

and "ice making." For example—A 20 ton machine will produce the same cooling effect in 24 hours as the melting of 20 tons of ice, or in other words, will extract the same amount of heat from the brine as would be required to melt 20 tons of ice into water at 32 degrees. Theoretically the extraction of this amount of heat from 20 tons of water at an initial temperature of 32 degrees should change it into ice, but in practice these are various losses not present in the simple process of cooling, so that it is customary to allow for twice the boiler power per ton for ice making as for the process of cooling or ice melting effect; the indicated h.p. required per ton refrigeration depends upon suction and condenser pressure which in turn are governed by the temperature and amount of condensing water used.

Power Plant Records—One of the most essential things in power plants is the systematic record of operations by daily logs and recording apparatus, and when the results are published on engine room bulletin boards, it creates a rivalry between the different shifts and promotes a desire among the men for higher efficiency. The importance cannot be overestimated. In this way affairs in the plant are lifted from the realms of guess work to certainty. While the systems adopted for ordinary plants may be simple, the records should be arranged for convenient reference so that comparison of results with past performance may be made. Thus it is possible to note the effects of changes in equipment or improvements in economy.

Heating With Exhaust Steam From Power Plant—Exhaust steam heating by vacuum systems has developed rapidly during the last few years. With its decided advantages over the old style methods of heating, it practically predominates the heating field. The advantages of the vacuum system over the gravity system may be summarized as follows:—1. Positive circulation by prompt removal of air and condensation through the vacuum returns. 2. Smaller return pipes. Asbestos covering on returns can be eliminated so that the condensation can be handled by the pumps without the injection of cold water. 3. Increased economy, as back pressure on engines can be reduced to practically atmospheric. 4. Air binding and water hammer trouble removed.

The Dunham vacuum system is in use at one large plant I am acquainted with. It was installed in the place of the old gravity system, in which we used high pressure steam, which was unsatisfactory, wasteful and difficult to control under quick changes of temperature. The vacuum is maintained by a Tod-Attwood 6 x 8 x 10 in. pump and controlled by a $\frac{3}{4}$ in. Fisher vacuum pump governor, which is operated by a diaphragm and actuated by the vacuum produced in the return header. The condensation is removed by the operation of a thermostatic trap connected to each radiator. This trap is comprised of a shell, consisting of a body and cover. Attached to the cover is a hollow disc or diaphragm, containing a combination of volatile fluids which vaporize at about 200°. Attached to this diaphragm is the valve of the trap, which raises and lowers on its seat as the disc or diaphragm expands or collapses. The condensation from these traps is pumped into a sump, from which an electric centrifugal pump actuated by a float delivers it to the boiler feed pump through a Cochrane heater. During the

winter the hot water heater supplying the offices is heated with this condensation which passes directly through the chamber and is connected to the vacuum pump. The total square feet of radiation in station is 6,200. Low pressure

condensation equals 0.25 lb. per sq. ft. per hour. High pressure condensation equals 0.4 lb. per sq. ft. per hour, showing an approximate saving of 35%.

The foregoing was read before the Canadian Railway Club, Montreal, recently.

Birthdays of Transportation Men in December.

Many happy returns of the day to:—
E. T. Agate, ex-Assistant Superintendent, Lake Superior Division, Canadian Northern Ry., Capreol, Ont., now of Toronto, born at Pittsford, N.Y., Dec. 7, 1874.

A. G. Albertsen, General Agent, Passenger Department, C.P.R., Minneapolis, Minn., born at Copenhagen, Denmark, Dec. 31, 1887.

J. H. Barber, Engineering Department, C.P.R., Montreal, born at Cobourg, Ont., Dec. 20, 1856.

H. E. Bissell, Land and Tax Agent, Grand Trunk Pacific Ry., Winnipeg, born near Noyan, Que., Dec. 31, 1867.

N. E. Brooks, ex-Engineer, Maintenance of Way, Western Lines, C.P.R., now at Sherbrooke, Que., born there, Dec. 25, 1866.

W. W. Butler, President, Canadian Car and Foundry Co., Montreal, born at Danville, Ohio, Dec. 9, 1862.

J. M. Cameron, General Superintendent, Alberta District, C.P.R., Calgary, born at Lochabar, N.S., Dec. 18, 1867.

W. C. Casey, General Agent, Passenger Department, Canadian Pacific Ocean Services Ltd., Winnipeg, born at Moncton, N.B., Dec. 12, 1882.

G. W. Caye, General Purchasing Agent, G.T.R., Montreal, born at Malone, N.Y., Dec. 1, 1865.

A. H. Foster, Manager, Brantford Municipal Ry., Brantford, Ont., born at Guelph, Ont., Dec. 24, 1888.

G. C. Gahan, Assistant General Auditor, C.P.R., Montreal, born there, Dec. 28, 1874.

W. H. Gardiner, City Freight Agent, C.P.R., and District Freight Agent, Esquimalt and Nanaimo Ry., Victoria, B.C., born there, Dec. 6, 1859.

