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EARLY CANADIAN INDUSTRY.

Three hundred and twenty-seven years ago, Jacques Cartier, of St. Malo, discovered the St. Lawrence,* sailed up its mighty stream for several hundred miles, formed alliances with the Indians, built a fort, and wintered in the country. In 1540, the colonization of the newly discovered "Canada" was commenced under the auspices of Roberval, the first Viceroy, and an attempt made to establish a traffic in furs with the natives, but in consequence of the loss of Roberval and some of his companions at sea in 1549, and European distractions arising from the wars between France, Spain and Austria, no further effort was made for nearly half a century to colonize the valley of the St. Lawrence. In 1581, a trade with Canada began to spring into activity, and in 1591 a fleet of ships was fitted out by the adventurous inhabitants of St. Malo, to engage in the Canada trade, and chiefly to procure the teeth of the walrus, which at that time was common in the estuary and gulf of the St. Lawrence.

In 1603, a company of adventurers, headed by M. de Chauvin, Lieutenant General of Canada and Acadia, received a royal charter from Henry IV. of France, and established a regular system of trade in the colony. Ten years later, Champlain obtained a commission authorizing him to seize every vessel not holding a license he should find trafficking in furs between Quebec and the upper part of the St. Lawrence. In 1628, the celebrated but unscrupulous Cardinal de Richelieu organized the "Company of One Hundred Partners," and conceded to its members in perpetuity the Vice-Royalty of New France and Florida, thus establishing a commercial regime in Canada, whose influence soon extended far and wide among the Indian races of the valley of the St. Lawrence.

The "Company of One Hundred Partners" was dissolved by Louis XIV in 1663, who resumed the jurisdiction over the country which for 35 years had been under the rule of a trading association.

Scarcely, however, had a year elapsed, when, by a royal edict dated 1664, Canada was once more handed over to the short-lived commercial bondage of the "West India Company," but, in 1666, free trade with the Aborigines was again declared,

* In 1503, one Thomas Aubert made a voyage from Dieppe to Newfoundland, and sailed up the estuary of the St. Lawrence.

subject to certain restrictions and reservations. The Company was permitted to retain the right to one-fourth of all the beaver skins, and one-tenth of the elk hides exported, besides the traffic which belonged to Tadoussac at the mouth of the Saguenay. For these privileges the Company paid 48,950 livres, or about 10,000 dollars, a livre being worth at that period about one English shilling. Thus far the efforts made by the French to colonize Canada and open a trade with the different Indian nations inhabiting the vast extent of country drained by the St. Lawrence, had not been productive of much public or private good, and was marked by a succession of individual disasters, which damped the ardour even of the most courageous and enterprising merchants of that day.

Lake Superior was visited, in 1659, by two traders, who joined some roving bands of Algonquins and passed the winter in that region. In 1660 they returned to Quebec, escorted by sixty Algonquin canoes laden with furs.

In the autumn of 1678, La Salle, armed with a royal commission, commenced the construction of a fort at Niagara, and during the winter he laid the keel of a vessel intended for the navigation of the upper lakes, about six miles above the stupendous cataract. The first Upper Canadian ship (for in those days it was worthy of that designation) was launched in the summer of the following year, and, to the unbounded astonishment and alarm of the savage Iroquois and Eries who peopled either shore, it sailed through Lake Erie, through Lake Huron, and finally reached Lake Michigan. The "Griffon," as the vessel was called, met with an untimely fate on the return; she was wrecked before she reached the Niagara river, and with her rich cargo of furs sank beneath the waves of the inland sea whose solitudes she was the first to invade. Not two centuries (183 years) after the lonely "Griffon" had penetrated through the Upper Canadian lakes, the commerce of the region tributary to them was more than sufficient to employ nearly two thousand steamers and sailing vessels, exceeding half a million tons burthen and costing fifteen millions of dollars.*

Subsequently to the extinction of the West India Company, the trade in peltries was free for a time, with the exception of beaver and elk skins, for which monopoly 70,000 francs a year was paid by the lessees, until it became the property of a French Society called the "Company of Canada." After

* The Marquis de Dononville, in a proclamation respecting the taking of the post, Niagara, in 1687, states that the stocks on which La Salle built his "bark" were still seen above the great lake, and that his "quarters" were burned in 1675 by the Senecas. He also states that the Sieur de la Salle navigated Lake Erie, Huron and Illinois (Michigan) for several years.

an unprosperous existence for a few years, this trading association, like its predecessors, expired deeply in debt in 1706. In a report on the condition of Canada in 1715, contained in the "*Documents de Paris*," there is an interesting account of colonial affairs, which throws some light on the state of Canada at that period. The report is by M. d'Auteuil, who remarks that trade with the savages, once considerable, had even at that early date greatly fallen off. Ship building was brisk even 150 years ago; hemp for cordage and flax for linen were advantageously grown, but France did not import Canadian timber, or continue to work the copper mines on Lake Huron. The French, at the close of the 17th century, must have been familiar with the copper treasures of the shores of Lake Huron and perhaps even Superior, or M. d'Auteuil would not have regretted their neglect of them. In 1687, M. de Denonville writes to the French Minister,* "The copper, of which I sent a sample to M. Arnon, is found at the head of Lake Superior. The body of the mine is not yet discovered. I have seen one of our voyageurs, who assures me that he saw, fifteen months ago, a lump 200 lbs. weight, as yellow as gold, in a river which falls into Lake Superior. When heated, it is cut with an axe, but the superstitious Indians, regarding this piece as a good spirit, would never permit him to take any of it." The estimate formed by M. d'Auteuil of the annual value of the peltries exported from Canada in 1677 was 550,000 francs, and, in 1715, two million francs. Thos. Dongan, governor of the province of New York, in 1687, complains bitterly of the difficulties he had to encounter in finding on his arrival in the colony "such a contest between the government of Canada and this (New York), about the beaver trade, the Inland country, and the Indians." The English found their way to Lakes Ontario and Erie with merchandise, for barter with the Ottawa Indians, as early as 1686, much to the disgust of M. de Denonville, who writes to his government that he is going to intercept ten English canoes, laden with merchandise, who have appeared on Lakes Ontario and Erie. "I regard, my lord," he says, "as of primary importance the prohibition of the trade to the English, who without doubt would entirely ruin ours, both by the cheaper bargains they could give the Indians, and by attracting to them the Frenchmen of our colony, who are accustomed to go to the woods."† The "merchandise" largely employed in those days, and continued up to the present time, both by British and French, has proved the ruin of the Indian race on this continent. M. de Denonville

* Paris Doc. 1686.

† Paris Doc. 1687.

writes to Governor Dongan, "Think you, sir, that religion will progress whilst your merchants supply, as they do, *eau de vie* in abundance, which converts the savages, as you ought to know, into demons, and their cabins into counterparts and theatres of hell." But what was the religion spoken of by Denonville? Here is a description of it. "The present is to inform Y. R. of our return from the Iroquois Mission, loaded with some spoils rescued from hell. We bear in our hands more than five hundred children and a number of adults, the most part of whom died in baptism. We have re-established faith and piety in the heart of a poor Captive Church, the first foundations of which we laid in the Huron country. We have proclaimed the gospel unto all the Iroquois nations, so that they are henceforth without excuse, and God will be fully justified against them at the great day of judgment.*

In a memoir addressed to the Marquis of Seignelay, dated 1687 (Paris Doc.), the trade of Canada is described as being very precarious. "Canada is encompassed by many powerful English colonies, who labour incessantly to ruin it by exciting all our savages and drawing them away with their peltries, for which the English give them a great deal more merchandise than the French, because they pay no duty to the King of England.†

In 1754, only ten vessels, of 40 to 100 tons, were built in Canada. The trade with France employed about thirty ships, belonging to merchants of La Rochelle. During the administration of French rule previously to the year of peace 1760, when Montreal and all the French fortresses in Canada were surrendered to Great Britain, the balance of trade was always against the colony.

The exports previous to 1759 are stated in a prosperous year to have been as follows :

Furs to the value of	£88,333 stg.
Seal oil.....	10,416 "
Flour and pease	10,416 "
Timber	6,250 "

Total £115,415 "

* Father Paul Ragueneau.

† Governor Dongan's reply to M. de Denonville is characteristic of that officer. "The missionary fathers, if they please but do me justice, can give you an account how careful I have been to preserve them, I have ordered our Indians strictly not to exercise any cruelty or insolence against them, and have written to the King, my master, who has as much zeal as any prince living to propagate the Christian faith, and assure him how necessary it is to send to them some Fathers to preach the gospel to the Natives allied to us, and care would then be taken to dissuade them from their drunken debouches, though certainly our rum doth as little hurt as your brandy, and in the opinion of Christians is much more wholesome; however, to keep the Indians temperate and sober is a very good and christian performance, but to prohibit them all strong liquors seems a little hard and very Turkish."

Paris Doc., III.

In 1729, the annual expenditure of the government of Canada was £16,166 13s. 4d.; in 1759, the disastrous year which witnessed the fall of Quebec, the expenditure rose to £1,083,330 6s. 8d. stg., but this vast outlay did not increase the trade of the country, Military operations, glory and extravagance, consuming it all. In 1754, the number of vessels engaged in foreign trade with the Colony only amounted to fifty-three, bearing a total importation valued at £216,769, and an exportation valued at £75,560, leaving a balance against the Colony of £141,209 sterling.

After the fall of Quebec, trade increased and assumed a healthy tone; the imports no longer exceeded the exports; another race less addicted to military glory acquired a standing in Canada, and began to develop its long neglected resources. But the country people, of French origin, had received an indelible impress of character and disposition which they have retained in many particulars up to the present day.

Discoveries at Pompeii.

Under the government of the Neapolitan Bourbons, it was the custom to unearth a house at Pompeii on the occasion of a visit from some illustrious guest of the king. The visitor was allowed to pay the expences of the honour conferred upon him. A fear was entertained that if all the buried treasures of the city were at once exposed, all interest in the discoveries would gradually die out, and "strangers' money" would soon be wanting to gladden the eyes of Neapolitans. Moreover, if the work had been at once completed, the king must of necessity have paid the expences, Thus by spreading it over a number of years, the appetite for antiquities was fed but never satiated, and the cost of entertainment did not tax the king's pocket. The "Ré Galantuomo" does not, it appears, act on this shabby system, for we hear that no less than three houses have within the last month been exposed to view. One is of unusual extent and magnificence, and is enriched with wall paintings of rare design and workmanship. It forms another illustration of the 6th book of Vitruvius, wherein the domestic architecture of the Romans is so minutely described, and recalls Pliny's account of the luxury and splendour in which the more favoured citizens indulged; but neither Crassus, Pollio, or Lucullus, would ever have placed "Salve Lucrum," as we find the ashed-out owner of the latest discovered villa has done, upon his very door step. We have heard already of "salve" and of "cave canem," and we have seen them repeated upon English door-mats, but the new inscription will have, we fancy, no duplicates made of it.

The other discovery is a baker's shop, which has, of course, been closed for nearly 2,000 years, but in which everything has remained in such order that the baker might be supposed to have just left it, and might be momentarily expected to return and resume his vocation.—*Building News.*

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The following is an abstract of Mr. Glaisher's paper on the recent balloon ascents.

