167,735	57,714	110,021	111,060	513,139	138,261	384,874	194,514	881,993	254,990	627,003
23 Portland	83,454	368,858	126,729	242,129	116,831	410,108	183,334	226,764	1,210,241	11,574,030	3,314,986	8,259,044
24 Rouses Point	75,315	380,315	124,925	255,390	1,210,241	11,574,030	3,314,986	8,259,044	48,337	201,727	79,093	122,632
25 Rutland	48,337	201,727	79,093	122,632	5,008	15,378	3,732	11,643	48,337	201,727	79,093	122,632
26 St. Johns	106,949	369,426	251,010	108,416	10,691	42,013	17,602	34,411	118,985	1,594,228	769,131	825,097
27 St. Lambert	318,995	1,594,228	769,131	825,097	10,691	42,013	17,602	34,411	341,727	1,763,648	636,211	1,127,437
28 Sherbrooke	331,038	1,763,648	636,211	1,127,437	27,158	232,588	367,904	470,953	606,533	3,134,214	1,836,360	1,297,854
29 Troybrooke	606,533	3,134,214	1,836,360	1,297,854	27,158	232,588	367,904	470,953	27,158	232,588	367,904	470,953
30 Vancorb	205,422	98,364	462,513	476,111	34,711,178	26,063,872	5,615,695	8,259,044	34,711,178	26,063,872	5,615,695	8,259,044
31 Vermont Junction	205,422	98,364	462,513	476,111	34,711,178	26,063,872	5,615,695	8,259,044	34,711,178	26,063,872	5,615,695	8,259,044
32 Westchester Junction	3,037,750	23,660,390	5,215,836	18,444,554	34,099,720	\$191,505,655	\$67,372,648	\$124,236,007	34,099,720	\$191,505,655	\$67,372,648	\$124,236,007
33 Weston & Albany	3,037,750	23,660,390	5,215,836	18,444,554	34,099,720	\$191,505,655	\$67,372,648	\$124,236,007	34,099,720	\$191,505,655	\$67,372,648	\$124,236,007

The figures included in this statement are those reported by the following

- Banker & Groesbeck
- Boston & Maine
- Central New England
- Central Vermont
- Maine Central
- The New York, New Haven and Hartford
- Rutland

- 1 CNE - NYC
- 2 CNE (LANE) - CNJ, LV.
- 3 CNE - (LANE) NYC, NYO&W
- 4 S&AP - CP
- 5 CNE - NYC, LANF, NYO&W
- 6 Rut. - NYC.
- 7 NYNH&H - CNJ, LV.
- 8 MC - GT.
- 9 CNE (LAH) - CNJ, LV, DL&E, Penn.
- 10 CV - CP.
- 11 NYNH&H - Long Isl.
- 12 NYNH&H - Penn. CNJ, LV, LI.
- 13 B&M - CP, GT.
- 14 MC - CP.
- 15 CNE - Erie, LAH, NYO&W
- 16 MC - GT
- 17 B&M - D&H.
- 18 MC - CP.
- 19 B&M - CP.
- 20 MC - GT.
- 21 Rut. - NYC.
- 22 Rut. - GT, QU&SO.
- 23 CNE (LAH) - Penn.
- 24 MC - GT.
- 25 CNE (LAH) - DL&E
- 26 B&M - NYC
- 27 CV, Rut. - D&H, GT.
- 28 Rut. - D&H.
- 29 CV. - GT.
- 30 CV. - GT, QU&S.
- 31 B&M - CR.
- 32 B&M - GT.
- 33 B&M - D&H, NYC.
- 34 MC - CP.
- 35 Segregation of gateways where interchanged traffic was light.
- 37 Includes only traffic to and from points west of Hudson River via Boston & Albany Junctions from and to points on other New England lines; traffic amounting to 5,456,820 tons moved to and from Boston & Albany points and points west of the Hudson River.

"Merchandise" means all freight traffic other than "Coal"

Revenues are based on rates in effect prior to August 26, 1920.

APPENDIX K

78.

SCHEDULE OF BOSTON AND MAINE
FAST FREIGHT TRAINS.