A. S. Goodeve, member Board of Railway Commissioners for Canada, born at Guelph, Ont., Dec. 15, 1860.

A. J. Gorrie, ex-Superintendent District 1, Transcontinental Division, Canadian Government Rys., Quebec, now of Toronto, born at Raith, Kirkcaldy, Scotland, Dec. 10, 1868.

W. H. Grant, General Tie Agent, Canadian National Rys., Toronto, born at Acton, Ont., Dec. 8, 1858.

F. P. Gutelius, Federal Manager, Delaware & Hudson Rd., U.S. Railroad Administration, Albany, N.Y., born at Mifflinburg, Pa., Dec. 21, 1864.

Jas. H. Hall, President, Western Transportation Co., Ltd., Ottawa, Ont., born at Hawkesbury, Ont., Dec. 20, 1863.

J. T. Hallisey, Superintendent, Halifax Division, Maritime District, Canadian National Rys., Truro, N.S., born at Beaver Bank, N.S., Dec. 29, 1862.

D. B. Hanna, President, Canadian National Rys., Toronto, born at Thornliebank, Scotland, Dec. 20, 1858.

R. W. D. Harris, ex-Trainmaster, Moose Jaw Division, Saskatchewan District, C.P.R., Moose Jaw, now of Tappen, B.C., born at Victoria, B.C., Dec. 12, 1879.

J. J. Hennigar, District Freight Agent, Great Lakes Transportation Co., Windsor, Ont., born at Topeka, Kan., Dec. 21, 1884.

L. S. Landers, Acting Division Engineer, Canadian National Rys., Edmund-

ston, N.B., born at Farnham, Que., Dec. 15, 1888.

A. McCowan, Master Car Builder, Western Lines, Canadian National Rys., Winnipeg, born at Perth, Scotland, Dec. 5, 1868.

J. T. McGrath, ex-Superintendent of Motive Power and Equipment, Chicago and Alton Rd., Bloomington, Ill., born at Toronto, Dec. 6, 1869.

A. T. McKean, Division Freight Agent, C.P.R., Winnipeg, born at St. John, N.B., Dec. 18, 1886.

Capt. R. McKillop, formerly Superintendent, Laurentian Division, Quebec District, C.P.R., Montreal, then Officer Commanding 13th Canadian Light Railway Operating Co., now acting as relieving Superintendent, Eastern Lines, C.P.R., born at Perth, Scotland, Dec. 26, 1884.

J. M. MacArthur, Superintendent, Medicine Hat Division, Alberta District, Medicine Hat, Alta., born at Toronto, Dec. 8, 1885.

H. M. MacCallum, General Freight Agent, Canadian Pacific Ocean Services, Ltd., Toronto, born at Huntingdon, Que., Dec. 3, 1882.

A. D. MacTier, Vice President, Eastern Lines, C.P.R., Montreal, born at Blairgowrie, Scotland, Dec. 27, 1867.

J. C. O'Donnell, Superintendent, Divisions 2 and 3, Central District, Canadian National Rys., Winnipeg, born at Cobden, Ont., Dec. 17, 1879.

Alfred Price, General Manager, Eastern Lines, C.P.R., Montreal, born at Toronto, Dec. 6, 1861.

W. J. Radford, Assistant Superintendent, Toronto Suburban Ry., Toronto, born at Boldre, Hants, Eng., Dec. 23, 1870.

G. D. Robinson, ex-European Freight Agent, Canadian Pacific Ocean Services Ltd., Montreal, born at St. John, N.B., Dec. 7, 1877.

G. E. Smart, General Master Car Builder, Canadian National Rys., Toronto, born at Edinburgh, Dec. 23, 1873.

W. Tansley, Car Service Agent, New Brunswick District, C.P.R., St. John, N.B., born at Shelburne, Ont., Dec. 27, 1872.

W. H. Thompson, Chief Dispatcher, C.P.R., Edmonton, Alta., born at Bobcaygeon, Ont., Dec. 26, 1886.

M. F. Tompkins, General Freight Agent, Eastern Lines, Canadian National Rys., Moncton, N.B., born at Margaree, N.S., Dec. 6, 1878.

H. H. Vaughan, ex-Assistant to Vice President, C.P.R., Montreal, now Vice President and General Manager, Dominion Copper Products Co., and director, Armstrong Whitworth of Canada, Ltd., born at Forest Hill, Essex, Eng., Dec. 26, 1868.

R. C. Vaughan, Assistant to President, Canadian National Rys., Toronto, born there, Dec. 1, 1883.

A. P. Walker, Assistant Engineer, Ontario District, C.P.R., Toronto, born at West Hartlepool, Eng., Dec. 9, 1860.

J. B. Way, Freight and Ticket Agent, C.P.R., Sault Ste. Marie, Ont., born at Operating Co., now acting temporarily as relieving Superintendent, Eastern Lines, C.P.R., born at Perth, Scotland, Dec. 26, 1884.