

year reported on (1890) 4.73 mills; doubtless it has been higher this year.

The Erie's average cost of carrying freight was 4.27 mills, an increase of 0.3 mill per ton per mile. A considerable item in this increase was the heavy expenditure for improvements and betterments charged to working expenses, concerning which something will be said later on. In dividing the increase in freight revenues the sum of \$1,806,580 is attributed to increase in tonnage and \$2,011,985 to increase in average rate.

In the division of working expenses we find that there was an increase of more than \$900,000, or 29.28 per cent. in the item of maintenance of way and structures as compared with the year before, the aggregate having been \$3,974,618. The work of replacing light bridges has been carried on and during the year \$90,000 was charged to working expenses for the renewal of the Kinzua Viaduct alone. Of company's sidings 38.2 miles was built, of which less than one-third was charged to construction account. Thirteen and one-half miles of private side tracks was also built and largely charged to working expenses. The 90-lb. rail laid amounted to 18,119 tons and the 80-lb. to 6,183 tons. A good deal of ballasting was done, nearly a million ties were put in and 620,000 tie plates.

Maintenance of equipment, which amounted to \$6,889,647, increased 33.16 per cent. over the preceding year. This was due to the purchase of heavier equipment, the remodeling of lighter engines and cars and the application of air-brakes and couplers. The company bought or built 20 locomotives during the year which were charged to maintenance account, and about 50 which were charged to capital account. A little over 1,500 freight service cars of various sorts were bought or built and 784 were rebuilt and the sides of 3,574 coal cars were raised, all of this being charged to working expenses, while capital account is charged with 1,000 steel hopper coal and ore cars of 100,000 lbs. capacity, six horse express cars, a rotary snow plow and a 50-ton wrecking crane. The company also charged to working expenses \$424,000 for equipping stock with M. C. B. couplers and air-brakes, the law being now quite complied with in this respect. Since Dec. 1, 1895, the company has expended \$8,081,583 for new equipment.

The principal results of operation are as below:

	1890.	1900.
<b>Earnings.</b>		
Freight .....	\$17,817,941.76	\$20,132,762.44
Coal .....	7,191,481.83	8,675,226.00
Passenger .....	6,310,443.87	6,905,224.28
Mail .....	486,019.74	492,171.45
Express .....	592,312.97	616,629.57
Rents .....	131,108.84	120,985.77
Miscellaneous .....	1,223,094.91	1,330,632.27
<b>Total earnings .....</b>	<b>\$33,752,703.92</b>	<b>\$38,293,031.87</b>
<b>Expenses.</b>		
Maintenance of way and structures .....	\$3,974,317.45	\$3,974,618.01
Maintenance of equipment .....	5,174,136.80	6,889,647.42
Conducting transportation .....	15,291,801.54	15,806,021.02
General expenses .....	725,739.00	780,735.75
Taxes .....	860,931.49	907,522.94
<b>Total expenses .....</b>	<b>\$25,169,926.28</b>	<b>\$28,448,905.14</b>
<b>Net earnings from operation .....</b>	<b>\$8,582,777.64</b>	<b>\$9,844,126.73</b>

To net earnings from operation should be added income from securities, etc., making a total income of \$10,264,535. Interest and rentals being paid out of this leave a balance to profit and loss of \$1,663,430. This surplus added to that of the previous three years and seven months gives a total surplus earned from Dec. 1, 1895, the date of the company's organization, of \$3,454,874. Of this accumulated surplus a quarter of a million dollars has been advanced to the Chicago & Erie, a third of a million on account of old New York, Lake Erie & Western car trusts, about \$320,000 to the New York & Greenwood Lake for construction purposes; invested in materials in excess of the amount received from the receivers nearly another million dollars and finally over a million and a half expended for construction, car trust payments, etc. The company has received cash from all sources for construction and equipment since December, 1895, about 10% million dollars, and has expended in addition to this \$1,155,000, for which it is entitled to be reimbursed from the sale of prior lien or general lien bonds.