All philosophical inquiries carried on or near the surface of the earth are of necessity fully within its influence, and consequently within the influence of many disturbing causes. By no other means than the use of the balloon can we free ourselves from these disturbing influences. Let us consider what sciences might be thereby benefited—chemistry probably, magnetism certainly, and meteorology and astronomy. When we regard the influence which a clear sky or a cloudy one exercises upon the temperature, and so upon our comfort and well-being generally, we see the importance of cultivating an acquaintance with the higher regions, and increasing our knowledge with aerial phenomena. I will now state the object of the experiments which have been instituted. The committee charged me with two primary objects. 1. Determination of the temperature of the air and its hygrometric state at different elevations up to five miles. The secondary objects were, to compare the readings of an aneroid barometer with those of a mercurial barometer; to determine the electrical state of the air; to determine the oxygenic conditions of the atmosphere by means of ozone papers; to determine the time of vibration of a magnet on the earth and at different distances from it; to determine the temperature of dew-point by Daniell's dew-point hygrometer and Rognault's condensing hygrometer, and by the use of the dry and wet bulb thermometers as ordinarily used, and by their use, when under the influence of the aspirator, to collect air at different elevations; to note the height and kind of clouds, their density and thickness, at different elevations; to determine the rate and direction of different currents in the atmosphere; to note atmospherical phenomena; and to make general observations. The ascents were all made by Mr. Coxwell's large balloon, three of them from Wolverhampton, four from the Crystal Palace, Sydenham, and one from Mill Hill, near Hendon, where the balloon had fallen the night previously. The first ascent was from Wolverhampton, on 17th July last. Owing to the force of the wind considerable difficulty was experienced in the preliminary arrangements, and I was unable to place a single instrument in its position before starting. The ascent took place at 9.43 a.m., and at once the balloon was quiescent. The degree of tranquillity experienced was remarkable, considering that but a few minutes had elapsed since the balloon was agitated. The swaying to and fro had ceased in an instant, and I at once proceeded to fix the instruments. At the height of 4,000 feet we entered a stratum of clouds of nearly a mile in thickness. A height of more than 10,000 feet had been passed before I could put all the instruments in working order. The sky was of a deep Prussian blue colour, without a cloud of any kind upon its surface. At starting, the temperature of the air was 59°; at 4,000 feet, 45°, and descended to 26° at 10,000 feet, and then there was no variation of temperature between this height and 13,000 feet. During the time of passing through this space, Mr. Coxwell and myself both

put on additional clothing, feeling certain that we should experience a temperature below zero before we reached an altitude of five miles; but, to my surprise, at the height of 14,500 feet, the temperature, as shown by all the sensitive instruments, was 31°, and at each successive reading up to 19,500 feet the temperature increased, and was here 43°. When we had fallen somewhat, the temperature again began to decrease, and with extraordinary rapidity, and was 16° or 27° less than it was 26 minutes before. At this time, about eleven a.m., we were at a height of five miles. When the balloon had attained a height of four miles, I wished to descend for one or two miles, and then to reascend; but Mr. Coxwell felt certain we were going too near the Wash to enable us to make a dip and then reascend. Our descent began a little after eleven, Mr. Coxwell experiencing considerable uneasiness at our too close vicinity to the Wash. We came down quickly, passing from a height of 16,300 feet to one of 12,400 between 11:38 and 11:39. Immediately afterwards we entered a dense cloud, which proved to be no less than 8,000 feet thick, and in passing through which the balloon was invisible from the car. Mr. Coxwell had reserved a large amount of ballast, which he discharged as quickly as possible to check the rapidity of the descent. However, we came to the earth with a very considerable shock, which broke all the instruments which I had been unable to pack up. The descent took place at Langham, near Oakham. The first ascent from the Crystal Palace took place on the 30th of July. The balloon left the earth at 4:40 p.m. The temperature declined instantly. A height of 7,000 feet was reached at about six o'clock, and the descent began about 6:15. It was rather rapid, but quite under control, and we reached the earth at Singlewell, near Gravesend, at 6:30. Another ascent was made from Wolverhampton on August 18. In about ten minutes we passed through a fine cumulus cloud, and then emerged into a beautiful clear sky, dotted over with cirrus clouds. The descent was made when we had reached an altitude of 24,000 feet. We reached the earth at Solihull, about seven miles from Birmingham. The second ascent from the Crystal Palace took place on the 20th of August. The balloon started at 6:26 p.m. At 6:37 the height of three-quarters of a mile was attained, and the air was so tranquil that we were still over the Palace. At 6:43, when at the height of nearly a mile, we passed through a thick mist, the earth being just visible. We continued for a time at this elevation, and then descended 200 or 300 feet. We kept at this height till 7:2, when Kennington Oval was in sight. At 7:9 St. Mark's Church, Kennington, was exactly underneath us. The hum of London was heard, and there was scarcely a breath of air stirring. We then descended gradually, and at 7:12 the lamps were being lighted over London, and the hum of the great city increasing in depth. At 7:20 shouting was heard of people below who saw the balloon. At 7:40 Mr. Coxwell determined to ascend above the clouds, and at 7:47 we were nearly a mile high, the temperature being 45 deg. We still ascended till the clouds were below us tinged with a rich red. At 7:52 the striking of a clock and the tolling of a bell were heard. It was quite dark below, but the sun tinged the tops of

the clouds. At 8:5 we were above the clouds, and it became light again, and the hum of London died gradually away. After this we descended, and London was again seen, but it now presented the appearance of a conflagration of enormous extent, the sky being lit up for miles around. We descended in the centre of a field at Mill Hill, about a mile and a half from Hendon, and it was resolved to anchor the balloon here for the night, with the view of making an early morning ascent. By half-past four a.m. we again left the earth. There were in the car, besides Mr. Coxwell and myself, Captain Percival and my son. At 4:53 we were above a mile high; we were just entering a cloud. At 4:57 we were in cloud, surrounded by white mist. The light rapidly increased, and gradually we emerged from the dense cloud into a basin surrounded by immense black mountains of cloud far above us, and shortly afterwards we were looking into deep ravines of grand proportions, bounded with beautiful curved lines. By 5:31 we were somewhat less than three miles high, at which elevation we continued about half an hour. During our descent I noticed the loud ticking of a watch. Captain Percival said he could not hear it. He was seated and I was standing, and after some experiments were made, it was found that when the ear was on the same level as the watch no sound was heard, but it became remarkably distinct on the ear being situated above it. At the height of two miles the barking of a dog was heard. We gently reached the ground at Dunton Lodge, near Biggleswade. On the 1st September another ascent was made from the Crystal Palace. The wind was E.N.E., the sky was almost covered with cirrostratus cloud, the horizon was moderately clear. The ascent took place at 4:40 p.m. The balloon rose to the height of half a mile in four minutes. At this time the whole of the river Thames from beyond Richmond was in sight. At 5:31, when we were about 4,000 feet high, clouds had formed following the whole course of the Thames from the Nore up to the higher parts of the river, and extending but little beyond its sides. The clouds were parallel to the river, following all its windings and bendings. At this time it was about high water at London Bridge, so that the formation of the clouds is connected with the warm water from the sea. The balloon fell at 6:15 near Woking. The most important ascent took place from Wolverhampton on Sept. 5. It commenced at 1:3 p.m. The temperature of the air was 59°, at the height of one mile it was 39°, and shortly afterwards we entered a cloud of about 1,100 feet in thickness, in which the temperature fell to 36½°, and the air was saturated with moisture. We reached two miles in height at 1:21, three miles at 1:28, and four miles at 1:39. In ten minutes more we had reached the fifth mile, and the temperature had passed below zero, and then read minus 2°. Up to this time I had taken observations with comfort. I had experienced no difficulty in breathing, whilst Mr. Coxwell, in consequence of the necessary exertions he had to make, had breathed with difficulty for some time. Mr. Coxwell ascended into the ring, and I endeavoured to reach some brandy which was lying on the table, at a distance of about a foot from my hand, but I was unable to do so. My sight became dim. I looked at the

barometer and saw it between 10 and 11 inches, and tried to record it, but was unable to write. I then saw it at ten inches, still decreasing fast, and just managed to note it in my book; its true reading therefore, was about 9½ inches, implying a height of about 29,000 feet. I was losing all power and endeavoured to rouse myself by struggling and shaking. I essayed to tell Mr. Coxwell I was becoming insensible, but I had lost the power of speech. I saw Mr. Coxwell dimly in the ring; it became more misty, and finally dark. I was still conscious, and knew I should soon be insensible, and I suddenly sank, as in sleep. On recovering consciousness I heard Mr. Coxwell say, "What is the temperature? Take an observation; now, try." I could neither see, move, nor speak, but I knew he was in the car trying to rouse me. I then heard him speak more emphatically, "Take an observation. Now, do try." I then saw the instruments dimly, and Mr. Coxwell very dimly, then more clearly, and shortly afterwards said to Coxwell, "I have been insensible," and he replied "You have, and I nearly." I recovered somewhat quickly, and Mr. Coxwell said "I have lost the use of my hands; give me some brandy to bathe them." His hands were nearly black. I saw the temperature was still below zero, and the barometer reading 11 inches, and increasing quickly. I resumed my observations at 27, recording the barometer reading 11.53 inches, and the temperature minus 2°. I then found that the water in the vessel supplying the wet bulb thermometer which I had by frequent disturbance kept from freezing, was one mass of ice. Mr. Coxwell then told me that whilst in the ring he felt it piercingly cold; that hoar frost was all round the neck of the balloon, and on attempting to leave the ring he found his hands frozen, and he had to place his arms on the ring and drop down; that he found me motionless, with a quiet and placid expression on the countenance, that he at first thought I was resting myself; that he then spoke to me without eliciting a reply, and then observed my arms hanging by my side, and my legs extended, and found I was insensible. He then felt that insensibility was coming over himself, and that he could not assist me in any way; that he became anxious to open the valve; that his hands failed him, and that he instantly seized the line between his teeth and pulled the valve open two or three times, until the balloon took a decided turn downwards. This act is quite characteristic of Mr. Coxwell. I have never yet seen him without a ready means of meeting every difficulty as it has arisen with a cool self-possession that has always left my mind perfectly easy, and given to me every confidence in his judgment, in the management of so large a balloon. Six pigeons were taken up. One was thrown out at the height of three miles, it extended its wings and dropped like a piece of paper; a second at four miles flew vigorously round and round, apparently taking a dip each time. A third was thrown out between four and five miles and it fell downwards. A fourth was thrown out at four miles when descending; it flew in a circle and shortly alighted on the balloon. The two remaining pigeons were brought down to the ground. One was found dead, and the other, a carrier, had attached to its neck a note. It would not, however, leave, and when cast off the

finger returned to the hand. After a quarter of an hour it began to peck a piece of ribbon by which its neck was encircled, and it was then jerked off the finger, and it flew with some vigour finally towards Wolverhampton. One of the carriers returned to Wolverhampton on Sunday, and this is the only one we heard of. We descended in the centre of a large meadow belonging to Mr. Kersmell, at Cold Weston, seven miles and a half from Ludlow. The last ascent was from the Crystal Palace, on the 8th of September. We fell about four miles from Tilbury Fort. These eight ascents have led me to conclude—firstly, that it was necessary to employ a balloon containing nearly 90,000 cubic feet of gas, and that it was impossible to get so high as six miles even with a balloon of this magnitude, unless carburetted hydrogen, varying in specific gravity from 370 to 340, had been supplied for the purpose. It is true that these statements are rather conflicting when compared with the statements made by one or two early travellers who professed to have reached some miles in height with small balloons. But if we recollect that at three miles and three-quarters high a volume of gas will double its bulk, we have at once a ready means of determining how high a balloon can go, and in order to reach an elevation of six or seven miles it is obvious that one-third of the capacity or the balloon should be able to support the entire weight of the balloon, inclusive of sufficient ballast for the descent. The amount of ballast taken up affords another clue as to the power of reaching great heights. Gay Lussac's ballast was reduced to 33 lb. Rush and Green, when their barometers, as stated by them, stood at 11, had only 70 lb. left, and this was considered a sufficient playing power. We found that it was desirable to reserve 500 or 600 lb., and although we could have gone much higher by saving less, still on every occasion it was evident that a large amount of ballast was indispensable to regulate the descent and select a favourable spot with the nicest accuracy. Secondly, it was manifest throughout our various journeys that excessive altitude and extended range as to distance are quite incompatible. The reading of the instruments establishes this, and it has been pointed out what a short time the balloon held its highest place, and how reluctantly it appeared to linger, even at a somewhat less elevation. It has been stated by an aeronaut of experience that strong opposing upper currents have been heard to produce an audible contention, and to sound like the roaring of a hurricane. Now the only deviation we experienced from the most perfect stillness was a slight whining noise in the netting, and this only when the balloon was rising with great rapidity. The balloon itself as it descends flaps about occasionally, but this occurs when it is in a collapsed state, and very likely it was under similar circumstances, and perhaps during a rapid descent, that the flapping of the lower part of the balloon was mistaken for a roaring wind. I may also say that the too readily accepted theory as to prevalence of a settled west or north-west wind was not confirmed in our trips, nor was the appearance of the upper surface of the clouds such as to establish the theory that the clouds assume a counterpart of the earth's surface below, and rise or fall like hills or dales. The formation of vapour along the

course, and sinuosities during an ascent, from the Crystal Palace, was a very remarkable demonstration. The principal conclusions adduced from these observations may be briefly stated:—That the temperature of the air does not decrease uniformly with the height above the earth's surface, and that consequently more elucidation upon this point is required, particularly in its influence on the law of refraction. That an aneroid barometer can be made to read correctly, certainly to the first place and probably to the second place of decimals, to a pressure of so low as five inches. That the humidity of the atmosphere does not decrease with the height with a wonderful increasing ratio. That at heights exceeding five miles, the amount of aqueous vapour in the atmosphere is very small. That we now can answer the question I put in my opening remarks, and can say that observations up to three miles high even of a delicate nature can be made as completely in the balloon as on the earth; that at height exceeding four miles they cannot be made quite so well because of the personal distress of the observer; that at five miles high it requires the exercise of a strong will to make them at all. That up to three miles high any person may go into the car of a balloon who has any ordinary degree of self-possession. That no one with heart-disease or pulmonary complaints should attempt four miles high. But at the same time it must be borne in mind that I am concluding that the balloon is properly handled. It has been fortunate for the association and myself that we have had the assistance of Mr. Coxwell. He has the experience of more than 400 ascents, based upon knowledge of natural philosophy, and knows the why and because of all his operations; and it was this fact, which I saw immediately from the clearness of his explanations to me for each operation, that enabled me to dismiss from my mind all thoughts of my position, and to concentrate my whole energies upon my duties. In conclusion, I feel certain that if these experiments from the balloon are available for philosophic research one of the brightest links in the long chain of useful works performed through the agency of the association will be the proving that the balloon, in proper hands, may be made a powerful philosophic agent.