<u>Eastbound.</u>		<u>Westbound.</u>	
R-B2 Daily (No. 9050)		B-M1 Daily (No. 9051)	
Rotterdam	9.00 A.M.	Boston	6.25 P.M.
Mechanicville	10.30 A.M.	E. Deerfield	11.10 P.M.
E. Deerfield	4.40 P.M.	E. Deerfield	11.35 P.M.
E. Deerfield	6.25 P.M.	Mechanicville	4.00 A.M.
E. Fitchburg	11.15 P.M.		
Boston	2.00 A.M.		
R-B4 Daily (No. 9057)		B-R1 Daily (No. 9053)	
Rotterdam	12.00 N.N.	Boston	6.45 P.M.
Mechanicville	2.00 P.M.	E. Fitchburg	9.10 P.M.
E. Deerfield	8.00 P.M.	Fitchburg	9.15 P.M.
E. Deerfield	9.00 P.M.	E. Deerfield	11.55 P.M.
E. Fitchburg	1.00 A.M.	E. Deerfield	12.30 A.M.
Boston	3.45 A.M.	Mechanicville	5.20 A.M.
		Rotterdam	7.00 A.M.

APPENDIX L

PHYSICAL FACTORS (Mileage, Equipment & Operation)

Years Ended	Average Miles Operated	Extra Main Track	Loco-motives owned	Freight & Co. Cars	Freight to all Traffic	Density	Aver. Frt. Train Load	Train Mile-Earnings (\$)	Average Rate per Ton Mile (¢)
June 30:									
1912	2,244	600	1,185	26,749	60%	1,096,698	265	2.15	1.09
1913	2,252	601	1,243	25,523	60	1,208,342	292	2.24	1.05
1914	2,252	601	1,208	25,630	59	1,170,294	314	2.37	1.06
1915	2,302	601	1,159	25,177	58	1,049,721	333	2.54	1.12
1916	2,252	601	1,074	24,579	61	1,019,609	363	2.66	1.08
Dec. 31:									
1917	2,259	597	1,132	23,594	59	1,553,849	383	3.02	1.05
1918	2,259	597	1,120	22,863	61	1,599,486	426	2.40	1.19
1919	2,258	610	1,120	22,296	60	1,458,595	448	4.23	1.32
1920	2,256	610	1,102	23,249	63	1,736,908	453	4.68	1.44
1921	2,287	610	1,085	21,632	61	1,169,116	448	4.91	1.79
10 Year Average:	2,262	603	1,143	24,129	60	1,306,262	373	3.12	1.22

Appendix M

Tabulation showing car capacity of freight yards, Boston, Mass., Metropolitan District, classified according to purpose for which used.

