

traffic, we propose now to look into the sources of Revenue.

The transportation of lumber is one of the chief sources, while the cattle, butter and pork, and the passengers formerly make up the rest. Now, however, we have to notice a new source of income as mentioned in the report as follows:—"Iron ore which appears for the first time in the report is destined to form one of the chief sources of revenue." This iron ore is brought from the neighbourhood of Perth and from Arnprior, the largest quantity coming from Arnprior. It consists of Red Haematite of good quality and will doubtless be a source of wealth to the present proprietors.

We wish now to notice the operating expenses. Last year the operating expenses were \$28,974.63. For the first 6 months of this year they are \$38,960.06.

This increase in the operating expenses is due to the fact of a purchase of large quantities of fuel—there remaining at present on hand 5,294—\$6,392.23, and to some other small amounts, which by reference to the report will more fully appear.

We also wish to call the attention of those interested to the small amount of renewals:—

Bridge at Smith's Falls.....	\$ 1,768.57
Bridge covering at Arnprior.....	198.92
Ties.....	5,170.01
Re-organization.....	3,610.83
	\$10,748.33
Renewals last year.....	38,375.28

If for the balance of the year only, as much more for the renewals is calculated, the whole expenses this year would amount to nearly \$18,000 less than last year.

It is proposed by the Manager to build a new Iron Girder Bridge at Carleton Place, as one of this year's renewals, and a turntable at Perth, which, it is expected, will be all the renewals that will be necessary. Why these "repairs" should be called "renewals," and charged in a separate account we are not aware, unless it be to make "operating expenses" smaller.

We also notice this statement:—"Operating expenses 53 1-10 per cent, for this half year, against 54 7-10 last year, the difference being 1 6-10 in favor of this year's operations." We do not understand this statement, or rather we think there may be a little inconsistency, inasmuch as Mr. C. F. Fraser, who acted as Secretary-Treasurer to the Company last year, stated in a letter to the Board of Directors as follows:—"The gross receipts in cash for the year 1887 were \$146,209.39. The per centage for operating expenses has been in the proportion of 48 11 per cent. of such gross receipts." Mr. Abbott in his report says they were in the proportion of 54 7-10. We think this arises from the renewals not being taken into consideration last year.

Cash on hand last of July is \$24,479.02. Number of miles run to one cord of wood in 1887, 44.49; in 1888, 45.45.

Speaking of renewals and operating expenses, the report says:—

"It will be borne in mind also that the cost of all renewals of wheels, &c., to cars or engines were last year charged as "renewals," while this year they are included in operating expenses, thereby causing the article of wages and materials to cars and engines to appear larger in this than in last year's statement. This also accounts for the increase in the cost of locomotive power per mile run."

We have heard of no complaints except, perhaps, the rate of freight for iron ore, and so far as the employees are concerned all are highly pleased.

THE PETROLEUM DEPOSITS OF ONTARIO.

At the meeting of the American Association for the Advancement of Science, held at Chicago, several scientific papers were read, among others one by Professor Hunt, which elicited some interesting discussion.

Professor Hunt read a paper "On the Upper Silurian and Devonian rocks of Ontario." He observed that the paleozoic rocks of the Southwest Ontario region are covered by a thick layer of clay, which has rendered examinations of them extremely difficult, but more recently borings for petroleum have greatly modified or entirely removed these obstacles. The stratification of the rocks was noticed at length. The Genesee black slate, the Hamilton group, the sandstone formations were specifically noticed. The distribution of the gray Hamilton shales and black shales has been pretty clearly determined by the borings. The entire thickness of the Portage group is 224 feet. The Hamilton group attains a thickness of 1,000 feet in some places. The calcareous formations are from 300 to 400 feet thick. The Lower Devonian or corniferous limestone is from 60 to 275 feet in thickness, increasing towards the west. In the northwest the thickness is greatest. Here a boring of 700 or 800 feet was made before reaching soft marl; below was a layer of rock salt 40 feet thick. This salt formation, measures nearly 1,000 feet in New York and on Lake Huron. Gypsum is also found in the lower soil. This shows a condition of very slight precipitation of moisture and of very great evaporation at that time. The petroleum was thought to originate in the Lower Devonian limestones. An oil well in Inniskillen was sunk to a depth of 776 feet. Other very deep wells were mentioned to confirm the theory of the origin of the oil. Similar wells occur in the corniferous limestones in Kentucky. Oil is also found in the lower Silurian. The borings show geological horizons far below the bottom of the lakes, and that the southwest portions of Lake Erie and Lake St. Clair have been excavated from the quartz formations.