EXTENT, CHARACTER, RESOURCES, &c, OF THE BRITISH NORTH AMERICAN PROVINCES AND POSSESSIONS, AND CLIMATE OF THE INTERIOR.

The great and practical value of the British North American Provinces and possessions is seldom appreciated. Stretching from the Atlantic to the Pacific ocean, they contain an area of at least 3,478,380 square miles—more than is owned by the United States, and not much less than the whole of Europe, with its family of nations. No small portion of British territories consists of barren and inhospitable regions in the extreme north; but as a recompense, the arid plains extending through Texas, and thence northward beyond the limits of the United States, are comparatively insignificant as they enter the British Possessions, where the Rocky mountains are less elevated and have a more narrow base. The isothermal line of 60° for summer rises on the interior plains

of this continent as high as the sixty-first parallel, its average position in Europe: and a favourable comparison may also be traced for winter and the other seasons of the year. Spring opens almost simultaneously on the vast plains reaching from St. Paul's to the Mackenzie river—a distance northerly of about 1,200 miles. Westward from these regions—now, scarcely inhabited, but of incalculable value in the future—are countries of yet milder climate, on the Pacific slope and in Vancouver's Island, whose relations to California are already important. On the eastward, but yet far distant from other abodes of civilization, are the small settlements enjoying the rich lands and pleasant climate of the Red River of the North, a stream capable of steamboat navigation for four hundred miles.

It is asserted by those who add personal knowledge of the subject to scientific investigation, that the habitable but undeveloped area of the British possessions westerly from Lake Superior and Hudson's Bay comprises sufficient territory to make twenty-five States equal in size to Illinois. Bold as this assertion is, it meets with confirmation in the isothermal charts of Blodgett, the testimony of Richardson, Simpson, Mackenzie, the maps published by the government of Canada, and the recent explorations of Professor Hind, of Toronto.

North of a line drawn from the northern limit of Lake Superior to the coast at the southern limit of Labrador exists a vast region, possessing in its best parts a climate barely endurable, and reaching into the Arctic regions. This country, even more cold, desolate, and barren on the Atlantic coast than in the interior latitudes, becoming first known to travellers, has given character in public estimation to the whole north.

Another line, drawn from the northern limit of Minnesota to that of Maine, includes nearly all the inhabited portion of Canada, a province extending opposite the Territory of Dakota and State of Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, Vermont, New Hampshire, and Maine, possessing a climate identical with that of our northern States.

The "Maritime Provinces" on the Atlantic coast include New Brunswick, Nova Scotia, Prince Edward's Island and Newfoundland. Geographically they may be regarded as a northeasterly prolongation of the New England system. Unitedly they include an area of at least 86,000 square miles, and are capable of supporting a larger population than that at present existing in the United States or Great Britain. They are equal in extent to the united territory of Holland, Greece, Belgium, Portugal, and Switzerland.

New Brunswick is 190 miles in length and 150 in breadth. Its interests are inseparably connected with those of the adjacent State of Maine. It has an area of 22,000,000 acres, and a sea-coast 400 miles in extent and abounding in harbors. Its population some years ago numbered 210,000, whose chief occupations are connected with ship-building, the fisheries, and the timber trade. Commissioners appointed by the government of Great Britain affirm that it is impossible to speak too highly of its climate, soil, and capabilities. Few countries are so well wooded and watered.

On its unreclaimed surface is an abundant stock of the finest timber; beneath are coal fields. The rivers, lakes, and sea-coast abound with fish.

Nova Scotia, a long peninsula, united to the American Continent by an isthmus only fifteen miles wide, is 280 miles in length. The numerous indentations on its coast form harbors unsurpassed in any part of the world. Including Cape Breton, it has an area of 12,000,000 acres. Wheat and the usual cereals and fruits of the northern States, flourish in many parts of it. Its population in 1851 was declared by the census to be 276,117. Besides possessing productive fisheries and agricultural resources, it is rich in mineral wealth, having beneath its surface coal, iron, manganese, gypsum, and gold.

The province of Prince Edward's Island is separated from New Brunswick and Nova Scotia by straits only nine miles in width. It is crescent-shaped, 130 miles in length, and at its broadest part is 34 miles wide. It is a level region, of a more moderate temperature than that of Lower Canada, and well adapted to agricultural purposes. Its population in 1848 was 62,678.

The Island of Newfoundland has a sea-coast 1,600 miles in extent. It has an area of 23,040,000 acres, of which only a small portion is cultivated.

Its spring is late, its summer short, but the frost of winter is less severe than in many parts of our own northern States and territories. It is only 1,665 miles distant from Ireland. It possesses a large trade with various countries, including Spain, Portugal, Italy, the West Indies, and the Brazils.

The chief wealth of Newfoundland and of the Labrador coast is to be found in their extensive and inexhaustible fisheries, in which the other Provinces also partake. The future products of these, when properly developed by human ingenuity and industry, defy human calculation. The Gulf Stream is met near the shores of Newfoundland by a current from the Polar basin, vast deposits are formed by the meeting of the opposing waters, the great submarine islands known as "The Banks" are formed, and the rich pastures created in Ireland by the warm and humid influences of the Gulf Stream are compensated by the "rich seapastures of Newfoundland." The fishes of warm or tropical waters, inferior in quality and scarcely capable of preservation, cannot form an article of commerce like those produced in inexhaustible quantities in these cold and shallow seas. The abundance of these marine resources is unequalled in any part of the globe.

Canada, rather a nation than a province, in any common acceptance of the term, includes not less than 346,865 square miles of territory, independently of its Northwestern Possessions not yet open for settlement. It is three times as large as Great Britain and Ireland, and more than three times as large as Prussia. It intervenes between the great Northwest and the Maritime Provinces, and consists chiefly of a vast territorial projection into the territory of the United States, although it possesses a coast of nearly 1,000 miles on the river and gulf of the St. Lawrence, where fisheries of cod, herring, mackerel, and salmon are carried on successfully. Valuable fisheries exist also in its lakes.

It is rich in metallic ore and in the resources of its forests. Large portions of its territory are pe-

culiarly favourable to the growth of wheat, barley, and the other cereals of the north. During the life of the present generation, or the last quarter of a century, its population has increased more than four-fold, or from 582,000 to 2,500,000.

The population of all the provinces may be fairly estimated as numbering 3,500,000. Many of the inhabitants are of French extraction, and a few German Settlements exist; but two-thirds of the people of the Provinces owe their origin either to the United States or to the British islands, whose language we speak, and who "people the world with men industrious and free."

The climate and soil of these Provinces and Possessions, seemingly less indulgent than those of tropical regions, are precisely those by which the skill, energy, and virtues of the human race are best developed. Nature there demands thought and labor from man, as conditions of his existence, but yields abundant rewards to wise industry. Those causes which, in our age of the world, determine the wealth of nations are those which render man most active; and it cannot be too often or too closely remembered in discussing subjects so vast as these, where the human mind may be misled if it attempts to comprehend them in their boundless variety of detail, that sure and safe guides in the application of political economy, and to our own prosperity, are to be found in the simple principles of morality and justice, because they alone are true alike in minute and great affairs, at all times and in every place.

They imply freedom for ourselves, and those rules of fraternity or equality which enjoin us to regard our neighbours as ourselves. We can trust in no other policy.—From the Report of the Committee on Commerce, on the Reciprocity Treaty with Great Britain, House of Representatives, U. S.

Board of Arts and Manufactures

FOR UPPER CANADA.

JOURNAL OF THE BOARD OF ARTS AND MANUFACTURES FOR 1863.

In consequence of the rapidly increasing list of subscribers to this Journal, the Board have determined to reduce the price of the subscription for 1863 to a uniform rate of 50 cents. The number of copies now circulated monthly has risen to over 1200, and it is expected that the issue of 1863 will be 2,000.

At a time when the proprietors of most other monthly or weekly publications are increasing the price of their subscription, the *Journal of the Board of Arts and Manufactures for Upper Canada* is reducing its price one half, or from one dollar per annum to FIFTY CENTS.

The attention of Manufacturers, Patentees, and others, are respectfully directed to the following notices:—

TO PUBLISHERS AND AUTHORS.

Reviews and Notices of Books will always have a place in the Journal, and the attention of publishers and authors is called to the excellent advertising medium it presents for works suitable to Public Libraries. A copy of a work it is desired should be noticed can be sent to the Editor, or to the Secretary of the Board.

TO INVENTORS AND PATENTEES IN CANADA.

Inventors and Patentees are requested to transmit to the Secretary of the Board short descriptive accounts of their respective inventions, with illustrative wood cuts, for insertion in this Journal. It is essential that the description should be concise and exact. Attention is invited to the continually increasing value which a descriptive public record of all Canadian inventions can scarcely fail to secure: but it must also be borne in mind, that the Editor will exercise his judgment in curtailing descriptions, if too long or not strictly appropriate; and such notices only will be inserted as are likely to be of value to the public.

TO CORRESPONDENTS.

Correspondents sending communications for insertion are particularly requested to write on one side only of half sheets or slips of paper. All communication relating to industry and Manufactures will receive careful attention and reply.

TO MANUFACTURERS AND MECHANICS IN CANADA.

Statistics, hints, facts, and notices of new discoveries, are respectfully solicited. Manufacturers and Mechanics can afford useful coöperation by transmitting descriptive accounts of LOCAL INDUSTRY, and suggestions as to the introduction of new branches, or the improvement and extension of old, in the localities where they reside

ERRATA

Page 260, 13 lines from the bottom, 1st column—strike out the words "*exclusively of Canadian growth.*"

Page 321, 3rd line from bottom of the 2nd column—for "as during the first trial," read "during the second hour of trial."

Page 323, 2nd column, 9 lines from bottom—for "carbonic acid," read "carbonic oxide."

"THE OIL CITY REGISTER."

A valuable weekly, published at Oil City, Venango County, Pennsylvania, and devoted to the interests of the Venango Oil Region. This paper always contains much valuable information respecting the American Oil Region, and whatever belongs to Petroleum, and the vast interests now dependent upon that material. Its terms are only one dollar a year, payable in advance.

PETROLEUM GAS—THE ST. NICHOLAS HOTEL, NEW YORK.

The subjoined certificate has been presented to Mr. Thomson, of this city, by the Proprietors of the St. Nicholas Hotel, New York, on the occasion of the introduction into that establishment of the new patented process for the manufacture of illuminating gas from petroleum.

The St. Nicholas Hotel is one of the largest in the world, and is well known both on this continent and in Europe. The proprietors state in their certificate, that the daily consumption of gas supplied by the Manhattan Company is 36,000 feet in the month of October, which is taken as representing the average of the year. The cost of 36,000 feet per day is \$90, at \$2 50 a thousand feet, so that the annual cost of lighting this establishment with the Manhattan Company's gas would amount to \$32,850 a year. The annual saving resulting from the use of petroleum gas, even when crude petroleum is at 50 cents a gallon, amounts to more than \$16,000; and if petroleum can be supplied at 20 cents a gallon, an extreme price in many parts of the United States and Canada, the saving will reach the large sum of \$24,000 per annum, according to the statement of the proprietors of the St. Nicholas, as contained in the subjoined certificate. By a process, which it is not thought advisable to publish at present, but which has already been put in actual operation in New York, the petroleum gas can be furnished of any desired illuminating power, from the equivalent of 36 candles downwards. In order to make this statement familiar to the uninitiated in gas illumination, it is necessary to remind the reader that the illuminating power of coal gas is universally expressed photometrically, in standard wax candles. The gas supplied to the St. Nicholas was examined at the Manhattan Gas Works, by Dr. Torrey and Dr. Wolcott Gibbs, from a sample conveyed to the laboratory of the company in a portable gas holder. The following is the report of Dr. Wolcott Gibbs, addressed to G. W. des Vœux, Esq., who undertook to have the photometric examination and analysis made:

Sir,—Agreeably to your request, I have examined the petroleum gas prepared by the process under Thomson's patent, and now exclusively used at the St. Nicholas Hotel. The illuminating power of the gas, as determined by photometric experiments, made in the laboratory of the Manhattan Gas Works, with excellent apparatus, was found to be equal to 27.48 standard candles; the illuminating power of the coal gas used in this city being from thirteen to nineteen standard candles, and averaging about sixteen.

