

The two lines have their terminal points near each other at Bancroft, Ont., and they both have power to construct extensions from that point. Neither line is financially strong, the C.O.R. particularly being the subject of continued law proceedings as to title and its bond issues. The I.B. and O.R. is one of the lines which the James Bay Ry. Co. has power to purchase as part of a connection with Ottawa and the Great Northern Ry. of Canada. We were recently advised that there is no truth whatever in this press report.

Midland Ry.—It is expected that the transfer of this line to the Dominion Atlantic Ry., the sale of which has been authorized by the shareholders, and approved by Parliament, will be made Oct. 1.

Minneapolis, St. Paul and Sault Ste. Marie Ry.—Half-yearly dividends of 2% on the common stock and 3½% on the preferred stock for the half-year ended June 30, have been declared.

New Brunswick Ry.—The officers and directors for the current year are:—President, R. Meighen; Vice-President, H. H. McLean; other directors: Lord Strathcona and Mount Royal, J. Turnbull, J. Hardisty, J. S. Kennedy, S. Thorne, D. W. James, E. W. Burpee, F. S. Meighen.

Reid Newfoundland Co.—It has been officially stated that the Newfoundland Government has decided not to purchase the interests of the R.N. Co. in the railway and steamships. R. G. Reid, who was in St. John's, Nfld., during the negotiations, has gone to England, and is reported to have said before leaving that the Government would not have another chance of acquiring the property at the same price as it had recently been offered them. Negotiations are said to be in progress with private capitalists, for a sale of the property.

Temiscouata Ry.—Gross earnings for July \$13,897.33 against \$13,765.47 for July, 1904.

Temiskaming and Northern Ontario Ry.—The Provincial Treasurer of Ontario stated Aug. 15, that the net traffic receipts of the line for April, May, June and July averaged \$8,000 a month. The working expenses averaged, for the same period, 55% of the gross earnings.

Toronto, Hamilton and Buffalo Ry.—Estimated receipts for July, \$56,740.72, against \$56,760.12 for July, 1904.

The Algoma Steel Co., an officer recently stated, had orders in hand for 75,000 tons of steel rails. The mill is turning out 500 tons a day. The Intercolonial Ry. has placed an order for 25,000 tons of 80-lb. steel rails in Nova Scotia.

Residents of Windsor, Ont., are again complaining that the Pere Marquette Rd. is neglecting its local passenger traffic, and say that if an improvement is not made the matter will be brought to the attention of the Railway Commission.

The war on passenger differential rates from Chicago, Ill., which had been going on for some time between the Michigan Central Rd. on the one hand, and the C.P.R. and G.T.R. on the other, has been settled, and normal rates were restored Aug. 20.

P. S. Archibald, C.E., of Moncton, N.B., is acting as engineer for A. E. Trites of Bangor, Me., who has the contract for building the Northern Maine Seaport Ry., from La Grange to Stockton Harbor, Me. The line, which is an extension of the Bangor and Aroostook Ry., is about 60 miles in length, with 10 miles of branch lines. At the terminal at Stockton Harbor there are piers for passenger, freight and coal traffic. Work was started on April 1, and it is hoped to have the line completed early in Nov.

I.C.R. Relief and Insurance Association.

The 16th annual report for the year ended June 30, shows a net surplus of \$13,890.22. The total receipts for the year were \$78,661.27, and the credit balance from June 30, 1904, was \$13,329.56. The total expenditures were \$74,200.62, leaving a credit balance of \$17,790.92, which, less estimated outstanding liabilities, \$3,900, leaves a net surplus of \$13,890.22. The claims against the sick and accident fund for weekly indemnity, medical and surgical attendance and for special treatment and hospital charges during the year have been considerably in excess of its income. The deficit in this fund was found to be increasing so rapidly that the general executive committee found it necessary to order a special assessment of 25 cents per member, and this reduced the deficit very materially. It amounted to \$4,179.78. In view of the state of this fund the executive officers have under consideration the advisability of reducing the allowance made for special treatment and for hospital charges. Ten death claims were paid from the temporary employees' accident fund during the year; 53 death claims were assessed during the year; 45 were due to natural causes, and 12 were due to accidental injuries, and they totalled \$20,750. Fourteen claims for total disability allowance, aggregating \$6,250, were approved by the general executive committee—assessed and paid.

Suggestions for Steam Economy.

By W. McKay, of the Robb Engineering Co.

