

THE WATERSHED OF EASTERN ONTARIO.

The following is from Mr. R. W. Phippe's annual forestry report, published by the Ontario Government:—

There is no part of the science of forestry more beneficial than that which teaches to keep covered with forests the principal heights of land. These, especially those which are termed watersheds, when covered with extensive woods, from reservoirs which supply the sources of numerous rivers, give moisture to the numerous small lakes and watercourses which intersperse the slopes below them, and preserve throughout the whole country a fertility, invariably much impaired when the forests above are destroyed.

The chief watershed in Ontario extends in the shape of a crescent, the centre trending to the north, the ends touching respectively, near Kingston and Lake Nipissing. From and through this, many watercourses run to the east towards the Ottawa, and many more in a westward direction towards Lake Ontario. On this elevated section of country, therefore, the forest should, above all other places in Ontario, be preserved.

It happens luckily for this purpose that much of this territory is of an inferior character, not adapted for agricultural purposes, while it contains much valuable pine and other timber which it would be extremely desirable to preserve, both that this height of land may remain wooded, and to answer as a reserve of timber.

In order to examine this matter thoroughly by personal observation, I have, this summer, travelled from Ottawa to Lake Nipissing, and from thence back to Kingston, thus passing around and through much of the district in question, observing what progress had been made therein, and obtaining from lumbermen engaged in its forests, opinions as to the best method of preserving them.

A few words may well be said here concerning Ottawa. To this point logs are floated from most of eastern Ontario, and from all that portion of Quebec which the Ottawa drains. Here, every day, all summer through, comes the stream of timber floating down the turbid current, after its journey of hundreds of miles down the Ottawa—the "Utawa's tide" immortalized by Moore—passing by many a dense forest and many a fire-wasted shore, or, before that, down the dark and winding Mattawan, the Petowawa, home of many a rapid, the far stretching Coulonge, or even, now that steam has overcome the obstacle of the intervening neck of land, from distant Nipissing and many streams that terminate therein. There are numerous mills in the back country, and what they cut passes on by rail. But the great mass comes in log and is sawn up at Ottawa—that city of two great industries—the home of legislation and of saw mills.

Where Ottawa stand, the river pours its dark waters over a ridge of rock which, at that point crosses the country. The ridge does not span the river in a straight line. Its centre is bitten out by the tooth of time, and into this central gap the river, flowing till then broad and level above, pours all its waters suddenly from three sides at once. The result is marvellously beautiful—the whole immense acre broad cauldron boils in milk white mountains of half water, half vapor. This is the Chaudiere—the boiling pot. This vast mass of falling water is turned to the uses of science—clusters of great saw mills occupy all along its edge, using everywhere the overplus of the stream, and are even built out over one side of the cauldron itself. Here they are ever at work, their great chains drawing up a constant succession of logs from the river; you see a dozen soaking monsters at once on the floor opposite, each being carried hither and thither to the great saws that evermore go up and down—a log passes you, losing two outside slabs as it goes, it comes back through a gang of saws that cut it into twelve boards, it passes away on wheels; it is succeeded by others and again by others—a treadle line of timber day and night is passing in as logs and out as lumber. Down the river perpetually come logs by the thousand, divided off above the mills by booms, each coming to the mill of its owner, directed upon the toothed

chain by the pike pole, and drawn by it to the saws. Here, too, continually small portions of rafts—a score of pine logs with, it may be, four heavy beams pinned above—each with its crew and their little wooden shelter from the rain, pass down through long narrow artificial waterways planned to round the cataract, by gentle successive falls, to be united in a larger raft below. All the scene—the numerous mills, the centres of enormous piles of bright now boards—the ever coming and going lumber—the rattle of the different machines from all quarters, the all-pervading sound of a hundred great saws forcing their way through wet pine wood—the crowding thousands of men, horses, and carts everywhere, swarming in the mills or maneuvering in the roadways around, give a picture not to be surpassed except, perhaps, by itself at night, when the electric lights color with silver all the scene, and show in vivid glow the dark waters of the Ottawa, and the freight of logs ever pouring towards the open jaws of the mills. You might imagine the workers the swarm of demoniac Genii forced to build, on pain of Eblis, Aladdin's palace in a night.

