water power in the older districts, on the Saguenay, or those between Montreal and Quebec, and upon the Ottawa, nor to the more recent and extensive pulp and paper establishments—it being the object of this paper to draw attention to the continuity and broad distribution of water power across the continent, on Canadian territory, and to the unnumbered natural reservoirs of water at elevations which impart to them latent powers for the future development of this country. British Columbia has not been included in this field, because its occupied portion is separated by our great prairie region from the lake system of Eastern Canada, which system is deflected toward the North-West at the Lake of the Woods. This province is by no means deficient in water power, although it has been little used as yet where mines are on high levels, and because steam could be more readily applied. On the other hand, it is the only province in which hydraulic mining is in operation; and where gold is found in quantity sufficient to warrant the great outlay of capital necessary in connection with that system. In the Kootenay, water wheels, with or without electrical transmission, are necessary for water power, in order to mine, pump, and crush the gold-bearing rocks; but in the Cariboo district, water power is applied in the simplest form, without wheels or wires, by direct pressure from a nozzle, as is done in Ottawa from a fire hydrant. While the mountains south of the Canadian Pacific Railway are rich in metallic veins, the region north of this railway, extending into the Arctic Circle, appears to be a veritable land of Havilah, a continuous "Placer" gold field, in which much of the precious metal is to be obtained by hydraulic mining, wherever that is practicable.

This gold field, over a thousand miles in extent between the Fraser and Yukon rivers, and of unascertained width, has been exploited at Cariboo, (from whence fifty million dollars has been taken), at Cassiar and Omenica, and recently at Atlin, all in British Columbia—as well as in the far-famed Klondyke, in the Yukon district, said to be the richest gold field in the world. Water, in whatever way it is used, is necessary to the recovery of this gold, but in many places water power alone will profitably unearth it from its hidden recesses. This is collected in quantity from lakes, and reservoirs on the high levels, and carried for miles by ditches, aqueducts and flumes, to the banks of a primeval, deserted river channel, at the bottom of which, under forest-covered clay banks, lies the auriferous gravel studded with boulders and resting on the bed rock. Under a head of about 300 feet "six-inch rapid fire," hydraulic guns are pointed against the bank, breaking down the earth, uprooting trees, scattering boulders and washing out the gold—which remains in the traps set for it in the bottom of the sluices after all else has been carried off by the power of the water. These "machine guns," called "giants" and "monitors," are models of simplicity as well as of ingenuity and efficiency. While working they are great consumers of water—and can only be used when the ground is unfrozen, but this season is generally sufficient to use up all the water which can be collected at the necessary elevation. It requires at least two men to hold and direct the force of the issuing stream from an Ottawa fire hydrant, but a boy can direct the movement of a stream, twenty times greater in quantity and fifty per cent. stronger in pressure, as it rushes forth from the nozzle of one of these "giants"—which is fixed to a loaded platform, and moved forward as the bank in front of it melts away. A thin, short tube, of larger diameter, projects beyond the nozzle to which it is fixed by trunnions, so that the tube can be moved independently, both horizontally and vertically, to touch the issuing stream, which immediately recoils from the obstruction moving the "giant's" nozzle in the opposite direction. Thus a boy "behind the gun" can control its movement and compel the "giant" to fall back upon his own resources for motive power.

It is impossible to give anything but an approximate estimate either of quantity or value of the available water power over so vast an area, becuse the first would involve the survey of every power site; and, as to the second, the value begins when the power is wanted. All which now can be done is to state the conditions and endeavor to estimate the quantity, hypothetically. What is needed for an estimate is the quantity of water and the amount of fall which can be relied upon at the site for each power. To get the first, a measurement of the minimum flow at each point would be necessary in low water years, and for the second, some local knowledge as to river levels, back water, etc. In the absence of such surveys we must fall back upon the average rainfall of the whole region as far as that can be procured for any time, and assume the proportion of this precipitation (of rain and snow), which, after deductions for evaporation, the demands of vegetation, or infiltration, would reach the wheels. An allowance must also be made for that portion of the rainfall which may be carried off in floods. The area over which this precipitation would be in reach for water power purposes would embrace all the main land of Canada south of the St. Lawrence as well as all north of it in the St. Lawrence valley, and so much of the Hudson Bay watershed as can be utilized, or imported by transmission. As regards the power of the water thus estimated, we must embark in a much more speculative estimate as to the average fall which should be assigned to it for the whole region. We have in the undeveloped districts some scattered meteorological observations to assist us in estimating probable rainfall, and we have also a few barometrical observations giving the height above sea level of summit waters. On lower levels we have more numerous rain gauges, and summit levels ascertained by railway surveys.

For the whole river the total fall may be less than 100 feet, as in the case of the French river, which has Lake Nipissing for a mill pond, or rise to 1,500 feet or more as at the rivers below Anticosti. In the case of the French river (which is the lower part of a longer stream), we have surveys, and know that its whole fall can be utilized, as would be done if it is made navigable by locks and dams. In the others (where no surveys have been made), some will be more or less like French river, while at others only a portion of the total fall upon them may be profitably utilized. The most valuable will be those which, like Montmorency, bring all their water with sufficient head to the point where it is worth most. The upper sections of the rivers will be the least valuable, as having less water and being more remote until reached by a new railway, or a