In the discussion that followed Professor Newberry remarked that the present bed of Lake Erie did not well represent the ancient basin either in extent or depth. The lake was once only a river, and rivers now running into it from the south have their beds 100 feet above their ancient ones. The rock formations along the river valleys show the undisturbed geological order. He has a different theory from that of Professor Hunt concerning the genesis of petroleum. If it originated in rocks then we can extract it from them. The Hamilton black shales are carbonaceous, and afford some oil. In the Chemung and other groups, great oil reservoirs are found. The origin of it must be looked for above where it is found. He thought the black shales and not the corniferous limestone furnished the petroleum. The carbonaceous matter is derived both from animal and vegetable organism. The lower silurian limestone is highly carbonaceous, and affords oil in some regions. He showed that a high temperature was not essential to a production of oil from hydro-carbonaceous deposits; and a lower temperature only retarded the process.

One member remarked that there was a difference between the Canada and Pennsylvania oils.

Professor Hunt thought these differences of minor importance. He proceeded to review the remarks of Professor Newberry, rather confirming his former position. He would recognize different sources of oil in different regions. Even gravel beds have been found impregnated with oil. He thought a low temperature insufficient to effect the transformation of animal organisms into oil. He carefully described the chemical process of the conversion of vegetable and animal deposits into liquid oil, showing very thorough investigation, and ably sustaining his theory for the genesis of oil in the lower silurian carbonaceous limestones. The question of temperature was more carefully considered, and it was claimed that the chemical transformations producing oil could take place within certain limits of temperature.

Professor Newberry acknowledged that this was a chemical question, but not that all chemists agreed upon certain transformations in carbonaceous substances. Carburized hydrogen was a product of spontaneous decomposition, and he still thought that the theory presented in the paper was incorrect. He hoped chemists would make observations on spontaneous distillation of carbonaceous substances, so as to arrive at a correct theory.

Professor Winchell remarked that he had spent considerable time in the Ontario region, and had carefully examined the petroleum wells. He desired to present a paper referring to the Ontario region. He remarked at some length on the genesis of petroleum, regarding the shales as the true origin. He had examined a test well, and was assured that the corniferous limestones did not furnish the oil. There are dark shales at the bottom of the Hamilton group, but it is calcareous in most regions, although in others it is bituminous, and may furnish oil.

Professor Hunt had spent more time in the region than Professor Winchell, and had made wider observations. At Tillotson the oil is undoubtedly obtained from the limestone, because there are no shales above it. Also at Thamesville oil was pumped from 16 feet below the upper surface of the limestone. He remarked further upon some very deep oil wells, and reservoirs of oil in rocks which do not produce it.

Professor Winchell rose to speak, but Professor Newberry rose to explain that in Pennsylvania the corniferous limestone was not thick enough to furnish it.

Professor Winchell then said that he would not have Professor Hunt consider the difference a question of veracity, for he could not question the authenticity and veracity of the statements made. He proceeded to explain and defend his theory.

FRONTENAC LEAD MINE.

(From the Kingston News.)

COMPARATIVELY few persons are aware of the existence within the bounds of the county of Frontenac of a veritable lead mine, one which is believed to be of immense extent, and great natural richness, and in which systematic workings have already been begun. The Frontenac Lead Mining Company have as yet not been anxious for newspaper notoriety, but have gone about their business in a quiet way, and as a consequence only the population in the immediate neighborhood, or the casual visitor who have been aware of the extent of the operations which have been planned and begun. On Tuesday last, however, the Company had made arrangements to have Professor Chapman, of Toronto, visit the mine, and the opportunity was taken to plan a little excursion to the mine, to which several gentlemen in Kingston, and the members of the press were invited. We presume therefore that henceforth the Frontenac Lead Mining Company do not intend to hide the light of their enterprise under a bushel, but will be glad of an inspection by any one interested in mining, and in developing the mineral resources of this part of the country. The mining property in question is situated in the township of Loughborough, and lies upon the streak of land which marks the separation of two distinct geological formations. It is well known, to those who have examined the subject, that a line drawn from Roscoe, in the State of New York (opposite Morrisburgh) where lead-mining on a large scale has been carried on for the past thirty years, to the township of Tudor, and even beyond, where lead has been discovered and worked, will pass over a tract of country in which it is exceedingly probable that lead will be found. This is not mere theory, but has proved to be a fact by the discovery of lead mines at various intermediate points, as in the townships of Lansdowne, Storrington and Loughborough. The vein of mineral in Loughborough, which is owned by five gentlemen of Kingston, who have formed themselves into a