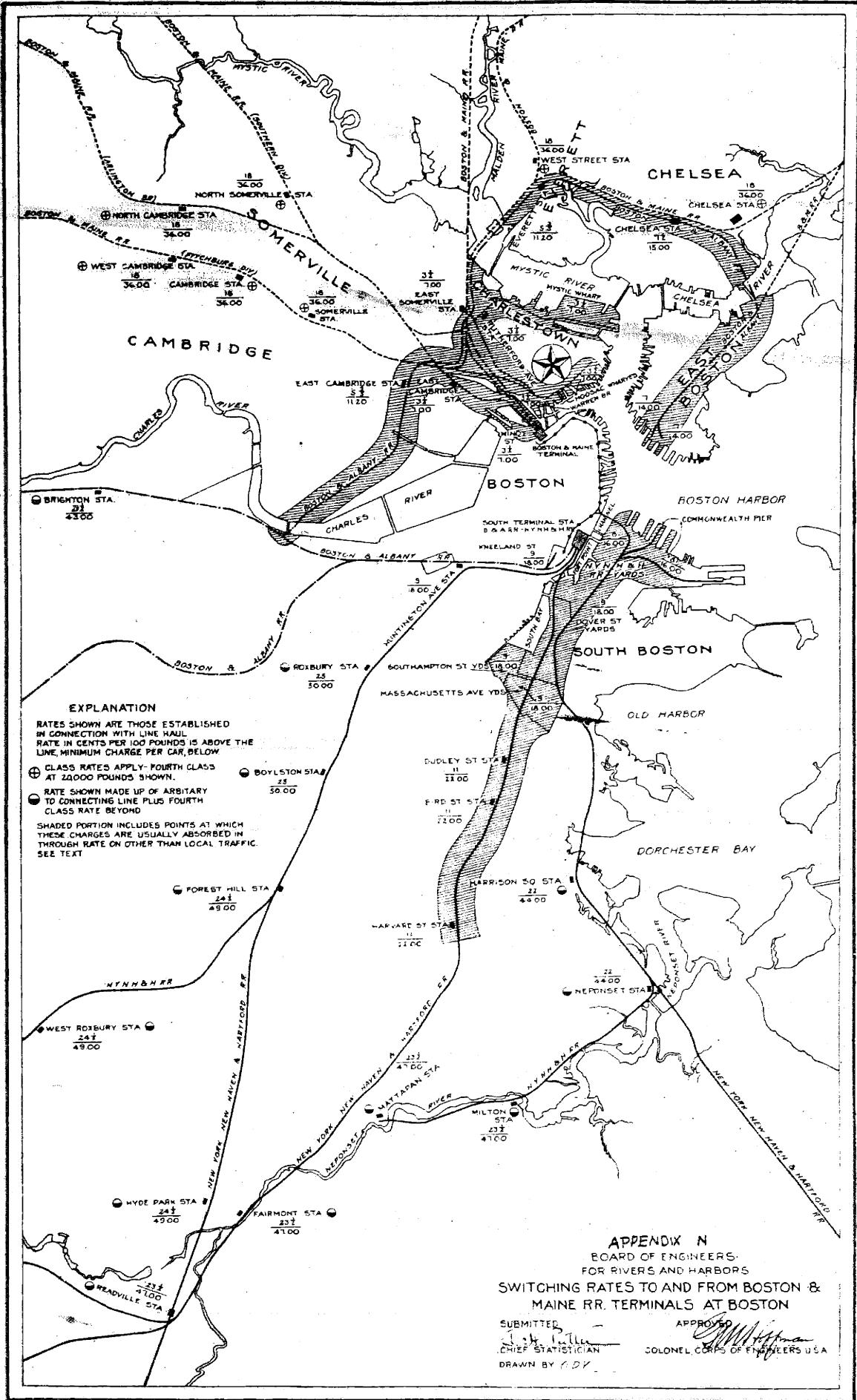
Railroad, section and yard.	Classi- fca- tion.	Stor- age.	House.	Team and de- livery.	Indus- trial.	Repair and service.	Not classi- fied.	Grand total.
Boston & Albany R. R.:								
Boston, Mass.—								
Brighton Yard.....							127	127
Allston repair yard.....						71		71
Beacon Park Yard.....	1,593					350		1,943
Brookline Junction Yard.....							154	154
Storage track.....		67						67
Huntington Avenue Yard.....							341	341
Kneeland Street Yard.....	9		121	262				392
Cambridge, Mass.—								
Massachusetts Avenue Yard.....							43	43
Main Street Yard.....							27	27
Binney Street Yard.....							224	224
McLean Asylum Yard.....							111	111
Chelsea, Mass.—								
Chelsea Yard.....							83	83
Eastern Avenue Yard.....							28	28
East Boston, Mass.—								
East Boston Yard.....			14	74	80			168
Maverick Street Yard.....		723			65	130		918
Terminal Yard.....		279	152					431
Boston & Maine R. R.:								
Yard No. 2, Charlestown¹								
Yard No. 3, Cambridge²								
Yard No. 4, Cambridge²								
Yard No. 5, Charlestown¹								
Yard No. 6, Boston.....	64	89	85					238
Yard No. 7, Cambridge.....	182	83	77					342
Yard No. 8, Somerville.....	490	104						584
Yard No. 9, Somerville.....	456	81						537
Yard No. 10, Somerville.....	317	171						488
Yard No. 11, Hoosac Wharves.....		17		83				100