**Long Island Railroad.**—The gross earnings of the Long Island Railroad for the year ending June 30 amounted to \$4,557,250, and the net earnings were \$1,281,186. After paying interest and rentals the net income was \$159,493, from which \$100,000 was transferred to the reserve fund, leaving \$59,493 to profit and loss. The passenger earnings were the largest in the history of the road. While the gross earnings from all traffic show a decrease of a little more than \$65,000 it must be remembered that the extraordinary revenue from Government business the year before amounted to \$157,000. Thus the increase of gross earnings from ordinary traffic was \$91,784. The passenger and freight earnings have increased steadily for four years. Since 1897 the increase in passenger earnings has been 14 per cent., which has been accomplished with an increase of 30 per cent. in passenger train mileage. Obviously, it has been necessary to give greater facilities to encourage the growth of this business, which doubtless is a wise policy. On the other hand, an increase of 11 per cent. in freight earnings in the same period has been brought around with actually a less freight train mileage. The total charges to capital account on account of additions and betterments so properly amounted in the year to \$219,776. The increased cost of material and supplies made it impolitic to undertake any new work chargeable to working expenses.

#### Relays for Automatic Signals—A Decision.

In the United States Circuit Court at Pittsburgh last week (Oct. 5) Judge Buffington delivered an opinion in the suit of the Hall Signal Company against the Union Switch & Signal Company for infringement of the Buchanan patent on relays for automatic electric signals, deciding in favor of the Hall Company. The decision appears to practically sustain the patent in all its essential features.

The complaint, entered at the May term, 1894, charges infringement of patent No. 497,489, of May 16, 1893. The patentee, John P. Buchanan, assigned his patent to the Union Switch & Signal Company. The object of the patent is to provide a shunt circuit by which an automatic signal is prevented from remaining fixed in the all-clear position in case the contact points in the track relay are fused by lightning. The relay of the Union Company containing this feature was described in the *Railroad Gazette* of March 30 last. As described in the patent, the arrangement of armature levers is vertical instead of horizontal, as in our description, and instead of a single lever, with an auxiliary pivot and fulcrum, there are two separate levers. The lever which is attracted to or withdrawn from the cores of the track relay is hung in a vertical position, pivoted at its top; when attracted, instead of directly closing the signal circuit, it presses, through an insulated block, against the upper end of another lever, pivoted at its lower end, and this second lever closes the local or signal circuit by a contact point fixed to its opposite side. If this point becomes fused to the one which it touches, thus permanently closing the local circuit, the first or armature lever continues free, as it is completely insulated from the second lever, through which the local circuit flows. On the entrance, then, of a train into the block section, de-energizing the track relay, the armature lever is retracted (by a spring) the same as under normal conditions; and on striking its back contact it makes a short connection between the two poles of the local battery, thus de-energizing the signal magnet and allowing the signal to go to the stop position. Thus the normal setting and releasing of the signal may go on repeatedly the same as before the contact points of the local circuit were fused.

The principal claim of the patent is based on the provision to control two or more pairs of contact points, so that when all the pairs are in one position a normal path is provided for the current, while if either pair is in the other position the current is excluded from its normal path. The principal claim of the defendant appears to have been that the same device was already in use; and a shunt circuit, used in duplex telegraphy, was brought in evidence. The Court holds that the prior patents cited in evidence do not show the essential features of Buchanan's invention; that the alleged resemblances are fanciful and not substantial; and that the shunt circuit in the duplex telegraph is not expected to work through an electrical storm, as if fused by lightning it is at once replaced. Instead of providing for the use of the shunt for an indefinite time the aim is to use it as little as possible. While in both devices a shunt current is used, the objects to be attained are wholly different. In the telegraph the permanent maintenance of the shunt current would suspend the practical working of the mechanism, while in the signal apparatus its effect is to make possible the continued working of the signal. The wide divergence between the two devices in form, object and operation is evidence that the change from one to the other was more than mechanical improvement. Neither one of the devices would suggest the other.

It was claimed that the invention in question was the joint work of Scott and Buchanan, though the patent was issued to Buchanan alone. This point is held not proved. A decree is issued in accordance with the finding, declaring infringement of all the claims except the tenth. The text of the decision, with a diagram, will be found in full in the advertising pages.

Prof. L. H. Bailey, of Cornell University, is preparing a Cyclopedia of American Horticulture, and it is proposed to include an elaborate article on "Railroad Gardening." He wishes to get as complete a list as possible of railroads that have done ornamental, economic or protective planting. From these roads is wanted a sketch, with dates, giving the plan employed in carrying on the work, the amount and character of the planting, and other information of interest. Roads which are now giving, or have at any time in the past given, attention to this subject are requested to send information to Mrs. Frances C. Seavey, Brighton, Ill., who has charge of this part of the book. The chapter to be prepared will contain information as to planting for such purposes as protecting banks also. In this connection we note an item from a Chicago paper of recent date to the effect that the Chicago & Northwestern is going to plant fewer flowers and more shrubbery. It seems to us that this is a commendable change. The Boston & Albany, one of the oldest railroad arboriculturists, has very few flowers. An important desideratum in adorning the grounds of a station is to have them look well throughout the year; and under circumstances as they are at present, another is to beautify as many stations as possible. No railroad, as yet, has done away with ugliness at all its stations; and as long as this is the case economical expenditure of money and labor is important. As flowers require much more care, for the benefit of their presence for a few months, than shrubs and grass do for eight, ten or 12 months, the latter are far less costly in the long run. With shrubs a high