company for the purpose of developing it, is in the track of this supposed line; and it is possible that still further discoveries may be made, as, for all that we know, the intervening country has, as yet, been very imperfectly explored. The first discoveries in Loughborough were made by Mr. Rousehorn, a farmer, whose love of adventure carried him to Madoc, on the early breaking out of the gold fever; and though he failed, like many hundreds of others, alas, to make a "pile," in the Hastings gold region, he there learned the valuable art of "panning out," and gained a habit of prospecting for minerals. Returning to his own farm, he made the discovery of lead, and the consequence has been that he has sold the mining rights on his farm for the handsome sum of \$5,000. Other neighbours have had strokes of equal good fortune; for the company, having satisfied themselves of the natural indications of the continuation of the vein, have bought up five lots of land embracing 1,000 acres, and are the owners of a lode or strake of mineral which has been traced for a mile, and even here and there for a distance of two miles. On this extent of land, of course, there is room for operations of great magnitude; enough, it has been said, by competent authority, to afford a busy industry for two generations or more.

The first workings, however, have been begun on the Rousehorn lot, number 16 in the ninth concession, distant from Kingston about 16 miles. Here some substantial buildings of frame have been erected necessary to carry on the works and lodge the workmen. A large boarding house capable of accommodating a considerable number of men, a blacksmith's shop supplied with forge tools and a stock of steel for making picks and hammers, a stable and driving house, a powder magazine, a house erected over the shaft, and an ore shed in which to sort and look up the ore, have been erected. A shaft has been sunk to the depth of forty feet and an adit along the course of the vein is being driven from the outside so as to enter the shaft at a lower depth. The tunnel has already been driven 150 feet. When the two openings meet each other the work of removing large masses of ore can be more easily accomplished. In the language of the miner, the ore can be the more easily "stopped out;" but, to practise this mode of mining, the more tedious operations of making shafts and tunnels have first to be carried on. All these operations are conducted under the direction of the resident manager, Mr. Kirkpatrick, formerly of the Tudor mine. Three gangs of men are employed, working eight hours at a time, and the underground work goes on night and day. Besides the miners, labourers and choppers are employed as required. Altogether the change which has come over the backwood scene is a surprising one, destined, we hope, to be productive of great benefit. The vein at this part is a very wide one. Usually a vein of lead ore is measured by inches, but this is measured by feet, and is no less than twelve feet wide. It has been found to have this width over a length of 800 feet. The vein stone is calc spar, very friable, and separates easily from the galena which it contains. The proportion of galena to spar has been variously estimated at from one-ninth to one-fifth of the bulk. Mining operations proper were begun in December last, and in the course of sinking the shaft and forming the adit a quantity of ore valued at \$10,000 has been got out. From the width of the vein the working is expected to prove easy and cheap, and it will not probably be long before returns can be realized on a handsome scale. It is proposed to smelt the ore at the mine, the supply of wood in the neighborhood being plentiful and cheap, irrespective of the fuel growing on the company's lands, which they will be induced to utilize. A smelting hearth, on the plan followed at Roscoe, is about to be erected, and the pigs of lead will either be carted direct to Kingston, or sent by way of Indian Lake and the canal to Kingston harbour. It is thought that very much of the lead can be disposed of in Canada, and the remainder, if any, can be shipped to New York, Buffalo, or Cleveland, or elsewhere in the United States, as may be demanded. For washing the ore, also, there is every convenience on the property. A stream runs near the ore shed, which, when dammed up, will give an ample supply at a sufficient head to wash the ore, and to separate the finer particles of metal from the "pay dirt," thrown out in the different operations.

The company are very sanguine, and apparently with good reason, of the success of their lead mining enterprise in Loughborough. They have secured a wide vein, and a long tract of land through which it runs. Economical management will test its worth, and we are sure the people of this country will be glad to hear of their success. The establishment of the mine signifies the formation of a village and a market in the back country for agricultural produce, for firewood and timber—in short it signifies an improvement in the value of the surrounding lands, and will tend to encourage settlement in the rear part.

THE COMMERCIAL OUTLOOK.

(From the N. Y. Financial Chronicle.)

THE Fall Trade opens with unusual encouragements, and yet with some peculiarly perplexing doubts. In our last issue, we pointed out the injurious effects upon trade of a continued succession of short crops; it is satisfactory to be able to state that the country is now nearing the end of this cardinal cause of commercial depression. It may now be considered as almost beyond doubt that the present harvest will prove the most abundant in the history of the country. Nor are we likely to be deprived of the commercial advantage of cheaper bread through scarcity in Europe; for there also the yield of grain promises to go far toward restoring stocks to their usual volume, the chief essential to the recovery of average prices for food. It is not easy to over-estimate the importance to commerce of a good supply of breadstuffs. The cheapening of food removes the most stubborn impediment to