Yard No. 12, Boston.....	18	57						75
Yard No. 13, Charlestown.....	60	123	138		8			329
Yard No. 14, Charlestown.....		333						333
Yard No. 15, Charlestown.....	304	58		27	20			409
Yard No. 16, Charlestown.....	225	338						561
Yard No. 17, West Cambridge.....	178	72						248
Yard No. 18, Charlestown.....			157					157
Yard No. 19, Charlestown.....	346	627	360					1,333
Yard No. 20, Charlestown.....	300	82						382
Yard No. 21, Somerville.....	293	443						736
Yard No. 22, Somerville.....	310	182						492
Yard No. 23, Mystic Wharf.....				160				160
Yard No. 24, Mystic Wharf.....	120	250		83				453
Yard No. 25, Mystic Wharf.....	268	147						415
Yard No. 26, Mystic Wharf.....	12	296				52		360
Yard No. 27, Mystic Wharf.....		257		24				281
Yard No. 28, Mystic Wharf.....		303						303
Yard No. 29, Mystic Wharf.....	277	181				98		556
West Yard, West Cambridge.....	20							20
East Yard, West Cambridge.....	437							437
New York, New Haven & Hartford R. R.:								
Ruggles Street Yard.....							248	248
Massachusetts Avenue Yard.....							200	200
Northampton Street Yard.....							386	386
Boston Freight Terminal.....	1,164			1,301				2,465
Commonwealth Terminal.....	555							555
Boston Classification Yard.....	1,613					123		1,736
Army Supply Base.....	900							900
Union Freight R. R.:								
Atlantic Avenue Yard.....							28	28
Copps Hill Yard.....							16	16

