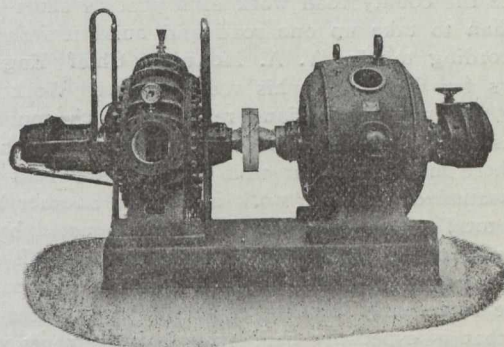


## AN EFFICIENT HYDRAULIC PUMP.

The accompanying photograph shows a view of the "Victoria" hydraulicking pump. It is one of these pumps which was supplied to the Nipissing Mining Company. The pump, as shown, delivers 4,000 gallons per minute against a head of 415 feet, and has a speed of 1,180 revolutions per minute.

Details of the test made of this pump under actual working conditions will be found on the table accompanying this article, from which it will be seen that the efficiency in normal working reached 84 per cent. Boving & Company, Limited, who are the designers and manufacturers of this pump, and who are represented in Canada by Canadian Boving Company, inform us that similar pumps of various sizes have been sent to different parts of the world. It is interesting to note that the "Victoria" pump has the impeller automatically balanced, which obviates the necessity of a high-pressure stuffing box. One of these pumps installed at the Goss Moor tin mines has effected a great saving over the pumping methods previously used. The results obtained at Goss Moor are shown herewith and speak for themselves.

The Victoria pump has been designed especially to overcome the difficulties experienced where water containing a large amount of mud and grit would cause heavy wear and tear. That it has done this effectively may best be seen from the results obtained in actual practice.



Some test results as obtained in the Goss Moor pump after it had been running for some time are given herewith. The engine is of the compound type, 11 in. x 19 in. cylinder diameter, 2 ft. 6 in. stroke, built by Messrs. Marshall.

Official Test Figures of Victoria Pump Supplied to the Nipissing Company.

No. of test	Pressure of pump	Vacuum	Total head	Speed R.P.M.	Water rise	Time for rise	Imp. galls. per min.	U.S. galls. per min.	Pump H.P.	Volts	Amps.	Kilo-watts	Elec. H.P.	Overall efficiency
1	174	12"	416.1	1,183	8.45'	126.5 sec.	3,850	4,620	485	2,155	149½	500	670	72.4
2	174	12"	416.1	1,183	8.45'	127.5 sec.	3,820	4,580	481	2,150	150	500	670	72.1
3	171	12"	408.44	1,179	8.40'	121.8 sec.	3,970	4,765	492	2,145	153	500	670	73.4
4	171	12"	408.44	1,175	8.25'	121.8 sec.	3,910	4,690	485	2,160	150	500	670	72.4
5	171	12"	408.44	1,175	9.1'	132.8 sec.	3,950	4,740	490	2,140	151	500	670	73.1
6	172	12"	410.75	1,184	9.0'	130.4 sec.	3,970	4,765	494	2,168	152.5	500	670	73.7
7	170	12"	406.6	1,181	7.6'	107 sec.	4,080	4,896	501	2,150	142	500	670	74.8
Average: 73.1														

Speed of pump	Pressure in lbs. per sq. in.	Vacuum at pump inlet	Vertical distance	Total head in feet	Quantity discharged, gal. per min.	Engine speed	Indicated H.P.: Pressure		Water H.P. I.H.P.	Approximate efficiency of Victoria pump
							high	low		
628	47	3"	5'	116.4	3,460	116	111	52.5	74.5	85%
628	—	—	—	116.4	3,460	116	—	—	74.5	
628	—	—	—	116.4	3,460	115	—	—	74.5	
630	47.2	—	—	46.9	3,460	116	—	—	75	

The pressure readings were taken with test gauge on the top of the horizontal discharge of the pump. The pressure was very unsteady, the pointer vibrating about 5 lbs. The average is entered in the above table.

The vacuum readings were taken on the top of the horizontal suction pipe. The vacuum fluctuated about ½ inch to 1 inch during all tests.

The water was measured in a circular tank of 14 feet inside diameter, and the discharge from the end of the pipe was diverted into the tank by means of a "bucket" mounted on a truck. The truck was running on rails and the flow could thus be diverted very quickly. The results obtained on the amount of water discharged are very accurate, as there was no leakage or waste of water whatever. The time of diverting the water into the tank was measured by a stop watch.

The volt and ammeter readings were taken by the switchboard instruments, the kilowatt was taken by means of a standard instrument mounted on the switchboard. The total consumption during two hours continuous running was 1,000 kw. hours, corresponding to an average consumption of 500 kw.

At the National Physical Laboratory in England, there is a recently constructed road machine, which is the first of its kind in any country. It is a building containing a circular track on which experimental lengths of road can be readily laid down and tested to destruction by the passage over them of wheels driven by motors which are guided in the circular track by a revolving framework.

The machine is now at work. The track has been filled with four lengths of water-bound macadam made up in four different ways and the behavior of these lengths will be compared and each of them tested until it is broken up. The designers hope that by means of this machine they will be able to arrive rapidly at conclusions which otherwise would

take years to reach on the actual roads themselves. The roadway is under cover and protected from weather influences, thus eliminating weather conditions entirely. It will be possible to introduce certain weather conditions one at a time and to study their individual effect.

For instance, the track can be heated by hot air blown upon it; rain can be imitated by spraying devices; it can be artificially cooled to the freezing point. The wheels used can be either standard wheels with plain steel tires carrying a fixed weight of one ton each; the diameter and widths of these wheels can be varied; solid rubber tires or pneumatic tires, plain corrugated or studded, can be substituted in turn and the effects of each on a road surface noted.