The petroleum gas burns with a clear white light. On analysis it was found to contain

Hydrocarbons, condensable by bromine.....	18.00
Carbonic oxide.....	3.00
Carbonic acid	2.00
Hydrogen and other gases	77.00
	160.00

The quantity of carbonic acid is probably a little too high; the proportion of volatile hydrocarbons is nearly three times as large as in ordinary coal gas, and indicates a gas of unusual richness in illuminating constituents. The best and most economical methods of burning the petroleum gas, so as to obtain the greatest illuminating power with the least consumption of gas, are still to be determined; but I can cheerfully bear witness to the excellent quality of the gas, and to the simplicity and efficiency of the apparatus employed in its manufacture.

Your obedient servant,
WOLCOTT GIBBS.

New York, December 9, 1862.

The foregoing analysis, satisfactory as it is, refers only to the quality of the gas manufactured for the St. Nicholas Hotel. With the addition of a proper lime purifier, the whole of the carbonic acid will be abstracted, and as it is well known that the illuminating power of gas is diminished 6 per cent. for each 1 per cent. of carbonic acid it contains, the actual standard value of the gas supplied to the St. Nicholas will be increased upon the addition of a lime purifier by 3.23 standard candles, making its actual illuminating power equal to 30.71 standard wax candles. The Manhattan gas is without doubt the best gas supplied by any company in America, and much superior to most English gas. The average standard candle power of the coal gas supplied throughout the United States does not exceed 11 candles, and the illuminating power of

petroleum gas can be raised to 36 candles, or reduced to 11 candles, according to the wishes of the manufacturer, by a process perfectly simple, safe and reliable.

THOMSON'S PATENT PETROLEUM GAS.

St. Nicholas Hotel, New York,
Dec. 10, 1862.

The proprietors of the St. Nicholas Hotel, New York, have recently introduced into their establishment the process for the manufacture of illuminating gas from petroleum, patented by Mr. James Edward Thomson, of Buffalo and Toronto. The results which have been attained during a trial extending over one week (from December 3rd to December 10th), are sufficient to warrant the proprietors in testifying to its excellence as an illuminator, and its comparative cheapness even at the present high prices of petroleum. These results establish the fact that even with crude petroleum at fifty cents a gallon, the cost of lighting their establishment by means of Thomson's patented petroleum gas is less than one-half the cost of Manhattan gas; and with petroleum at twenty cents a gallon, the cost will be one-fourth that of Manhattan gas at \$2 50 per thousand feet. The patentee first commenced to make gas at one o'clock on Wednesday, 3rd December, and succeeded in producing enough gas to supply the house from a single bench of three retorts the same night. The ordinary average consumption of the house is thirty six thousand feet of Manhattan gas per day in the month of October. The average number of lights used daily exceeds 2,500 (two thousand five hundred). This trial having taken place in the month of December, which demands the largest consumption of gas, makes it the more satisfactory for the proprietors of the St. Nicholas to offer the patentee and the public this testimonial in favor of the new illuminator.

(Signed) JOHN P. TREADWELL, } Proprietors.
VIRGIL WHITCOMB, }

BOOKS ADDED TO THE FREE LIBRARY OF REFERENCE.

SHelf No.

<p>A 8. American Engineering; Embracing Stationary, Marine, River Boat, Screw Propeller, Locomotive, Pumping and Steam Fire Engines, Rolling and Sugar Mills, Tools, and Iron Bridges. Plates, folio, 1861</p> <p>E 89. American Engineering; Letter Press. 1 vol., 4to.....</p> <p>G 23. Warming and Ventilation of Buildings, Railway Cars, &c., illustrated by fifty-four plates, Exemplifying the Exhaustion Principle. 8vo, 1862.....</p> <p>H 46. The Art of Double-Counting on the Lathe, whereby patterns of a complex character may be produced by means of the common Eccentric Chuck, &c., with sixty illustrations. 8vo 1857</p> <p>K 34. The Book of Dates, comprising the principal events in all ages, from the earliest records to the present time. 12mo, 1862</p> <p>L 30. Manual of Domestic Economy: a book full of valuable information on a multiplicity of subjects common to every-day life, illust. by 100 Wood Engravings. 12mo.</p>	<p><i>G. Weissenborn.</i></p> <p>“</p> <p><i>Hon. H. Ruttan.</i></p> <p><i>Capt. J. Ash.</i></p> <p><i>Griffin, Bohn & Co.</i></p> <p><i>J. H. Walsh.</i></p>
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DONATIONS TO THE LIBRARY.

Canadian Agriculturist, bound, 5 vols., 1857 to 1861, inclusive	By	<i>Bd. of Ag., U. C.</i>
Transactions Board of Agriculture for State of Maine. 1 vol. 1861.....	"	"
United States Patent Office; Report on Agriculture, for 1861. 1 vol	"	<i>Mr. Hadfield.</i>
Annual Report of Smithsonian Institute for 1861. 1 vol.....	"	<i>Smithsonian Inst.</i>

BRITISH PUBLICATIONS FOR OCTOBER 1862.

Adams (H. G.) Our Feathered Families: the Birds of Prey, illust., fcap. 8vo.....	0	3	6	<i>Hogg.</i>
----- a Description of Brit. Birds of Song, fcap. 8vo.....	0	3	6	<i>Hogg.</i>
Andlau (Baron Von) Universal German Reading Book, 2nd Course, 12mo.....	0	4	6	<i>Stanford.</i>
Bacon (J. H.) Science of Memory Simplified and Explained, Pt. 2, fp. 8vo. 1s. 6d.; complete.....	0	3	0	<i>Bateman.</i>
Baker (T.) On the Mathematical Theory of the Steam Engine, 12mo.....	0	1	0	<i>Virtue.</i>
Balfour (J. H.) Outlines of Botany, for Schools and Families, 2nd edit., sm. cr. 8vo	0	8	6	<i>Black.</i>
Beeton's Dictionary of Universal Information, Arts and Sciences, Vol. 1, A—Co., 8vo.....	0	6	0	<i>Beeton.</i>
Bowman (J. E.) Practical Handbook of Medical Chemistry, ed. by C. L. Bloxam, 4 e. f., 8vo.....	0	6	6	<i>Churchill.</i>
Carpenter (Wm. B.) Microscope and its Revelations, 3rd edit., fcap. 8vo.....	0	12	6	<i>Churchill.</i>
Condy (H. B.) Air and Water: their Impurities and Purification, 8vo.....	0	3	6	<i>J. W. Davies.</i>
Corner (Miss) History of Italy, new edit., enlarged, fcap. 8vo.....	0	3	6	<i>Dean.</i>
Dictionary of Useful Knowledge (The) Vol. 4, N—Z, cr. 8vo.....	0	2	6	<i>Houlston.</i>
----- Vols. 3 & 4 in 1 vol., cr. 8vo.....	0	5	0	<i>Houlston.</i>
Donaldson (Jno. Wm.) Complete Greek Grammar, 3rd ed., considerably enlarged, 8vo	0	16	0	<i>Deighton & Co.</i>
Ellis (Wm) Collection of English Exercises, revised by Arnold, 24th edit., 12mo...	0	3	6	<i>Simpkin.</i>
Graham (Wm.) Genealogical and Historical Diagrams, from Ninth Century to Present, 4to.....	0	4	6	<i>Simpkin.</i>
International Exhibition 1862, Ill. Catalogue, British Department, 2 vols. imp. 8vo	1	1	0	<i>Exhibition.</i>
----- Hunt (R.) Handbook to Indust. Depart. Vol. 2, fcap. 8vo.....	0	4	0	<i>Stanford.</i>
Mayne (R. G.) Medical Vocab. Explan. of All Terms, &c., used in Medicine, 2nd edit., fp. 8vo.....	0	8	6	<i>Churchill.</i>
Payne (George) Elements of Mental and Moral Science, 5th ed., 8vo.....	0	8	6	<i>Snow.</i>
Pearson (J. R.) Hints on the Construc. and Management of Orchard-Houses, 2nd edit., fcap. 8vo.....	0	1	6	<i>J. of Hort. Off.</i>
Peddie (Alex.) Prac. Measurer: or Tradesman and Wood Mer.'s Assist., n.e., 12mo	0	7	6	<i>Blackie.</i>
Phillips (Sir Rich.) Million of Facts of Correct Data, new ed., post 8vo.....	0	12	0	<i>Darton & Hodge.</i>
Phipson (T. L.) Phosphorescence; or, Emis. of Light by Minerals, Plants, and Animals, fp. 8vo.....	0	5	0	<i>L. Reeve & Co.</i>
Pick (Dr. Ed.) On Memory and the Rational Means of Improving it, 2nd ed., fp. 8vo	0	2	6	<i>Trübner.</i>
Snowden's Police Officers, Con. Guide, and Mag. As., 5th e., by W. C. Glen, 12mo	0	10	0	<i>Shaw & Sons.</i>
Townsend (George H.) Manual of Dates, a Dictionary of Reference, cr. 8vo.....	0	12	6	<i>Routledge.</i>
Wood (Rev. J. G.) Athletic Sports and Recreations for Boys, fcap. 8vo, adv. to....	0	2	0	<i>Routledge.</i>

AMERICAN PUBLICATIONS FOR NOVEMBER.

Bovee (C. N.) Intuitions and Summaries of Thought, 2 vols. 12mo.....		<i>Wm. Vearie.</i>	
Dana (Jas. D.) Manual of Geography; with Special Reference to American Zoological History, 1 vol. 8vo.....	4	00	<i>T. Bliss & Co.</i>
Haraszthy (A.) Grape Culture and Wine Making; the Official Report of the Commis- sioners appointed to investigate the Agriculture of Europe. Maps and Illustra- tions, 8vo.....		<i>Harper & Bros.</i>	
Taylor (Bayard) the Poet's Journal, 12mo.....		<i>Ticknor & Fields.</i>	

PRIZE LIST.

The following is the corrected List of Prizes awarded in the Arts and Manufactures Department of the Provincial Exhibition, held in the City of Toronto in September last.

PRIZE LIST.

COMPETITION OPEN TO CANADIAN EXHIBITORS ONLY.

CLASS XXXVIII.—CABINET-WARE AND OTHER WOOD MANUFACTURES—(61 Entries.)

Judges—George Stephens, Cobourg; George Jackson, Simcoe.

- Best Bed Room Furniture, set of, Jacques & Hay, Toronto, \$10; 2nd do., do., do., \$8.
- Best Centre Table, do., do., \$7.
- Best Drawing Room Sofa, do, do., \$7.
- Best Drawing Room Chairs, set of, do., do., \$7.
- Best Wardrobe, do., do., \$5; 2nd do., do., do., \$4.
- Best Cooper's Work, Corridor Lewis, Salford, \$4; 2nd do., R. S. Dodd, Stratford, \$3.
- Best Curled Hair, 10 lbs., Peter R. Lamb, Toronto, \$3; 2nd do., do., do., \$2.
- Best Handles for Tools for Carpenters, Blacksmiths, Gunsmiths, Watchmakers, &c., collection of, Thomas Moore, Etobicoke, \$3.
- Best Joiner's Work, assortment of, Smith & Burke, Toronto, \$3.
- Best Machine wrought Moulding and Flooring, 100 feet of each, do., do., \$6.
- Best Turning in Wood, collection of specimens, Jacques & Hay, Toronto, \$6; 2nd do., Smith & Burke, Toronto, \$4.
- Best Veneers, from Canadian Woods, W. Clements, Newbury, \$10; 2nd do., F. F. Purdy & Brother, Newbury, \$6.
- Best Wash Tubs and Wooden Pails, three of each, factory made, Corridor Lewis, Salford, \$4.

Extra Prizes.