¹ Included in Yard No. 20.

² Included in Yard No. 7.

SUMMARY.

Boston & Albany R. R.....	1,602	1,069	287	336	145	551	1,138	5,128
Boston & Maine R. R.....	4,665	4,292	817	382	28	150		10,334
New York, New Haven & Hartford R. R.....	4,232			1,301		123	834	6,490
Union Freight R. R.....							44	44
Total.....	10,499	5,361	1,104	2,019	173	824	2,016	21,996



EXPLANATION

RATES SHOWN ARE THOSE ESTABLISHED IN CONNECTION WITH LINE HAUL. RATE IN CENTS PER 100 POUNDS IS ABOVE THE LINE, MINIMUM CHARGE PER CAR, BELOW

⊕ CLASS RATES APPLY—FOURTH CLASS AT 24000 POUNDS SHOWN.

● RATE SHOWN MADE UP OF ARBITRARY TO CONNECTING LINE PLUS FOURTH CLASS RATE BEYOND

SHADED PORTION INCLUDES POINTS AT WHICH THESE CHARGES ARE USUALLY ABSORBED IN THROUGH RATE ON OTHER THAN LOCAL TRAFFIC. SEE TEXT

APPENDIX N
 BOARD OF ENGINEERS
 FOR RIVERS AND HARBORS

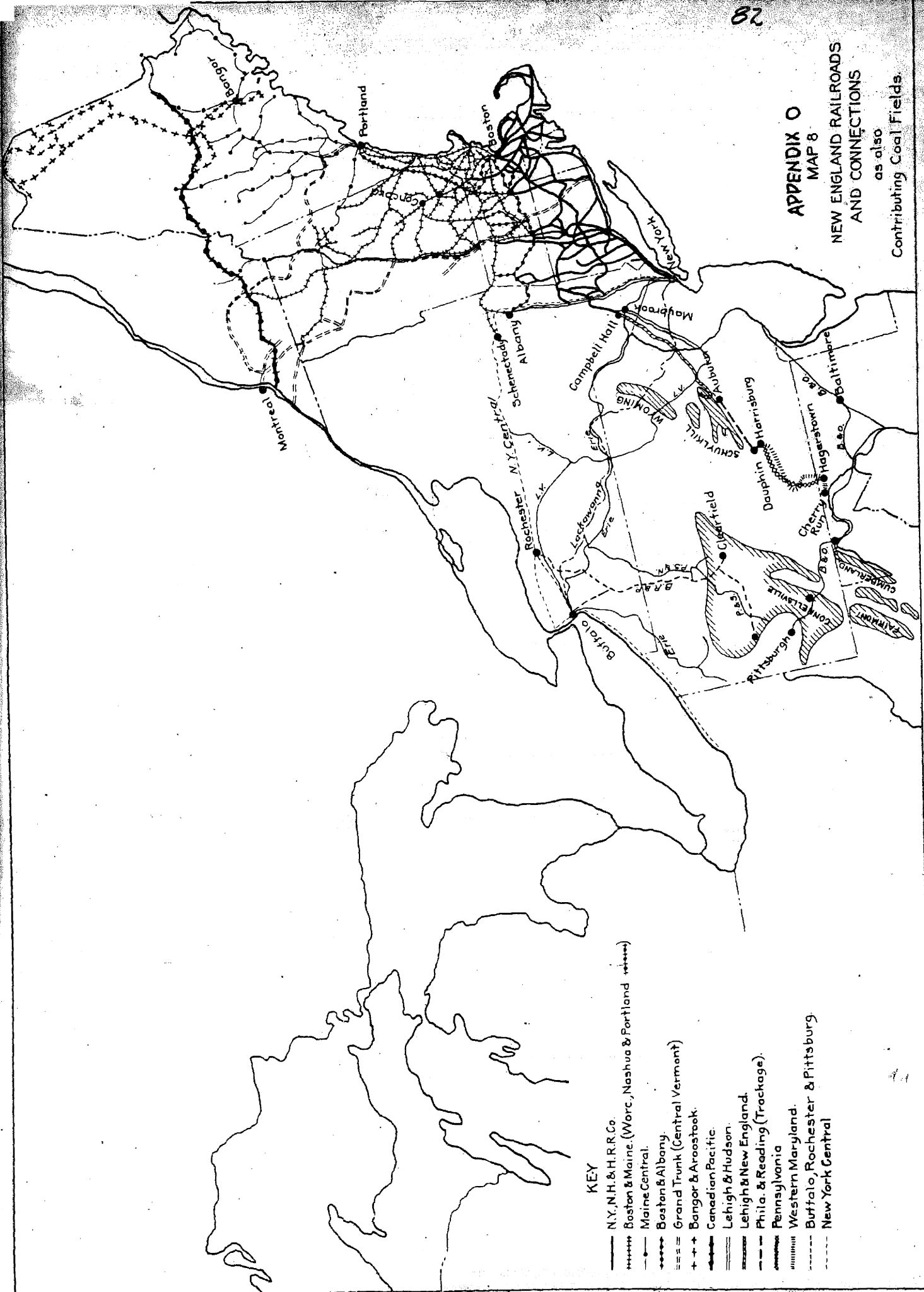
SWITCHING RATES TO AND FROM BOSTON & MAINE RR. TERMINALS AT BOSTON

