

to keep it dry during construction, but that it cannot be counted on for drainage purposes for any great time after the road has been finished; but that, in the case of roads for lighter traffic, which should of necessity be cheaper, the road-bed might be made flat, and the crowning of the finished surface obtained by making both the foundation and the macadam thinner towards the sides. As for the completed surface, in the district of which the writer had charge in Ireland, the usual rule was to raise the centre above the sides at the rate of one inch per yard of width from the centre to the side, the slope being steeper at the sides than in the centre. Mr. Owen states that for a sixteen-foot roadway, an average crowning of four inches is desirable, which is at the rate of one inch in two feet from the centre to side, or a grade of one in twenty-four. The other members who took part in the discussion did not question the statement. Mr. Codrington's opinion is that the fall from the centre to the sides need not be more than six inches on a thirty-foot road, or one in thirty from centre to side, and should never exceed nine inches or one in twenty; and that for a road eighteen or twenty feet wide three or four inches, or from one in thirty-six to one in thirty is enough. He also remarks that, if the surface be neglected and allowed to wear into ruts, no amount of convexity will clear the surface of water. This latter statement can be fully endorsed by the writer, who saw a gravel road last winter, about fourteen feet wide, in the centre of a sixty-six foot road allowance, and raised about two feet above the level of the water tables at the edges of the sidewalks, the water tables being quite dry, and yet the roadway, which was badly rutted, was full of water, and almost impassable. Had this road been well harrowed and rolled, it might have been kept in good condition. As there was no discussion on this subject, it might be taken for granted that on the level, or on easy grades, a fall of from one in thirty to one in thirty-six is sufficient, and that on hills the slope from the centre to the sides might be from one in twenty to one in thirty, and that it is useless to try to make higher crowning take the place of an even surface for transverse drainage.

(To be continued).

—"The G. A. Robertson" catch basin and tap, described in our November issue, is already receiving substantial recognition of its merits, the Montreal Pipe Foundry Co. having had an order from the Corporation of Westmount, Que., for 50, which are now in position, and giving complete satisfaction.

—Owing to the increased demand in Canada for the Norton Ball-Bearing Jacks, A. O. Norton will enlarge his plant at Coaticook, Que., and equip it with special machinery. Export business will also be handled from this point, shipments having recently been made to Japan, South America, Hawaiian Islands and New Zealand.

—This primitive conveyance seems rather to mock the improvements of the age. A horse railroad, about a mile in length, accommodates the residents of a suburb of San Francisco. The grade is about  $3\frac{1}{2}$  per cent. A horse draws the car and passengers uphill, the car descends by its own gravity, and then carries the horse on the rear platform of the car. The ascent is made at the rate of  $3\frac{1}{2}$  miles an hour, the descent is at the average rate of 15 miles an hour.

—The Hamilton, Ont., Blast Furnace Company has decided to install a steel plant in connection with the blast furnace at once, and employment will be given to a large number of skilled workmen. When the blast furnace was proposed, the city passed a by-law granting a bonus of \$65,000 and an additional sum of \$60,000 was to be granted if the steel works were in operation within a certain time. The latter bonus lapsed, but the company does not intend to ask any further favor from the city.

—George Waring intends going to Quebec to erect and drive into the woods a novel machine for hauling logs on the snow by steam power. The machine is made in Michigan and is to be sent by rail to a station on the I.C.R. east of Levis, where Mr. Waring will put it together and drive it about seventy-five miles to its place of operation in the forest, on the head waters of the St. John river. George Cushing of St.

John is the enterprising lumberman who is starting this new method of handling logs in the woods. The weight of the machine is upwards of twenty tons. It is said that several of these engines are operating about Winnipeg and in the western States. This new departure will be watched with interest.—St. John Sun

—It is probable that for the first time in our history the United States will this year be surpassed by Russia as a producer of petroleum. Reducing the totals to the common standard of metric tons, we produced in 1897 a total of 7,708,236 tons, while the quantity reported for Russia was 6,919,000 tons. For the first half of the present year, however, according to Russian official figures quoted by *The Chemiker Zeitung*, the output was 3,993,300 metric tons, which points to a total for the year approximating 8,000,000 tons. The output of the United States for 1898 will not differ greatly from that of 1897; if anything it will be somewhat less, so that we may expect to fall to the second place.—*The Engineering and Mining Journal*.

—A burnished finish on the journals of axles for railway carriages and locomotives has given good service, and has been used on many roads for a long time, says *The American Engineer*. The advantage of it is to smooth the surface of the journal after the finishing cut, and to shorten the period of breaking in. The burnishing is done by three rollers carried on a tool rest and bearing against the journal, considerable pressure being obtained by a screw. The rest is fed along so that the finishing cut and the burnishing are done at the same time. Mr. Atkinson, of the Canadian Pacific, uses the burnisher on piston rods, and intends to use it on valve rods, as well as on journals. He stated, at the recent Master Mechanics' Convention, that it gave the best finish that he knew of for piston rods.

—Although so recently brought to the notice of the South African public, the adoption of acetylene as an illuminant is making steady progress. It is recognized that there is a distinct field open for it in South Africa among the smaller towns, and in the suburban districts of larger towns where paraffin or candles are still the chief illuminant. At the present price of imported carbide, £32 to £36 per ton in Johannesburg, acetylene gas shows no economy over the electric light, but with the cheapening of prime cost and the lowering of freights—and we understand that the German-Australian Co. has now consented to accept it at a slight additional charge over ordinary cargo rates—a reduction in cost may be eventually effected that may lead to its competing even with the electric light. In the case of the manufacture of calcium carbide being undertaken in South Africa, the reduction in cost which would follow would enable it to successfully compete with all comers.—*South African Mining Journal*.

—The report of the James' Bay Railway commission, appointed by the city of Toronto, was handed to the City Council at its last meeting for 1898. The commission has embodied in the report not only the information obtained by the expedition sent out to examine the country along the route of the proposed line, but also deals with the question of Toronto's transportation facilities, with special reference to the proposed Collingwood Air line, the harbor improvements, the Sault Ste. Marie and James Bay Railway, and the connection at Scotia with the Parry Sound road. The conclusions arrived at by the expedition, which were conducted under W. T. Jennings and Major Villiers-Sankey, city surveyor, are as follows: That a new line from or near Toronto, Barrie, or Waubaushene north to or near Sudbury, etc., would open up a new section fully as good as that between Gravenhurst and North Bay, and that such a line would shorten the distance to Winnipeg by fully fifty miles; that a new line in the meantime from, say, Verner, northeast to Temogami Lake, would be of immediate benefit in developing that large section in its very near future; that a line from North Bay to Temogami and north to the Blanche river country, a hundred miles, would make an available outlet for the lands and forest products of these regions, including the extensive valley of the Montreal river; that a through line to James Bay should be constructed by way of the last named route; that the ultimate extension of the line from the divide to James Bay is a matter for future consideration.