- Ker & Brother, Streetsville, samples of Jack Spools and Bobbins for Woollen and Cotton Mills, \$2.
- P. T. Ware & Co., Toronto, three Sewing Machine Cases, \$3.
- William and Thomas Walker, Brampton, Washing Machine, \$2.
- O. W. Everett, Dundas, lot of Turned Wooden Bowls, \$2.
- Richmond & Walton, London, Clothes Dryer, \$4.
- Henry Fryatt, Aurora, Scrubbing Machine, commended.
- Thomas McMurchy, Glenwilliam, Pat. Mangle, \$3.
- John Addison, Hamilton, Patent Spring Mattress, Diploma.
- James Meyers & Son, Toronto, Washing Machine and Wringer, \$2.
- Harris, Brothers, Toronto, Corn Brooms, \$1.
- Samuel Creighton, Toronto, Spinning Wheels, \$2.
- Michael Malcolm, Toronto, Chess Boards, comm'd.
- Wm. Haines, Toronto, specimens of Varnishing and Polishing on Grand Piano, \$4.

CLASS XXXIX.—CARRIAGES, SLEIGHS, AND PARTS THEREOF—(51 Entries.)

Judges—James Kay, Galt; John King, St. Thomas.

- Best Bent Shafts, half a-dozen, A. P. Bussack, Stouffville, \$3; 2nd do., Abraham Efner, London, \$2.

- Best Buggy, double seated, C. F. Hall, Toront^o, \$8; 2nd do., do., do., \$6.
- Best Buggy, single seated, Macabe & Co., Hamilton, \$7; 2nd do., C. F. Hall, Toronto, \$5.
- Best Carriage, two horse, pleasure, C. F. Hall, Toronto, \$12; 2nd do., do., do., \$8.
- Best Carriage, one horse, pleasure, Macabe & Co., Hamilton, \$3; 2nd do., C. F. Hall, Toronto, \$6.
- Best Child's Carriage, John Webster, Yorkville, \$4; 2nd do., Edward Colley, St. Mary's, \$3.
- Best Hubs, two pairs of Carriage, Abraham Efner, London, \$3.
- Best Rims or Felloes, two pairs of Carriage, R. McKinlay & Co., St. Catharines, \$3; 2nd do., Abrm. Efner, London, \$2.
- Best Spokes, one dozen, machine made, carriage, Thos. C. Saunders, St. Catharines, \$3.
- Best two horse Pleasure Sleigh, Hart & Son, Picton, \$10.
- Best Sleigh, one horse, pleasure, Saml. Luke, Newburgh, \$8; 2nd do., Macabe & Co., Hamilton, \$6.
- Best Springs, one set of Steel Carriage, Isaac Briggs Gananoque, \$4; 2nd do., Moira Spring Co., Belleville, \$3; extra do., Buggy Springs, John Stephenson, Unionville, \$2.
- Best Wheels, one pair of Carriage (unpainted), C. F. Hall, Toronto, \$4.

Extra Prizes.

- W. J. Hamilton, Homer, Lincoln, Trotting Buggy, \$2.
- Do., do., Trotting Sulky, \$1.
- R. McKinley & Co., St. Catharines, Bows for Carriage tops, \$1.
- Do., do., Rails for Buggy Seats, \$1.
- Do., do., Set of Bent Sulky Felloes, \$1.
- Do., do., Set of Cutter Stuff, \$1.
- Do., do., Bent Stuff and Bendings for Cutters, \$2.
- John Webster, Yorkville, Express Waggon, \$3.
- A. P. Bussick, Stouffville, Sleigh Bends, \$2.
- Abraham Efner, London, Bent Cutter and Sleigh Stuff, \$1.
- C. F. Hall, Toronto, Boston Chaise, \$2.

CLASS XL.—CHEMICAL MANUFACTURES AND PREPARATIONS—(51 Entries.)

Judges—H. Y. Hind, Toronto; Thomas J. Cottell, Woodstock; T. McIlwraith, Hamilton; W. N. Alger, Brantford.

- Best Glue, 14 lbs., Peter R. Lamb, Toronto, \$3; 2nd do., do., do., \$2.
- Best Medicinal Herbs, Roots and Plants, native growth, Dr. T. W. Poole, Norwood, \$12; 2nd do., W. Saunders, London, \$3.
- Best Oils, Linseed and Rape, and other expressed kinds, Robert Pomeroy, Toronto, \$6.
- Best Oil (Coal, Shale or Rock) Petrolia Refining Co., Petrolia, \$6; 2nd do., T. W. Esmonde, Toronto, \$4.

Extra Prizes.

- A. C. Walkinshaw, Toronto, Blue-black Writing Fluid, Copying Ink, Black Writing Ink, Blue Writing Fluid, Red Writing Fluid and Indelible Writing Ink, all commended, \$3 for the assortment.
- Peter R. Lamb, Toronto, Neat's Foot Oil, \$2.

NOTE BY JUDGES.—The specimens of oil exhibited, both in the raw and manufactured state, are favorable samples of this now branch of industry; but as a scientific analysis of the samples produced would be of no commercial value, the Judges have awarded the prizes to the exhibitors who have shown the best assortment of Oils from Canadian Petroleum.

**CLASS XLI. — DECORATIVE AND USEFUL ARTS,
DRAWINGS AND DESIGNS—(91 Entries.)**

Judges—John Shier, Whitby; C. Quinlan, Port Hope; Wm. Boys, Barrie.

Best Carving in Wood, R. E. Griffith, Toronto, \$6; 2nd do., James McGee, Toronto, \$4.

Best Decorative House Painting, And. Widdowson, Toronto, \$5; 2nd do., Geo. D. Lucas, do., \$3.

Best Engraving on Wood, with proof, Edwd. Roper, Hamilton, \$5; 2nd do., Edwd. Hooper, Toronto, \$3.

Best Goldsmith's Work, Joseph Robinson & Co., Toronto, \$5; 2nd do., Savage & Lyman, Montreal, \$3.

Best Geometrical Drawing of Engine or Millwright Work, colored, P. A. Peterson, Toronto, \$5; 2nd do., Wm. Gill, Toronto, \$3.

Best Lithographic Drawing, W. C. Chewett & Co., Toronto, \$5.

Best Lithographic Drawing (colored), L. Magnus, Toronto, \$6; 2nd do., L. Magnus, do., \$4.

Best Mantel Piece, in marble, W. H. Sheppard, Toronto, \$10; 2nd do., N. L. Steiner, Toronto, \$6.

Best Mathematical, Philosophical and Surveyor's Instruments, collection of, A. F. Potter, Toronto, \$15; 2nd do., Geo. Mathias, do., \$10.

Best Modelling in Plaster, Charles Bell, Toronto, \$6; 2nd do., Farrall & Duckworth, Toronto, \$4.

Best Monumental Tomb or Headstone, Borrowman & Pearce, Toronto, \$6; 2nd do., Robert Sheppard, do., \$4.

Best Picture Frame, ornamented gilt, Mr. Scott, Montreal, \$5; 2nd do., Mr. Scott, do., \$3.

Best Seal Engraving, Thos. Wheeler, Toronto, 2nd prize, \$4.

Best Silversmith's Work, J. G. Joseph & Co., Toronto, \$5; 2nd do., Savage & Lyman, Montreal, \$3.

Best Stained Glass, col'n of specimens, McCausland & Horwood, Toronto, \$10; 2nd do., W. Bullock, Toronto, \$6.

Extra Entries.

Map of Canada, Tackabury, Bros., London, \$4.

Dining Instrument, W. H. Sheppard, Toronto, \$5.

Designs and Stamps for Embroidery, Wm. Williams, Toronto, \$3.

Decorative Sign Painting, George Booth, Toronto, \$5.

Lithographic Drawings, W. C. Chewett & Co., Toronto, \$3.

Assortment of Gold and Silver Leaf, and Dentist's Gold Foil, C. W. Hubbard, Toronto, \$4.

Map Engraving and Printing (Map of Upper Canada) G. C., G. R., and G. M. Tremaine, Toronto, Diploma and \$6.

Writing on Glass in Gold, Geo. D. Lucas, Toronto, \$3.

Dentistry, Wm. Myers, Toronto, \$4.

Sign Writing or Gilding on Glass, And. Widdowson, Toronto, \$4.

Specimens of Penmanship, I. Bates, Toronto, \$5.

Orr's System of Writing, J. Edwards, Toronto, \$5.

Case of Dentistry, Chas. J. Curtis, Toronto, \$5.

Natural Weather Indicator, L. S. Ullman, Toronto, \$3.

Collection of Native Marbles, W. Haughey, Ottawa, highly commended, \$5.

CLASS XLII.—FINE ARTS—(67 Entries.)

Judges—W. M. Wilson, Simcoe, Norfolk; J. D. Dumble, Cobourg; H. W. Peterson, Guelph.

Professional List—Oil.

Best Animals, grouped or single, Robert Whale, Burford, \$12 and Diploma; 2nd do., W. N. Cresswell, Harpurhey, \$8.

Best Historical Painting, W. N. Cresswell, do., \$12; 2nd do., Robert Whale, Burford, \$8.

Best Landscape, Canadian subject, Robert Whale, Burford, \$12; 2nd do., W. N. Cresswell, Harpurhey, \$8.

Best Marine Painting, Canadian subject, W. N. Cresswell, Harpurhey, \$12; 2nd do., W. Armstrong, Toronto, \$8.

Best Portrait, Robert Whale, Burford, \$10; 2nd do., not numbered ("Indian Girl"), \$7.

In Water Colors.

Best Animals, grouped or single, John H. Caddy, Hamilton, \$8; 2nd do., Wm. Armstrong, Toronto, \$6.

Best Flowers, grouped or single, John Griffith, London, \$8; 2nd do., Miss A. F. H. Gibbon, Weston, \$6.

Best Landscape, Canadian subject, John H. Caddy, Hamilton, \$8; 2nd do., W. N. Cresswell, Harpurhey, \$6.

Best Marine View, Canadian subject, W. Armstrong, Toronto, \$8; 2nd do., W. N. Cresswell, Harpurhey, \$6.

Pencil, Crayon, &c

Best Crayon, colored, Wm. Armstrong, Toronto, \$6; 2nd do., Miss Amelia F. H. Gibbon, Weston, \$4.

Best Crayon, plain, do., do., \$6; 2nd do., Miss Annie Bushell, London, \$4.

Best Pencil Drawing, J. C. Braithwaite, Toronto, \$6; 2nd do., do., do., \$4.

Best Pen and Ink Sketch, Miss Amelia F. H. Gibbon, Weston, \$6; 2nd do., P. H. Verner, Toronto, \$4.

Amateur List—Oil.

Best Animals, grouped or single, John Whale, Burford, \$9; 2nd do., do., do., \$7; do., highly commended, Mrs. Gourlay, Hamilton.

Best Historical Painting, Rev. Wm. Grant, Port Perry, \$9; 2nd do., Miss M. A. Evans, Toronto, \$7.

Best Landscape, Canadian subject, J. Whale, Burford, \$9; 2nd do., A. H. Gilmore, Toronto, \$7.

Best Marine Painting, Canadian subject, J. Whale, Burford, \$9; 2nd do., do., do., \$7.

Best Portrait, do., do., \$8; 2nd do., Miss Beddome, London, \$6.

In Water Colors.

Best Animals, grouped or single, F. A. Wise, Toronto, \$8; 2nd do., Miss Kirkpatrick, Kingston, \$6.

Best Flowers, grouped or single, M. L. Brunskill, Toronto, \$5; 2nd do., James Griffiths, London, \$3; do., highly commended, M. Thompson, Toronto.

Best Landscape, Canadian subject, T. D. Belfield, Grafton, \$8; 2nd do., Wm. Ambrose, Hamilton, \$6; do., highly commended, Mrs. B. Walker, St. Thomas.

Best Marine View, Canadian subject, T. D. Belfield, jun., Grafton, \$8; 2nd do., W. Ambrose, Hamilton, \$6.

Pencil, Crayon, &c.

Best Crayon, colored, E. A. Mara, Toronto, \$5; 2nd do., Miss E. J. Thompson, Toronto, \$3.

Best Crayon, plain, Miss Rowe, Whitby, \$5; 2nd do., Mrs. Henry Reid, Toronto, \$3.

Best Pencil Drawing, Miss Maughan, Windsor St., Toronto, \$5; 2nd do., do., do., \$3; extra do., James Griffith, London, \$2; highly commended, George Armitage, Toronto.

Best Pen and Ink Sketch, Mrs. Gourlay, Hamilton, \$5; 2nd do., Edward Roper, Hamilton, \$3; do., extra prize, J. G. Horn, Toronto, \$2.

Photography.

Best Collection of Ambrotypes, Jas. Rawe, Toronto, \$7.

Best Collection of Photograph Portraits, in duplicate, one set colored, Carl Loeffler, do., \$10; 2nd do., do., \$8.