A great part of the city of Ottawa is a city without residents—a city of lumber. Here are piles of lumber—square piles—quadruple piles, diagonal piles, built tier on tier high in the air above—lumber for all intents and purposes—acres of inch boards—mountains unending of joists, beams, sheeting—every sort and kind of lumber which our forests give; streets of lumber, blocks of lumber—miles on miles of lumber—and when past it, it is lumber still, for here are numerous large houses crammed from earth to rafters with short lengths for pails, for boxes, for purposes beyond count. Fast as the great mills build the city up, so fast great railway trains and multitudes of immense barges pull it down and carry it away. The air is redolent with the smell of lumber; you breathe pine and resin at every step. From here again this great mass of wood, coming but by one channel, leaves by many, and spreads itself by a hundred railways over all the Northern States, and by river to Quebec, to England, and to the Continent.

At Ottawa, the headquarters of many leading lumbermen, some valuable opinions were obtained from Messrs. Pattee, Bronson, W. Mackay, J. Gordon, and others well acquainted with the Ottawa woods.

Leaving Ottawa, there is nothing to chronicle in the interests of forestry until Pembroke is reached, where many gentlemen experienced in lumbering and forest operations are seen and their views obtained.

After Pembroke, the next stopping place is Bisett's Creek, where.—

Mr. McCormack, the manager of Young's estate, attends to extensive lumbering operations, and proposes to take me to the nearest scene of action, twelve miles over the hills, which here are seen in all their autumn beauty. A lumber wagon is equipped by filling its box with clover hay. Mr. C. sits in the rear, I and the driver in the high spring seat in front. "Get along," he cries. The whip is cracked, two sturdy horses are doing their best, and we are rolling, jostling and tumbling over the roughest road in the universe—up great ranges of hills, down them, over rough corduroy logways in the gullies, over rocks on the level, over great stones everywhere. The wagon rattles down a hill, and rushes across a hundred boulders—you are thrown violently against your companion—you are thrown to the other side—you fly a foot upward by the action of the springs you fall a foot downward by the action of gravity. Holding to the seat till your arms are numb, you ask what is to be the length of the journey. "Four hours," replies the imperturbable Mr. C. from the rear. Rattle! smash! bang! You wonder what four hours in purgatory are like—or whether the German stone roller trough of torture was worse than this; and at last, seeing your companions not at all affected, you begin to get used to it. The prospect from the wagon is but one of many—it is a *brule*. Sixteen and fourteen years ago—one great fire meeting the dead edge of the other—a tract here seventy miles by ten or fifteen, almost without exception a forest of noble pines, was burned into desolation. Pine went there which would have brought many millions now—a

forest was destroyed which, continuing a forest, would have brought large sums yearly. Far as the eye can see, closely standing, are the dead trunks of great pines, below them a youthful forest of poplar bright with yellow, and birch still in its greener hue—below again a dense dark red carpet of ferns—of blue berry—of wild peppermint. From noon till night we toil along through a scene of such wilderness where the partridges are

"So unacquainted with man." that they walk like barn door fowls beside the wagon. At last a ruddy glow, not from door or window, but from the roof of a large, low log house, and half a dozen "Bon jours" from choppers lounging outside, show that we have reached the shanty.

"It is a lodge of ample size
Though strange of structure and device
Of such materials as around
The woodman's hand had readiest found.
Lopped of their boughs—their huge trunks bared
And by the hatchet rudely squared
To give the walls their destined height—
The sturdy oak and ash unite."

But not exactly so—all here is pine. The shanty is forty feet by thirty inside, a great square opening in the roof lets out the smoke from a fire in the middle of the floor below—earthen there—pine all around. Rows of bunks, two stories high, formed of logs and slabs and filled with hemlock boughs of pleasant odour, covered with thick grey blankets, form the beds. A line of flattened logs form benches around the room. The ubiquitous cook is balancing on an immense crane vast pots over the fire, and soon all are busy with tin pans of bread, pork, beans and strong tea. It is an interesting and animated scene—the great bright fire lighting up the sturdy forms and bronzed visages around—the sober dress of Ontario—the bright colors and gay sashes of Quebec—the chatter in French and English—the pipes inevitable and numerous after supper, adding to the smoke clouds "rolling dun" through the roof, while a fiddler, always found in such an assemblage, plies his cheerful instrument for hours. At last, however, drowsiness prevails, and every axeman finds his bunk, pulls his blanket over him, and a chorus of snoring fills the air.

Next morning we view the forest. It is a vast pine limit, extending—here dense with far-stretching succession of multitudinous pines, there lightening with a grove of maple or of birch, here again opening into a beaver meadow, its rank grass an island of herbage in the forest sea—for many miles, from the near Bissett to the far Petowawa. The foreman, Mr. Hall, accompanies us to the places where trees have been lately cut down for saw logs, great piles of which are already placed on roll-ways ready to be taken by the winter sleighs to the river, here four miles off. All around are spread in confusion the *débris*—numerous balsams cut to clear the way, piled in heaps around or scattered, "Anywhere, anywhere out of the road," rejected butts of logs, great tops of trees, a ready fire road indeed should sparks in summer drought light on their inflammable surface.

