

## WATER WHEELS.

Editor CANADIAN ENGINEER.

SIR,—I have a question in hydraulic engineering which you may be able to answer, or get an answer from some of your professional acquaintances. The query is, "Given a wheel 60 feet in diameter, supplied with floats having a square foot surface of 60 (20 x 3), what amount of horse power would they generate in a stream running ten miles an hour?" If you succeed in getting an answer to this, I would also be obliged if you can furnish me with the formula, in as simple a form as possible, by which proportionate results could be got. Yours very truly,

C. T. REID,

Times Printing Co., Hamilton, Ont.

[One of the best books of reference for questions regarding water wheels, etc., is "Mechanics of Engineering," by Weisbach-DuBois, published by John Wiley & Sons, New York. The theory of the wheel you describe is in a crude state, very few experiments having been made in connection with it. Prof. J. Galbraith, Toronto, to whom we submitted this question, says: "On the supposition that not less than two floats are continually immersed in the water, and that the maximum immersion is two-thirds the depth of the float-board, the following formula is considered to give the maximum horse power of the wheel:

$$\text{Horse power} = .384 \frac{A v w}{550} - \frac{v^2}{2g} \quad \text{where}$$

A = Max. immersed area of float.

v = Velocity of stream in feet per second.

w = 62.3 weight of cubic foot of water in lbs.

g = 32.16.

Such is the uncertainty of the theory, however, that it is possible that the horse power might not be more than 50 per cent. of the above."—Ed.]

## TORONTO ISLAND TUNNEL.

Editor CANADIAN ENGINEER.

In your number for March I notice you state that my proposition to run a tunnel under the western gap, "completely ignores, or at least overlooks, the necessity of deepening the present western gap, an oversight fatal to the plan." In order to explain that I made no oversight, I enclose a blue print showing the plan and profile of the proposed tunnel, by which you will perceive that eight feet is allowed for deepening the channel, and the tunnel would be lined with hard bricks set in Portland cement, to prevent any percolation of water. The depth of water on the south side of the channel is twelve feet, instead of nine as stated in your article, and I may mention here, Capt. Eads' channel only contemplated eighteen feet of water. The shallow water where a vessel drawing nine feet touched the bottom, not rock, but sand, is outside the channel, which will soon be dredged to fourteen feet, according to a contract with McNamee & Simpson recently entered into by the commissioners. The commissioners will never consent to permit the construction of a bridge, with a centre pier, across the channel, and before a tunnel could be constructed a survey and levels should be prepared, and close estimates made of the cost and lapd damages, as provided in the City Bill as amended by the Private Bills Committee of the Legislature. Yours truly,

Toronto, April 2nd, 1897.

KIVAS TULLY.

Engineer, Toronto Harbor Commissioners.

[Unfortunately the blue print, referred to by Mr. Tully, was received too late for reproduction.—Ed.]

## FIRES OF THE MONTH.

March 7th.—L. E. Parsons' saw mill and several piles of lumber at Gold n Lake, Ont. Loss, \$4,000; insured for \$600.—March 10th.—The fire alarm system of Toronto was burned out by a live wire crossing the alarm wires. The damage was about \$1,000.—March 13th.—S. L. Elkin's cheese factory, Mansonville, Que. Fire supposed to be of incendiary origin.—March 14th.—B. B. Barnhill's portable saw mill, Two Rivers, N.S. Loss, \$3,000; not insured.—March 18th.—Wm. McLachlan's saw mill, Magnetawan, Ont. Loss, \$2,000; will be rebuilt at once.—March 19th.—Alex. MacKay & Co., plumbers, 62 Victoria Square, Montreal, damages amounting to \$3,000.—March 25th.—The J. B. Armstrong Manufacturing Co., Guelph, Ont., damaged to the extent of \$300.—March 28th.—The Waterloo, Ont., Manufacturing Co.; agricultural implements, damaged to the extent of \$3,000; fully insured.