Best Collection of Photograph Portraits, plain, Mathews & Anderson, Toronto, \$8; 2nd do., Jas. R. Hay, do., \$6.

Best Collection of Photograph Landscapes and Views, W. Armstrong, Toronto, \$9; 2nd do., Mathews & Anderson, do., \$7.

Best Photograph Portraits in Oil, James Rawe, Toronto, \$8; 2nd do., R. A. Pauling, Hamilton, \$6.

Extra Prizes.

James R. Hay, Toronto, Photographic Visiting Cards, \$4.

Miss A. F. H. Gibbon, Weston, Oil Painting, "Lake of Lucerne, Switzerland," \$4.

Miss Maughan, Toronto, Water Color Drawing, "English Ruins," \$2.

Do., do., do., "Autumn," \$2.

Do., do., do., "Cochem on the Moselle," \$2.

D. Gourlay, Toronto, Stereoscope for 100 views, \$4.

J. T. Carson, Toronto, Ivorytypes, \$2.

Do., do., Photographs re-touched in India Ink, Diploma.

Wm. Armstrong, Toronto, two Portraits in Water Colors, \$4.

Do., do., Series of Views on Lake Superior, Diploma. Benoni Irwin, Newmarket, Drawings in Indian Ink, Diploma.

William Ambrose, Hamilton, Composition in Water Colors, \$2.

T. Fitzgerald, Toronto, Enlarged Photographs, \$3.

Miss Kirkpatrick, Kingston, Ferns in India Ink, \$2.

REMARKS BY JUDGES.—The judges have found great difficulty in performing their duties in a manner satisfactory to themselves from the defective arrangement of the specimens. Many have not been seen at all. They would recommend that the persons in charge of the departments should be instructed to place sections as much as possible together. The judges have much pleasure in remarking that a decided improvement is observable in the Fine Arts department.

CLASS XLIII.—GROCERIES AND PROVISIONS—
(77 Entries.)

Judges—F. W. Fearman, Hamilton; D. McLaren, Mitchell; E. A. McNaughton, Newcastle.

Best Barley, Pearl, Robt. King, Hamilton, \$3; 2nd do., A. Mitchell, York, \$2.

Best Barley, Pot, Robert King, Hamilton, \$3; 2nd do., A. Mitchell, York, \$2.

Best Bottled Pickles, an assortment, manufactured for sale, C. B. Rowland & Co., Toronto, \$6.

Best Cayenne Pepper, from capsicums grown in the Province, H. Girouard, Hamilton, \$2.

Best Chickory, 2 lbs., G. Pears, Toronto, \$3; 2nd do., D. Crawford & Co., Toronto, \$2.

Best Indian Corn Meal, Robert King, Hamilton, \$3.

Best Oatmeal, James Russell, Clarendon Mills, \$3.

Best Sauces, for table use, an assortment, manufactured for sale, C. B. Rowland & Co., Toronto, \$6.

Best Soaps, collection of assorted fancy, C. Watts, Brantford, \$6; 2nd do., P. Freeland & Co., Toronto, \$4.

Best Starch, 12 lbs of Corn, Benson & Asphden, Edwardsburgh, \$2.

Best Starch, 12 lbs. of Flour, Klotz, Brothers, Preston, \$2.

Best Wheat Flour, Elias Snider, jun., Waterloo, \$4. 2nd do., G. Wheeler, Uxbridge, \$3; do., extra prize, John Kemp, Dunbarton, \$2.

Extra Prizes.

Six Jars Preserves, Miss E. Charles, Yorkville, \$2. Split Pleas, James Wilson, Eden Mills, \$2.

Pickling Vinegar, B. E. Charlton, Hamilton, Dip. Two Bottles Brandy, W. H. Smith & Co., Toronto, commended.

Mustard, D. Crawford & Co., commended.

Ground Spices, do., do., \$2.

Keg Challenge Soap, W. F. Langlois, Toronto, commended.

Collection of Biscuits, M. Nasmith, Toronto, \$3.

Table Sauces, Mrs. Jesse Thomson, Yorkville, \$2.

Preserves, 12 kinds, Mrs. Jesse Thomson, Yorkville, \$2.

Rock Candy, M. Davis, Toronto, \$2.

Collection of Biscuits, Christie, Toronto, Diploma.

NOTE BY JUDGES.—The judges on Class 43 desire to express their regret that there has not been more care taken in classifying the different articles. A great many articles that have been entered are not to be found, and others are placed in other classes; for example, wine, maple sugar, bacon, &c., in the dairy class; and no order on the table where the class is placed.

CLASS XLIV.—LADIES' WORK—(424 entries).

Judges—Mrs. R. L. Denison, Toronto; Mrs. Dr. Beatty, Cobourg; Mrs. F. W. Coate, Toronto; Mrs. J. F. Kidner, ———.

Best Braiding, Miss E. Eckhardt, Unionville, \$3; 2nd do., Miss F. Arnoldi, Toronto, \$2.

Best Crochet Work, Miss J. A. Ramsey, Kingston, \$3; 2nd do., Miss Bidwell, Cramahe, \$2; 3rd do., Miss Annie Norton, Toronto, \$1; do. commended, Miss Isabella Hunter, Orillia.

Best Embroidery in Muslin, Miss Bidwell, Cramahe, \$3; 2nd do., Miss J. A. Ramsey, Kingston, \$2.

Best Embroidery in Silk, Mrs. J. Johnston, Toronto, \$3; 2nd do., Miss Rosa Cameron, Toronto, \$2.

Best Embroidery in Worsted, Miss R. M. Evans, London, \$3; 2nd do., Miss Beddome, London, \$2.

Best Gloves, three pairs, Platt Hinman, Grafton, \$2; 2nd do., Mrs. Harper, Aurora, \$1.

Best Guipure Work, Miss Bidwell, Cramahe, \$3; 2nd do., Mrs. I. Bates, Hamilton, \$2.

Best Knitting, Mrs. Harper, Aurora, \$3; 2nd do., Mrs. E. Agar, Burwick, \$2.

Best Lace Work, Miss Maria Matthews, Belleville, \$3; 2nd do., Miss Bidwell, Cramahe, \$2; extra do. (equal to first Limerick lace), Miss Helen Raleigh, Toronto, \$3.

Best Mittens, three pairs Woollen, Platt Hinman, Grafton, \$2; 2nd do., Mrs. C. Miller, Norval, \$1.

Best Needle Work, Ornamental, Madame Griebel, Toronto, \$3; 2nd do., Miss J. A. Ramsey, Kingston, \$2.

Best Netting, Fancy, Miss E. Strickland, Oshawa, \$3; 2nd do., Miss M. Strickland, Oshawa, \$2.

Best Plait for Bonnets or Hats, of Canadian straw, Mrs. Silverthorn, Toronto, \$3; 2nd do., Mrs. H. Stickle, Cobourg, \$2.

Best Gentleman's Shirt, Mrs. M. A. Johnston, Yorkville, \$3; 2nd do., Mrs. J. T. Ewart, Woodbridge, \$2.

Best Socks, three pairs Woollen, Mrs. D. Christie, Utica, \$2; 2nd do., Mrs. Alex. Gerrie, Dundas, \$1.

Best Stockings, three pairs Woollen, No. 10 (name not known), \$2; 2nd do., Mrs. A. Gerrie, Dundas, \$1.

Best Tatting, Miss J. A. Ramsey, Kingston, \$3; 2nd do., Miss Hettie Denison, Toronto, \$2.

Best Wax Fruit, Miss Sophia Graham, Streetsville, \$6; 2nd do., Miss M. Lyman, Toronto, \$4.
 Best Wax Flowers, Mrs. A. Dredge, Toronto, \$6; 2nd do., a case, all white (ticket misplaced), \$4.
 Best Worsted Work, Miss Ann Unwin, Toronto, \$8; 2nd do., Miss Ann Unwin, Toronto, \$2.
 Best Worsted Work, Raised, Miss J. A. Ramsey, Kingston, \$8; 2d do., Miss J. A. Ramsey, Kingston, \$2.

Extra Prizes.

Miss Mary Sheppard, Willowdale, Hearth Rug, \$2.
 Mrs. Harper, Aurora, Knitted Quilt, \$2.
 Miss Dover, Toronto, Silk Table Cover, \$1.
 Miss Elizabeth McEvers, Cobourg, Ornamental Wreath in Seeds, \$4.
 Miss Isabella Graham, Streetsville, case of Wax Shells, \$6 and Diploma.
 Miss Isab. Graham, Streetsville, Work in Hair, \$3.
 Mrs. Fenwick, Markham, Counterpane, \$2.
 Mrs. D. Howland, Hamilton, case Hair Jewellery, \$3.
 Mrs. E. Goldsmith, Toronto, Knitted Counterpane, \$2.
 Mrs. G. Wiley, Richmond Hill, Hearth Rug, \$1.
 Mrs. Wright, Toronto, Wax Figure of Her Majesty the Queen, \$2.
 Mrs. S. A. Johnstone, Yorkville, Night Dresses, \$1.
 Mrs. Wood, Toronto, Tatting Work, \$1.
 Miss M. J. Wilson, Yorkville, Woollen Shawl, \$1.
 Miss Jane Mitchell, P. Hope, Transferred Work, \$1.
 Miss Rosa Parady, Toronto, Bead Work, \$1.
 Miss Bidwell, Cramahe, Cordon Collar and Cuffs, \$2.
 Mr. G. Silverthorn, Toronto, Straw Hat and Bonnet, \$1.

CLASS XLV.—MACHINERY, CASTINGS AND TOOLS—
 (78 Entries.)

Judges—James Crossen, Cobourg; W. P. Phillips, Kingston; Robert McKechnie, Dundas.

Best Castings for General Machinery, J. Gartshore, Dundas, Wentworth, \$10.
 Best Castings for Railways, Railroad Cars and Locomotives, assortment of, John Gartshore, Dundas, \$15.
 Best Edge Tools, assortment, H. H. Date, Galt, \$20.
 Best Pump, in metal, C. P. Hinds, Toronto, \$5; 2nd do., Isaac Briggs, Gananoque, \$3.
 Best Refrigerator, J. W. Esmonde, Toronto, \$6.
 Best Sewing Machine, Manufacturing, R. M. Wanzer & Co., Hamilton, \$10; 2nd do., L. N. Soper, Woodstock, \$7; Thomas Halligan, Newmarket; extra do., for a new improvement in Sewing Machines, adapting them to waxed thread, Diploma and \$10; do., commended, Patterson & Irwin, Belleville.
 Best Sewing Machine, Family, R. M. Wanzer & Co., Hamilton, \$10; 2nd do., Patterson & Irwin, Belleville, \$7.
 Best Valves and Gearing for working Steam expansively, either in model or otherwise—principle of working to be the point of competition, William Gill, Toronto, \$12.

Extra Prizes.

Fire Detector and Burglar Alarm, Salem Eckhardt, Unionville, Diploma and \$3.
 Blacksmith's Fire Iron, Salem Eckhardt, Unionville, \$2.
 Hand-power Loom, Miles Welsh, Brantford, \$5.
 Saw Shingle Machine, J. W. & N. Green, Waterford, \$4.
 Wood-sawing Machine, David Bruce, London, \$5.
 Four Amalgam Bells, Irwine & Sons, Uxbridge, \$5.
 Machine for making Bats, Elisha Simkins, Toronto, \$2.
 Coal Mining Machine, Elisha Simkins, Toronto, \$2.
 Shingle Machine, G. O. S. Conway, Ashburn, \$5.

Patent Fire Escape, George Campbell, Toronto, \$2 and Diploma.

Model of a Locomotive, F. A. Gardner, Hamilton, \$5.

Engine Beer Pump, D. S. Keith, Toronto, \$4.

Self-regulating Steam Warming Apparatus, D. S. Keith, Toronto, \$8.

Green House Hot Water Boiler, D. S. Keith, Toronto, \$3.

Portable Gas Making Apparatus, D. S. Keith, Toronto, \$5.

Blacksmith's Bellows, Saml. Westman, Toronto, \$3.

Smith's Forge Bellows, Jos. Dallyn & Sons, Hamilton, \$5.

A pair of Mill Stones, J. Gartshore, Dundas, \$10.

Bran Duster, John Gartshore, Dundas, \$8.

Central Discharge Water Wheel, John Gartshore, Dundas, \$5.

Forty Horse-power Steam Engine, not in operation, John Gartshore, Dundas, \$20.

Model of Improved Steam Engine, for Working Steam Expansively, Thomas Northey, Hamilton, Diploma and \$2.

Cracker and Biscuit Machine, W. W. Gibson, Dundas, \$10.