"Yes," said Mr. Hall, "no doubt they are dangerous. There would be but one way, if we were to clean up after ourselves—that is to carry them all into piles in as open spaces as possible, leave them till next year, and burn them then; they would not burn well when fresh. I do not know what it would cost; that would be found by experiment—but no doubt it would leave the forest in a less dangerous condition."

Everywhere here, the whole week long, resounds the crash of falling pines. Two athletic young fellows, clad in the strong homospun of the settlements, if they are lucky enough to have those who will weave it, if not in the less durable store goods, yellow leather moccasins, bright sashes around their waists, the great rolling muscles standing out and working visibly on arm, back and shoulder, stationed at the foot of a tree, swing with easy grace their long handled axes against the trunk, great chips flying right and left like hail. The tall tree totters at its base, and falls, the sound reverberating for miles. The choppers climb on the log, trim the branches as far as they need; one, two, three or more lengths are cut from the trunk, and it lies till the horses and sledges can draw it to the river.

All through this great extent of pine and lesser hardwood—in densely wooded slope or opening of lake and beaver meadow—valley dark and deep as that of Hinnom, where the great pine tops, broad and green, scarce reach the level—mountain tops where they wave dark defiance to the elements—everywhere lie the trains of great chips—the abandoned tree top—the smaller trees cut to clear the way, now obstructing it—all around. It has been lumbered over for years, and with care might be forever. "No fires just here of late," says the foreman, "but there have been many in the country."

After our journey back to the depot, from a high plateau, we observe one of the many magnificent views obtainable here. For thirty miles you look down the great valley of the Ottawa—the distance closed by high mountain ranges—the sides bounded by them twenty miles apart. Along the valley, broad, tranquil, its gently moving waves shimmering at hand—placid in the far distance—the great Ottawa rolls its sinuous length. Half way along, rounding it way beside a large island, which, covered with undulating poplar, bars its course, the Bissett joins the greater stream. Here lies before you at this season an amphitheatre so immense, of colors so varied and gorgeous, as scarcely eye has seen elsewhere. All these circling mountain sides are clothed in the richest colours. Here the waving poplar covers them with the brightest yellow, there, where only undergrowth flourished they are dark red brown; farther again a forest of young pines, gleaming bright green in the sun, ascends from river to summit, and everywhere interspersing, wearing the gayest hue of all, are great stretches of soft maple, crimsoning all the landscape, and adding greater beauty to what, even without it, were most beautiful. But to view it in perfection, you must approach it in early morning, when the dense mist, rising from the low grounds render all else invisible. Presently this will rise, gather itself in great billowy columns across the sky, move in rolling masses to the far distance, and out of sight. Then the curtain of nature has risen, the vast panorama is spread out before you, mountain and valley, forest and herbage glistening with dew; bright with the morning sun, and the great river below all, an immense serpent of molten silver, winding his devious way to the distant sea.

The next stopping place is Mattawa; where further statements from Crown Land Agents, storekeepers, settlers, etc., are had.

(To be Continued.)

GAS ENGINES AS MOTORS FOR WOOD MACHINERY.

Gas engines, even in the eyes of those who are favorably disposed towards, or interested in, steam engines, have certain advantages, which, in common fairness, must be admitted. As applied to a saw mill they can be placed in a cellar or upper room. They require but little space, and are altogether unassociated with steam boilers, mill chimneys, and smoke nuisance. They save the site and cost of the boiler and chimney, the coal and the site of the coal store, the wear and tear of the boiler, boiler insurance, and a great slice of fire insurance. They save the cost of a stoker and nearly all the water charge, the fuel and time in getting up steam every morning, and the fuel consumed during meal times, and they save the consumption of fuel when the engine is not at work.

In making the statement it may appear strange, but it is nevertheless one of the principal advantages of the gas engine, that when out of work it is not consuming fuel of any kind. With an owner of machinery who can guarantee regular and constant motion this is no consideration, but with an owner who has only occasional use for his machinery it is a consideration of the first order.

Sir Frederick J. Bramwell, speaking of the gas engine, says:—

"In 1866 the 'Hugon' gas engine consumed 7½ cubic feet of gas per indicated horse-power, a consumption that has been brought down to 20 to 23 cubic feet. With the low price of gas commonly prevalent in England, this con-