standard is easily maintained; with flowers a lower standard is maintained only by great care and effort; or, if excellence is maintained the temptation is to confine attention to a few stations. It is said that the Chicago & Northwestern will continue its greenhouses for the purpose of supplying flowers for the tables of its dining cars.

Demurrage bureaus, for securing the prompt unloading of freight cars are still a comparatively new institution; yet it is more than a dozen years since the first one was started and there is much truth in the claim made by the demurrage managers that the railroads have been saved hundreds of thousands of dollars by the work of these bureaus. We are reminded of this by the annual report of the Baltimore & Washington Car Service Association, just issued, for the year ending August 31, in which a statement is printed showing the total results of the work of that association for 10 years. The number of cars handled (582,790) has more than doubled, and the number handled in the past year is about 50 per cent. greater than the number reported in 1892; and the net revenue for the past year, over and above all refunds and expenses of administration, was \$25,467. This is more than twice the net revenue of any previous year. The percentage of cars released within the free time has been maintained very steadily, for seven years, at between 97 and 98 per cent. The average detention by the railroads for the last two years was only three-tenths of a day. Manager Gardner, in his report, says that this small average would have been materially reduced but for the unfavorable conditions at the yards where harbor delivery is made in Baltimore. The uncollected charges, which amount to only a little over one per cent. of the earnings, are all practically covered in credit accounts or by goods held in storage for charges. This association now embraces 26 railroads and daily reports are made to the central office from 600 stations.

#### NEW PUBLICATIONS.

**Master Car Builders' Association.**—The report of the Proceedings of the thirty-fourth annual convention of the Master Car Builders' Association, held last June, is received. Copies of this valuable document may be had from the Secretary of the Association, Mr. J. W. Taylor, The Rookery, Chicago, Ill. The report is an octavo volume of 424 pages, and contains a list of members with the names of officers and committees, the constitution and by-laws, the reports presented at the convention and the discussion thereon and the standards and recommended practice of the Association, together with illustrations of such standards and recommended practice.

#### TRADE CATALOGUES.

**The Dodge Mfg. Co., Mishawaka, Ind.,** has issued a circular descriptive of a new disc grinding machine for removing rough surfaces from forgings and castings where the surfaces are flat. The discs are made true and a table is provided so that parallel faces or faces at any angle can be ground accurately. The discs are steel, 18 in. in diam. and ½ in. thick, covered with emery paper or cloth, and the covering can be easily renewed. The shaft carrying the discs is run at 2,200 r.p.m.

**Roney Stokers.**—Messrs. Westinghouse, Church, Kerr & Co. have issued a circular containing a list of some of the recent buyers of Roney mechanical stokers. This list is headed by the Manhattan Railway Co., of New York, with 34,000 h.p.; but the combined power houses of the Metropolitan Street Railway and the Third Avenue will develop still more power, namely 59,000. The plants mentioned go down as low as 200 h.p., this being for the Calumet & Hecla Mining Co.

**Lumber Dry Kilns.**—The American Blower Company, Detroit, Mich., has issued a new pamphlet descriptive of the theory, practice and apparatus of drying lumber. This includes the hot blast apparatus, trucks and other equipment, together with statements from numerous users as to work already done.

**Perforated Metal.**—The Robert Aitchison Perforated Metal Co., Chicago, issue a little pamphlet, showing a number of examples of perforations in sheet metals. The full list of sizes covers over 600 varieties. The pamphlet also contains tables of weights and gages and a price list.

**Phosphor Bronze.**—The Phosphor Bronze Smelting Co. issues a catalogue and price list under date of Sept. 10. This may be had by addressing the company at 2200 Washington avenue, Philadelphia, Pa.

#### Eyes and Headlights.

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The air is never so free from dust and vapor that this strong pencil of light cannot be seen even if no solid object lies in its path. There is urgent need of better light as long as it is possible for a fast mail train to overtake and destroy two hand cars loaded with people on a straight track having two miles clear view ahead of the engine; for a second section of a night train to close up its five-minute interval and smash a caboose after being in easy sight of the first section at least three times in the previous six miles; while a lo-