Coffee Mill, W. W. Gibson, Dundas, \$3.

Sugar Mill, do., do., \$2.

Fire Engine, W. Marks, Toronto, \$10.

Branch Rail for Track, J. Findlay, Toronto, \$2.

Shingle Machine, Jas. Davidson, Cobourg, \$10.

Double Box Loom, James Davidson, Cobourg, \$10 and Diploma.

Washing Machine, James Spring, Dorchester, \$2.

Machine for making Tin Eave Trough, Robert Emery, Toronto, \$3.

Mill Stones, R. H. Oates, Toronto, \$5.

Tailor's Shears, Geo. & S. Rogers, Toronto, \$2.

Steam Gauges, Joshua Lowe, Toronto, \$10 and Diploma.

Model of Patent Churn, Mrs. M. Murdoch, Port Dalhousie, \$1.

Combination Carriage, Mrs. M. Murdoch, Port Dalhousie, \$1.

Model of Iron Waggon, Mrs. M. Murdoch, Port Dalhousie, \$2.

Model of Seed Drill, Mrs. M. Murdoch, Port Dalhousie, \$2.

Improved Rat Trap, J. B. Ryan, Toronto, \$1.

Self-acting Cattle Guard, James Forrest, Ontario, Co. Wentworth, \$2.

Small Saw Mill, Aaron Scott, Dereham, \$4.

CLASS XLVI.—METAL WORK (MISCELLANEOUS)
 INCLUDING STOVES—(95 Entries.)

Judges—A. K. Boomer, Toronto; John Watson, Ayr; Thos. D. Harris, Toronto.

Miscellaneous.

Best Coal Oil Lamps, an assortment, Parsons Brothers, Toronto, not manufactured in Canada, diploma; 2nd do., H. Piper & Brother, Toronto, not manufactured in Canada, diploma.

Best Coppersmith's Work, an assortment, Booth & Brother, Toronto, \$7.

Best Fire Arms, an assortment, W. P. Marston, Toronto, \$7; 2nd do., James M. Jones, Chatham, \$5.

Best Files, collection of cast steel, Andrew Hart, Hamilton, \$3.

Best Fire Proof Office Safe, J. & J. Taylor, Toronto, \$8; 2nd do., J. & J. Taylor, Toronto, \$6.

Best Iron Fencing and Gate, ornamental, Wm. Bain, Sandwich, \$7.

Best Iron Work from the Hammer, ornamental, Wm. Midford, Ottawa, \$6; 2nd do., James Berry, Wellington Square, \$4.

Best Locksmith's Work, an assortment, R. J. Brown, Toronto, \$7; 2nd do., J. & J. Taylor, Toronto, \$5.

Best Nails, 20 lbs. of pressed, Cavan & Britton, Gananoque, \$6.

Best Nails, 20 lbs. of cut, Cavan & Britton, Gananoque, \$6; 2nd do., Cavan & Britton, Gananoque, \$4.

Best Plumber's Work, an assortment, John Ritchie, Toronto, \$6; 2nd do., D. S. Keith, Toronto, \$4.

Best Tinsmith's Lacquered Work, an assortment of, Booth & Brother, Toronto, \$6.

Best Wire Work, an assortment of, W. H. Coe, Toronto, \$6.

Stoves.

Best Cooking Stove, for wood, with furniture, John McGee, Toronto, \$6; 2nd do., J. McGee, Toronto, \$4.

Best Cooking Stove, for coal, with furniture, J. G. Beard & Sons, Toronto, \$6; 2nd do., J. G. Beard & Sons, Toronto, \$4.

Best Hall Stove, for wood, John McGee, Toronto, \$5; 2nd do., John McGee, Toronto, \$3.

Best Hall Stove, for coal, John McGee, Toronto, \$5; 2nd do., John McGee, Toronto, \$3.

Best Parlour Stove, for wood, John McGee, Toronto, \$5; 2nd do., J. G. Beard & Sons, Toronto, \$3.

Best Parlour Stove, for coal, J. McGee, Toronto, \$5.

Extras.

Improved Fire-place, W. H. Sheppard, Toronto, diploma.

Three Iron Bedsteads, J. A. Taylor, Toronto, \$5.

Parlour House Safe, J. A. Taylor, Toronto, \$3.

Plumber's Brass Work, John Ritchie, Toronto, diploma.

Engineer's Brass Work, John Ritchie, Toronto, \$5.

Soda Water Fountain, T. Smith, Toronto, diploma.

Soda Water Bottling Machine, T. Smith, Toronto, diploma.

Specimens of Iron Rivets, Isaac Briggs, Gananoque, diploma.

A Collection of Saws, Morland, Watson & Co., Montreal, diploma.

Pair of Self-fastening Skates, R. J. Brown, Toronto, diploma.

Zinc Window Sash and Eave Troughs of Zinc and Galvanized Iron, Edward Colley, St. Mary's, diploma.

Steam and Water Engineering Brass Work, D. S. Keith, Toronto, diploma.

Assortment of Stamped Copper Bottoms, J. McGee, Toronto, diploma.

Sample Smoothing Irons, Ives & Allan, Montreal, diploma.

Patent Door Bell, A. E. Taylor, Brockville, diploma.

Railway Switches, J. Kitchen, Kingston, diploma.

Laundry Stove, J. G. Beard, Toronto, diploma.

New and Useful Apparatus for Economizing Fuel in Heating Rooms, applicable to open grates, E. Vernon, Hamilton, \$5 and diploma.

Assortment of Weights and Measures, H. Piper & Brother, Toronto, \$5.

CLASS XLVII. — MISCELLANEOUS, INCLUDING POTTERY AND INDIAN WORK—(56 Entries).

Judges—D. B. Garton, Barrie; David Savage, Belleville.

Miscellaneous.

Best Brushes, an assortment, Charles Boeckh, Toronto, \$6; 2nd do., Alfred Green, Hamilton, \$4.

Best Model of a Steam Vessel, Richard Osborne, Newburg, \$6.

Best Model of a Sailing Vessel, Richard Osborne, Newburg, \$6; 2nd do., Richard Osborne, Newburg, \$4.

Pottery.

Best Filter for Water, Jos. Brown, Carlton West, \$3; 2nd do., F. P. Gould, Brantford, \$2.

Best Pottery, an assortment, Jos. Brown, Carlton West, \$8; 2nd do., Wm. Lea, York, \$5.

Best Sewerage Pipes, Stoneware, assortment of sizes, W. & R. Campbell, Hamilton, \$10; 2nd do., F. P. Gould, Brantford, \$6.

Best Assortment of Stoneware, F. P. Gould, Brantford, \$10.

Best Slates for Roofing, Benj. Walton, Toronto, \$8.

Extra Prizes.

Artificial Limbs, John Condell, Brockville, \$4.

Stove-pipe Conductor of Artificial Stone, W. H. Sheppard, Toronto, \$2.

Patent Canvas Felt, W. D. Darlington, Toronto, \$3.

Artificial Limbs, Norris Black, Toronto, \$3.

Lamp Chimney Cleaners, C. Boeckh, Toronto, \$1.

Earthenware Vases, John Burns, Yorkville, \$1.

Specimens of Indian Work, "sox ska tien a chi," of Coughnawaga, \$3.

CLASS XLVIII.—MUSICAL INSTRUMENTS—(31 Entries.)

Judges—G. W. Strathey, Mus. Doc., Toronto; Prof. F. W. Sofge, Toronto.

Best Harmonium, R. S. Williams, Toronto, \$10; 2nd do., Andrews Bros., London, \$6.

Best Melodeon, R. S. Williams, Toronto, \$6; 2nd do., Andrews Bros., London, \$4.

Best Organ, Church, Edward Lye, Toronto, \$25.

Best Piano, Square, John C. Fox, Kingston, \$15; 2nd do., W. G. Vogt & Co., Montreal, \$10.

Best Piano, Grand, J. Thomas & Co., Toronto (2nd prize), \$10.

Best Piano (Cottage), J. Thomas & Co., Toronto (2nd Prize), \$6.

Best Violin, Silas Coleman, Toronto, \$3; 2nd do., Coridon Lewis, Salford, \$2.

Extra Prizes.

Violin Case, Silas Coleman, Toronto, \$2.

Double Bass, Silas Coleman, Toronto, \$3.

Bass Drum, R. S. Williams, Toronto, \$1.

Side Drum, in wood, R. S. Williams, Toronto, \$1.

Side Drum, in brass, R. S. Williams, Toronto, \$1.

Finishing of Piano Action, C. Baker, Toronto, \$2.

CLASS XLIX.—NATURAL HISTORY—(17 Entries.)

Judges—H. Y. Hind, Toronto; Thomas McIlwraith, Hamilton; T. J. Cottell, Woodstock; W. N. Alger, Brantford.

Best collection of Stuffed Birds of Canada, classified, and common and technical names attached, S. Passmore, Toronto, \$8.

Best collection of Native Fishes, stuffed or preserved in spirits, and common and technical names attached, Samuel Passmore, Toronto, \$8.

Best collection of Native Insects, classified, and common and technical names attached, Wm. Saunders, London, \$8.

Best collection of Minerals of Canada, named and classified, Thomas Herrick, Toronto, \$8; 2nd do., W. W. Fox, Toronto, \$6.

Best collection of Native Plants, arranged in their natural families, and named, T. Poole, M.D., Norwood, \$8; 2nd do., Miss Kate Crooks, Hamilton, \$6.

Best collection of Stuffed Birds and Animals of any country, Samuel Passmore, Toronto, \$8.

Extras.

Basket of Sea Weed, Mrs. Mary Gall, Toronto, commended.

Book of Fern Leaves, Mrs. Dredge, Toronto, commended.

Sea Weed, Mrs. Dredge, Toronto, commended as very tastefully arranged.

Collection of Sea Weed, Miss C. Carmichael, Toronto, commended.

CLASS L.—PAPER, PRINTING, BOOKBINDING & TYPE.
(26 Entries.)

Judges—John Edwards, Toronto; David Wyllie, Brockville; Archibald McLachlin, Mitchell.

Best Bookbinding, Blank Book, assortment of, Brown Brothers, Toronto, \$5; 2nd do., W. C. Chewett & Co., Toronto, \$3.

Best Bookbinding, Letter-press, assortment of, Brown Brothers, Toronto, diploma and \$5.

Best Letter-press Printing, Plain, W. C. Chewett & Co., Toronto, \$5; 2nd do., Geo. Brown, Toronto, \$3.

Best Letter-press Printing, Ornamental, G. Brown, Toronto, diploma and \$5.

Best Paper Hangings (Canadian paper), one dozen rolls, assorted, Barber & Bros., Georgetown, diploma and \$7.

Best Printing, Wrapping and Writing Papers, one ream of each, Buntin Bros., Toronto, \$7; 2nd do., Barber Bros., Georgetown, \$5.

Best Printing Type, an assortment, C. T. Palsgrave, Toronto, \$7.

Extras.

Paper Cloth Address Labels, T. Hill, Toronto, \$2.

Machine for Cutting and Mitering Printers' Rules, John Fenton, Toronto, diploma.

Blotting Paper, Colored Paper and Envelopes, Buntin Bros., Toronto, diploma.

Assortment Letter-press Printing, W. C. Chewett & Co., Toronto, \$2.

Bankers' Cases, &c., Brown Bros., Toronto, \$2.

Pocket Books, Wallets, &c., Brown Bros., Toronto, diploma.

Embossed Cloth Cases, Brown Bros., Toronto, \$1.

Ornamental Cards, G. Brown, Toronto, commended.

Plain Cards, Geo. Brown, Toronto, commended.

Plain Posters, Geo. Brown, Toronto, commended.

Ornamental Posters, Geo. Brown, Toronto, diploma.

Letter-press Printing, varieties, G. Brown, Toronto, commended.

CLASS LI.—SADDLE, HARNESS, ENGINE HOSE, AND TRUNK MAKERS' WORK, AND LEATHER.

(79 Entries.)

Judges—Duncan McKay, Brantford; Thomas Field, Galt; H. Thompson, Waterdown.

Best Engine Hose and Joints, 2½ inches in diameter, 50 feet of copper rivetted, T. Thompson, Toronto, \$6.

Best Harness, set Double Carriage, Marshall Porter, Bowmanville, \$8; 2d do., J. & R. Irvine, Montreal, \$6.

Best Harness, set of Single Carriage, A. Fraser, Hamilton, \$6; 2nd do., W. Steward, jun., Toronto, \$4.

Best Harness, set of Team, R. Malcolm, Toronto, \$5; 2nd do., W. Steward, jun., Toronto, \$3.