Almost every engineer and electrician is familiar with the fact that the majority of steam-power plants are not operating under the most economical conditions. In some cases this is due to the plant having been built up piecemeal as the requirements developed and in other cases it has been found difficult to determine the amount of power that would actually be required until after the plant was completed. If the consulting engineer could be informed, or could determine in advance the exact requirements for the present and future, it would be comparatively a simple matter to design the plant with fair accuracy as to the size and number of units, types of engines, boilers, and other details.

Although it is difficult to give any general information on this subject which will be of use or interest in the great variety of particular cases, it may be of some interest, and possibly of assistance to those who are managing or operating power plants, to discuss some of the principles upon which economy in the use of steam depends.

Beginning with the boiler, which is the first step in the production of power from fuel, it may be laid down as a good rule that it is more economical to use boilers of reasonably large size than to subdivide into a larger number of small units. The length and area of grate that can be conveniently fired or kept evenly covered with coal is, perhaps, the limiting feature, if hand firing is to be used. Working from this rule, a grate should not be over 7 ft. long or more than 5 ft. wide, which would give 35 sq. ft. of grate surface. The quantity of coal that may be burned on such a grate varies widely with the kind of fuel and strength of draft. Using bituminous slack coal of fair quality, with good natural draft or moderate-induced draft, it should be possible to burn 25 lbs. of coal per square foot of grate per hour, or 875 lbs. of coal per hour, and if this coal will evaporate say 8 lbs. of water per pound of coal, the boiler, if constructed with heating surface in proper proportion, would evaporate 7,000 lbs. of water per hour, which would be equal to a little over 200 standard boiler horse-power. In order to give good economy, the boiler should have from 2,000 to 2,400 sq. ft. of heating surface to evaporate

this quantity of steam economically. The return tubular boiler, on account of the amount of tube surface in proportion to the direct surface exposed to the fire, should have not less than 12 sq. ft. per horse-power; the water tube type from 10 to 11, and the internally fired type, which has a larger amount of direct heating surface in the furnace and tubes than either of the others, should have 9 to 10. If the grate surface is larger than that described, probably the grate will not be evenly covered with coal, or the fire will be dead in spots, so that too much cold air will pass through.

The economy in burning fuel is a matter requiring great skill and experience, and depends entirely upon the evenness, thickness and condition of the fire, which controls entirely the air supply and, therefore, the perfection or imperfection of the combustion, and I would say just here that there is very little use in splitting hairs over a quarter of a pound of steam consumption of the engine, while the fireman may be losing ten times this quantity of fuel from inefficient boilers or poor firing.

I fear it is too often the case that the demands for increased horse-power are met by grate surface too large in proportion to the heating surface of the boiler or forced draft, and too little attention is given to careful firing, with heating and grate surfaces in proper proportion to give best economy, and frequently a great deal of money is spent in obtaining high-class engines and condensers, whereas the principal loss is in the boiler and fire room.

The question is often asked whether in case of installing a certain horse-power of boilers, say 300 h.p., it would be more economical to have three boilers of 100 h.p. each or two boilers of 150 h.p. each. I would say by all means have the two larger units, as it will always be found that the larger boilers have less radiation, less air leakage and better combustion than a corresponding horse-power in small units. If it is necessary to have a spare unit for cleaning, let there be another one provided of the same size.

In regard to the pressure to be carried. It is well known that a high pressure gives a greater amount of expansion and better economy in proportion to the fuel burned. Even with simple engines in which it is not possible to obtain the full advantage of expansion, the high pressure of steam, which is drier and contains a larger number of heat units in proportion to the volume, gives the best results. I think every boiler should be designed for not less than 150 lbs. pressure per square inch. Even if it is not possible to utilize the full pressure, the boiler will be stronger, last longer and a better investment in the long run. In this respect, the water tube or some form of internally fired boiler in which the shell plates are not exposed to the high temperature of the furnace, are certainly safer than the horizontal return tubular boiler, because for large units intended to carry high pressure, the shell plates and seams must be of considerable thickness, and being directly exposed to the hottest part of the fire, are almost sure to give trouble, especially if there be any scale or sediment in the water which is liable to settle on the bottom directly over the fire.

As to the economy of various types of boilers, experience shows that any of the standard types, horizontal return tubular, water tube, or internally fired, if they are designed with proper proportions of heating and grate surface, give about the same evaporation per pound of coal, provided they are in good condition and clean both on the fire and water surfaces. While the externally fired boilers, either of the return tubular or water tube type, are said to have some advantage in combustion, on account of the heat of the brick furnace, they are subject to losses which are more serious, in the way of air leakage and radiation. Tests made at the Ohio