## METAL IMPORTS FROM GREAT BRITAIN.

The following are the values in sterling money of the imports of interest to the metal trades from Great Britain to Canada during Feb., 1896, and two months to Feb., 1896-1897:

	Month of February, 1896.	1897.	Two months to Feb., 1896.	1897.
Hardware and cutlery ....	£4,322	£2,298	£10,094	£7,063
Pig iron.....	1,260	55	3,033	435
Bar, etc.....	791	965	2,422	2,201
Railroad .....	852	552	852	552
Hoops, sheets, etc.....	631	1,771	2,372	3,611
Galvanized sheets .....	2,942	2,572	4,021	3,226
Tin plates .....	11 860	15,893	22,969	38,401
Cast, wrought, etc., iron ..	2,601	3,068	5,924	4,752
Old (for re-manufacture) ..	....	285	....	476
Steel .....	5,777	2,347	12,085	4,933
Lead .....	1,122	760	2,168	1,279
Tin, unwrought .....	936	1,451	2,087	4,497

## LITERARY NOTES.

Lucien Serrailier has compiled, and Whittaker & Co., London, Eng., will shortly publish, a "Technical Railway Vocabulary," giving over 5,000 French, English and American technical terms used in railway management, construction and working. The book is destined for the use of engineers, railway men, contractors, company directors, financiers, lawyers, patent agents and inventors.

The report for 1896-7 on the Archaeology of Ontario has been issued as an appendix to the report of the Minister of Education, and makes a pamphlet of 117 pages. It is prepared by David Boyle, the able curator of the archaeological collection now stored at the Canadian Institute, Toronto. The report records the collection of a large number of pre-historic relics within the province, and the patient industry with which Mr. Boyle is gathering and arranging the monuments of the hitherto unknown past of Ontario is meeting its reward. Already his enthusiastic labors have placed the province in possession of the most valuable collection of Indian remains in Canada.

Messrs. Murray & Williams, of Montreal, have just issued their catalogue and price list for the coming yachting season. It is nicely got up and contains illustrations of pleasure yachts, engines, boilers and fittings, with sufficient description. Added to this is a price list for complete sailing and steam yachts of various capacities, and for tugs, second-hand engines, etc. In the Feb. No. of the ENGINEER we gave some account of the Tregurtha water-tube boiler, and the catalogue under notice supplements that with some pertinent information. This catalogue should be consulted by all who need improvements in last season's yachts or are contemplating the purchase of new ones.

"Gas, Gasoline and Oil Vapor Engines," by Gardner D. Hiscox, M.E., is a book designed for the general information of every one interested in this new and popular motive power, and its adaptation to the increasing demand for a cheap and easily managed motor requiring no licensed engineer. The book treats of the theory and practice of gas, gasoline and oil engines, as designed and manufactured in the United States. It also contains chapters on horseless vehicles, electric lighting, marine propulsion, etc. Illustrated with 220 handsome engravings. Octavo, 350 pages. Price, \$2.50. Norman W. Henley & Co., are the publishers, and orders may be placed through THE CANADIAN ENGINEER.

What will beyond doubt be a most valuable publication to every one interested in the British Columbia mines has just made its appearance. We refer to the "B. C. Directory of Mines," whose first number reached us this month. It is a quarterly, but already it is proposed to issue it monthly. It contains a synopsis of the B.C. mining laws (a) as applicable to placer mining, (b) as applicable to lode mining. The facts and figures are given under each of the following heads: Provincial Government, Mining Recorders, Gold Commissioners, Provincial Government Agencies, Banks and Bankers, Money Order Offices, Express Companies, Assayers in B.C., Mining Associations, Mining Centres, Railways and Steamers, Stage Distances, Hotels, Fruit, Game, Fish in B.C., Telegraph Offices, Post Offices, Incorporated Mining Companies, B.C. Mining Stock Quotations, Directory of Mines. "The B. C. Directory of Mines," edited by Alex. Beg, Victoria, B.C. \$2 per annum.

We have received a very neat and attractive catalogue from Sadler & Haworth, long known under the style of Robin & Sadler, and Robin, Sadler & Haworth, belting manufacturers, of Montreal and Toronto. The personnel of the firm is precisely the same as heretofore, Mr. Sadler residing in Montreal and Mr. Haworth in Toronto. A glance at their catalogue informs us that they have begun manufacturing a high grade of belting for a class of customers who want something more than the ordinary good stock and