SUBMITTED: *[Signature]*
 CHIEF STATISTICIAN

APPROVED: *[Signature]*
 COLONEL, CORPS OF ENGINEERS USA

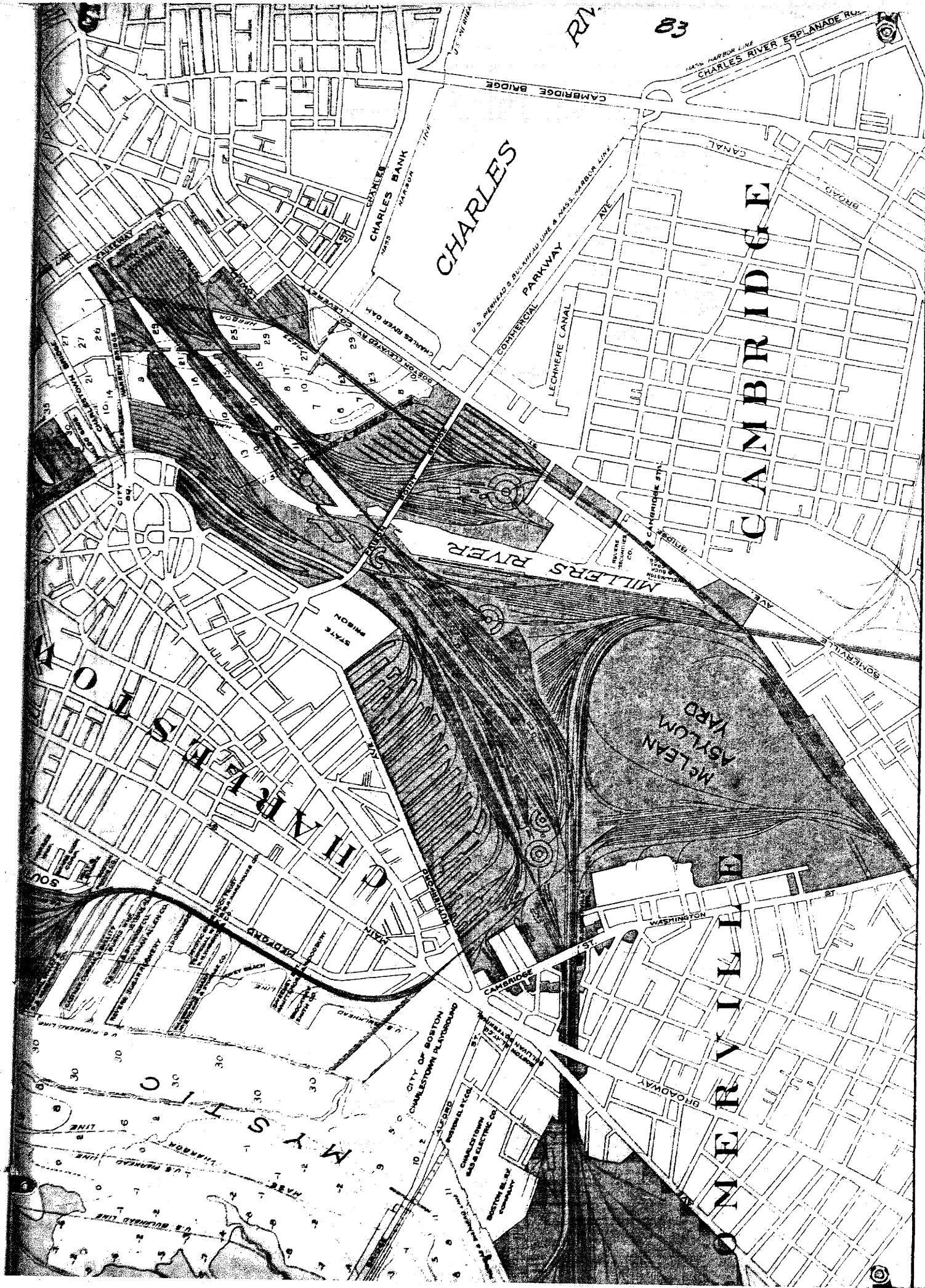
DRAWN BY G.D.V.

APPENDIX O
MAP 8
NEW ENGLAND RAILROADS
AND CONNECTIONS
as also
Contributing Coal Fields



KEY

- N.Y., N.H. & H.R.R.Co.
- ++++ Boston & Maine. (Worc., Nashua & Portland +++++)
- - - Maine Central.
- Boston & Albany.
- ==== Grand Trunk (Central Vermont)
- + + + Bangor & Aroostook.
- Canadian Pacific.
- ==== Lehigh & Hudson.
- ==== Lehigh & New England.
- - - Phila. & Reading (Trackage).
- ||||| Pennsylvania
- Western Maryland.
- Buffalo, Rochester & Pittsburg.
- New York Central



R.V. 83

CHARLES RIVER

CAMBRIDGE

CHARLES RIVER

McLEAN ASYLUM YARD

CAMBRIDGE

MILLS RIVER

CITY OF BOSTON
CHAPELSTOWN PLANNING BOARD

BROADWAY

WASHINGTON ST

CAMBRIDGE BRIDGE

CHARLES RIVER ESPLANADE

CHARLES BANK

PARKWAY

COMMERCIAL

LECHNERE CANAL

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