

pump house. During heavy rains, which may occur three or four times per year, the river may rise to 61 or even 62, which will not affect the operation of the works.

When the ice breaks up in the early spring the water may rise to 69, as it did in February, 1918, the highest on record. In 1917 the highest elevation was 65. The water stood above the elevation of the basement of the pump house for about a month in 1918, and for four or five days was above the floor of the filters.

The discharge of untreated or partially treated sewage into the river during floods cannot be objected to.

Embankments have been constructed around the pump house and humus tanks, also around the sludge beds, to protect them from floating ice and debris.

One attendant is employed to supervise and operate the works, and to keep proper records of sewage flow, temperatures, river conditions, sludge removals, etc.

The progress made on construction by the contractor was not considered satisfactory, and in October, 1917, he abandoned the works, and they were completed by day labor by the engineers.

The outstanding features of these works are:—

- (1) The sedimentation tanks are provided with movable covers.
- (2) The sludge from tanks is discharged by gravity to the drying beds.
- (3) Percolating filters are enclosed, the roof being of concrete.
- (4) Sprayers in sections, permitting repairs and renewals without interrupting the operation of the plant.
- (5) All parts of works provided with ways and means for operating, cleaning and controlling.

## ROADS IN COLEMAN TOWNSHIP\*

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COLEMAN Township is very irregular in outline, sitting, as it were, astride the North angle of the Gillies' Timber Berth, which juts up into it from the South. While not mountainous, it is very rough and irregular in contour, and contains several lakes and many high, rugged hills with very steep sides. Further, it is almost devoid of earthy overburden suitable for road material, especially in the main mining section, which makes the location and construction of roads a very interesting problem, offering a continuous variety and repetition of difficulties.

Work on the roads of Coleman Township was commenced in 1907 under the township foreman, and so continued through that and the following season. Commencing with the season of 1909, however, it was soon recognized by council that their system was entirely too inefficient, and the writer was retained to supervise the work, arranging to supply all necessary assistants and taking entire charge on a percentage basis.

### Locations Were Fixed

Finding about 100 men on the payroll working on definite locations into properties in urgent need of immediate transportation facilities, little change could be made during the first few months in either location or methods of construction. Much of the location of that and the previous two seasons had to be revised when heavier construction was undertaken later on.

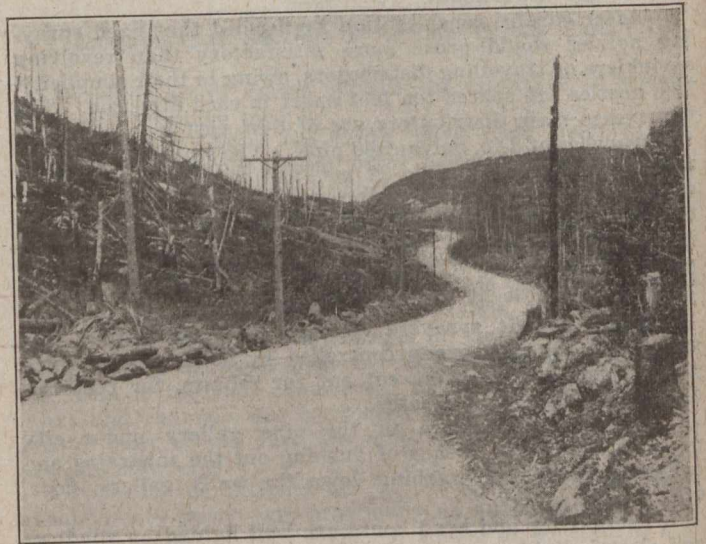
During the latter portion of the first season, however, any new roads opened were on fairly well examined locations. Strong recommendations were made for the purchase of a regular road-construction plant. This was refused at first, but ordered by council in the spring of 1910, and from then the real road history of Coleman Township begins.

\*Read February 19th, 1919, at the annual meeting of the Association of Ontario Land Surveyors.

There are no road allowances along original survey lines, but 5 per cent. of all the land is reserved for roads, which may be located where desired except in very special cases. Theory was not allowed to limit grades or restrict curves. The only limitations on location were the termini. Between the mine or prospect at one end, and the railway or some other section of constructed road at the other end, the new road or trail wound and sloped, seeking always to get through (with the funds available) to the objective, but having always in view the possibility of further development and ever seeking to find the best location.

### Haste and Erratic Development

That the best location was not always obtained is admitted, and can be laid largely to the fact that much of the general location was made, and considerable sums expended thereon, prior to the employment of an engineer; partly to the great difficulty of examining in detail so rough a country, covered largely by timber; and partly to the haste required and the more or less erratic development of the camp.



MACADAM BUILT IN 1910 IN COLEMAN TOWNSHIP  
(PHOTO 1910)

A grant for a certain section made in April might be cancelled in August because of the cessation of work at the particular mine to be served, and the funds diverted to some entirely new prospect which had developed in the meantime and was pressing urgently for a road.

To reiterate,—location, alignment and grade were fixed solely by the termini and the natural obstructions. Some grades in the first instance were as high as 15 per cent., or even 20 per cent., and there were curves that a wagon would just turn. But the first trail opened was always such that teams could get through with fair loads, and was the best to be had for the money immediately available, having due consideration for future development. We never exhausted a grant and built a road only part way. The grant was always expended over the entire section, leaving future grants to be spent likewise, and so developing the location generally, and, as far as possible, uniformly.

### Relocations and Improvements

After a year or so, when the whole road had been improved to a fair standard earth road, and before any macadamizing was attempted, a special grant might be set aside to relocate or otherwise improve a particularly steep or difficult section. No road was given a macadam surface until the sharper curves and steep grades of the first location were thoroughly revised. While the finished roads are quite winding, there are only two hills with grades over 6%.

From the foregoing you will see that the first point in the determination of a new location was generally the de-

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