Best Saddle, Lady's Full Quilted, W. Steward, jun., Toronto, \$8; 2nd do., Thos. Thompson, Toronto, \$6.

Best Saddle, Lady's Quilted Safe, R. M. Hinder, Toronto, \$6; 2nd do., W. Steward, jun., Toronto, \$4.

Best Saddle, Gentleman's Full Quilted, T. Thompson, Toronto, \$7; 2nd do., J. & R. Irvine, Montreal, \$5.

Best Saddle, Gentleman's Plain Shaftoe, W. Steward, jun., Toronto, \$5; 2nd do., A. Fraser, Hamilton, \$3.

Best Trunks, an assortment, H. E. Clarke, Toronto, \$8; 2nd do., W. Steward, jun., Toronto, \$6.

Best Valises and Travelling Bags, an assortment, H. E. Clarke, Toronto, \$5.

Best Hames, three pairs of iron cased, team or cart, Robert Malcolm, \$3.

Best Hames, six pairs of wooden team, R. C. Gill, Colborne, \$3; 2nd do., Robert Malcolm, Toronto, \$2.

Leather.

Best Belt Leather, 30 lbs., R. K. Johnson, Fergus, \$3; 2nd do., W. M. Macklem, Chippewa, \$2.

Best Brown Strap and Bridle, one side of each, W. M. Macklem, Chippewa, \$3; 2nd do., R. K. Johnson, Fergus, \$2.

Best Carriage Cover, two skins, Robinson & Flummerfelt, Markham, \$3; 2nd do., R. K. Johnson, Fergus, \$2.

Best Deerskins, dressed, Hy. Ferdinand, Waterloo, \$2; 2nd do., Greene, DeWitt & Co., Montreal, \$1.

Best Harness Leather, two sides, Jos. Flack, Sandhill, \$3; 2nd do., Robert Dale, Sandhill, \$2.

Best Hogskins for Saddles, (no first); 2nd do., R. K. Johnson, Fergus, \$3.

Best Patent Leather, for carriage or harness work, (no first); 2nd do., R. K. Johnson, Fergus, \$4.

Best Skirting for Saddles, two sides, W. M. Macklem, Chippewa, \$4.

Extra Entries.

Stud Bridle and Roller, Marshal Porter, Bowmanville, \$2.

Winker Leather, R. K. Johnson, Fergus, \$2.

Buff Grain Leather, R. K. Johnson, Fergus, \$2.

Express Harness, Robt. Malcolm, Toronto, \$2.

Sample of Belting, U. A. Harvey, St. Davids, \$2.

Assortment of Horse Collars, Robert Nicholl, Toronto, \$4.

Cart Harness, Robt. Malcolm, Toronto, \$2.

Pair Scotch Collars, Robert Malcolm, Toronto, \$2.

CLASS LII.—SHOE AND BOOT-MAKERS' WORK—
(78 Entries.)

Judges—John Sterling, Toronto; James Gow, Guelph; James F. Wright, Vienna.

Best Boots, ladies, an assortment, John Sims, Toronto, \$7; 2nd do., R. Nisbet & Co., Hamilton, \$5.

Best Boots, gentlemen's sewed, an assortment, John Sims, Toronto, \$7; 2nd do., R. Nisbet & Co., Hamilton, \$5.

Best Boots, pegged, an assortment, John Sims, Toronto, \$5; 2nd do., Childs & Hamilton, Toronto, \$3.

Best Boot and Shoemakers' Lasts and Trees, an assortment, W. A. Young, Dundas, \$8.

Best Calf Skins, W. M. Macklem, Chippewa, \$3; 2nd do., Robinson & Flummerfelt, Markham, \$2.

Best Calf Skins, two morocco, W. M. Macklem, Chippewa, \$3; 2nd do., R. K. Johnson, Fergus, \$2.

Best Cordovan, two skins of, R. K. Johnson, Fergus, \$3; 2nd do., Wm. Jacques, Colborne, \$2.

Best Dog Skins, two dressed, W. Jacques, Colborne, \$3; 2nd do., A. McGlashan, York Mills, \$2.

Best Kip Skins, two sides, W. M. Macklem, Chippewa, \$3; 2nd do., John Tye, Whithy, \$2.

Best Patent Leather, for bootmakers, 20 feet, R. K. Johnson, Fergus, \$6.

Best Sole Leather, two sides, Robt. Garner, Drummondville, \$3; 2nd do., Andrew McGlashan, York Mills, \$2.

Best Upper Leather, two sides, W. M. Macklem, Chippewa, \$3; 2nd do., Robinson & Flummerfelt, Markham, \$2.

Extra Prizes.

- Black Grain Kip, R. K. Johnson, Fergus, \$2.
- Grained Up. Leather, W. M. Macklem, Chippawa, \$2.
- Assortment of Shoemakers' Pegs, W. A. Young, Dundas, \$2.
- Boot Treeing Machine, W. A. Young, Dundas, \$5.
- Crimping Machine, W. A. Young, Dundas, \$5.
- Boston Boot Polishing Machine, W. A. Young, Dundas, \$2.
- Gr'd Dressed Calf Skin, Cook & Co., Yorkville, \$2.
- Leather Leggings, Gillyatt & Cobley, Toronto, \$5.
- Calf Kid, Greene, DeWitt & Co., Montreal, \$4.
- Sheep Kid, for gloves, Greene, DeWitt & Co., Montreal, \$2.
- Grained Calf Skin, John Tye, Whitby, \$2.
- Grained Kip Skin, John Tye, Whitby, \$2.

CLASS LIII.—WOOLLEN, FLAX AND COTTON GOODS ; AND FURS AND WEARING APPAREL—(155 Entries.)

Judges—James F. Kidner, Hamilton; Thomas Oliver, Woodstock; Joseph Manning, Brownsville.

- Best Bags, from flax or hemp, the growth of Canada, one dozen, David Smellie, Concord, \$5.
- Best Bags, one doz. cotton, Jos. Wright, Dundas, \$4.
- Best Blankets, woollen, one pair, John Woodhall, Delaware, \$6; 2nd do., Ezl. Snider, Brockville, \$4; Mrs. Geo. Bateman, Oakwood, commended.
- Best Carpet, woollen, one piece, E. Snider, Brockville, \$8; 2nd do., Reuben Lundy, Newmarket, \$6.
- Best Carpet, woollen stair, one piece, E. Snider, Brockville, \$6; 2nd do., E. Snider, Brockville, \$4.
- Best Cloth, fullod, one piece, Fraser & Co., Cobourg, \$6; 2nd do., J. N. Pitts, Port Dover, \$4.
- Best Cloth, broad, one piece, Fraser & Co., Cobourg, \$6; 2nd do., Platt Hinman, Grafton, \$4.
- Best Counterpanes, two, John Bowman, Almira, \$5; 2nd do., Hugh McMillan, Erin, \$3.
- Best Cordage and Twines, from Canadian flax or Hemp, assortment of, A. & D. McGregor, Toronto, \$10; 2nd do., A. Main & Co., Hamilton, \$6.
- Best Check, for horse collars, one piece, Ezekiel Snider, Brockville, \$4.
- Best Drawers, factory made, woollen, one pair, J. G. Crane, Ancaster, \$4.
- Best Flannel, factory made, Barber, Bros., Streetsville, \$5; 2nd do., Clark & Nixon, Clarksburg, \$3.
- Best Flannel, not factory made, one piece, Ezekiel Snider, Brockville, \$5; 2nd do., W. Forfar, Ellesmere, \$3.
- Best Flannel, scarlet, one piece, Barber, Brothers, Streetsville, \$5; 2nd do., Barber, Brothers, Streetsville, \$3.
- Best Fur Cap & Gloves, H. Ferdinand, Waterloo, \$4.
- Best Fur Sleigh Robe, H. Ferdinand, Waterloo, \$5; 2nd do., Platt Hinman, Grafton, \$3.
- Best Gloves and Mitts of any leather, an assortment, Greene, DeWitt & Co., Montreal, \$4; 2nd do., H. Ferdinand, Waterloo, \$3.
- Best Horse Blankets, two pairs, Newbury Button, Milnesville, \$5.
- Best Kersey for Horse Clothing, one piece, H. J. Scott, Belleville, \$5; 2nd do., Ez. Snider, Brockville, \$3.
- Best Linen Goods, one piece, David Smellie, Concord, \$5.
- Best Winsey, Checked, one piece, Elizabeth Patton, Milliken, \$3.
- Best Satinet, Black, one piece (no first); 2nd do., Disher & Haight, St. Catharines, \$4.
- Best Satinet, Mixed, one piece, Disher & Haight, St. Catharines, \$5; 2nd do., Barber Bros., Streetsville, \$3.

- Best Shirts, factory made, three woollen, Jasper G. Crane, Ancaster, \$5.
- Best Silk and Felt Hats, Higby, Woodruff & Co., Hamilton, \$5.
- Best Stockings and Socks, factory made, woollen, three pairs each, Jasper G. Crane, Ancaster, \$4.
- Best Suit of Clothes of Canadian Cloth, Lawson & Co., Toronto and Hamilton, \$10.
- Best Tweed, winter, one piece, J. N. Pitts, Port Dover, \$6; 2nd do., Fraser & Co., Cobourg, \$4.
- Best Tweed, summer, one piece, Barber Brothers, Streetsville, \$6; 2nd do., J. N. Pitts, Port Dover, \$4.
- Best Twines, Linen and Cotton, an assortment, Alex. Main & Co., Hamilton, \$3; 2nd do., A. & D. McGregor, Toronto, \$2.
- Best Woollen Cloths, Tweeds, &c., an assortment, J. N. Pitts, Port Dover, \$10; 2nd do., B. & W. Rosamond, Lanark, \$6.
- Best Woollen Shawls, Stockings, Drawers, Shirts and Mitts, an assortment, J. G. Crane, Ancaster, \$10.
- Best Yarn, white and died, one pound of each, J. G. Crane, Ancaster, \$2.
- Best Yarn, fleecy woollen, for knitting, one pound, J. G. Crane, Ancaster, \$2.
- Best Yarn, cotton, Joseph Wright, Dundas, \$2.

Extra Entries.

- Black Cassimere from Merino Wool, Barber Bros., Streetsville, \$4.
- Oxford Gray, Barber Brothers, Streetsville, \$4.
- Children's Stockings, J. G. Crane, Ancaster, \$1.
- Overcoat of English Material, Lawson & Co., Toronto and Hamilton, \$1.
- Overcoat of Canadian Cloth, Lawson & Co., Toronto and Hamilton, \$1.
- Sheepskin Mats, John Cooke, Toronto, \$1.
- Oxford Doeskin, Barber Brothers, Streetsville, \$3.

NOTES BY JUDGES.—The colours of the factory-made flannels need improving. Some of the home-made flannels to which we have not awarded prizes are very good, but the patterns are objectionable. The patterns of some of the woollen cloths and tweeds are also bad. An assortment of gentlemen's woollen scarfs from the Ontario Mills, Cobourg, are very good. A bale of factory cotton, manufactured by Gordon & McKay, is highly deserving of commendation.

CLASS LIV.—FOREIGN MANUFACTURES—(39 Ent.)

- Judges*—Dr. Beatty, Cobourg; Dr. Craigie, Hamilton.
- Assortment of Fishing Hooks, Fishing Tackle, Needles, &c. &c., Allcock, C. Laight & Co., Redditch, England, diploma.
 - Steam Fire Engine, Silsby, Myndesse & Co., Seneca, N. Y., diploma.
 - Patent Saponifer, and Soap manufactured therefrom, Erastus Burnham, Toronto, diploma.
 - Assortment of Steinway & Son's, Stodart's, and Chickering's Pianos, exhibited by A. & S. Nordheimer, Toronto; commended as first-class instruments of the respective manufacturers.

AMATEUR MUSICAL BANDS—(2 Bands in competition.)

- Judges*—G. M. Strathey, Mus. Doc., Toronto; Prof. F. M. Sofge, Toronto; W. L. Lawrason, London.
- Best Canadian Amateur Band, consisting of not less than eight performers, of whom there shall not be more than two professional artists, Cobourg Brass Band, \$60; 2nd do., Union Brass Band, Toronto, \$40.
- NOTE.**—The Judges would suggest an Overture being made one of the pieces to be played in future competitions.

The *Oil City Register*, referred to in an article on page 285, as being published in Titusville, Pennsylvania, is published in Oil City, at the mouth of Oil Creek, some 17 miles distant from Titusville in the centre of the Venango oil region.

Our exchanges will please notice that this Journal, commencing with the next number, will be published at the uniform subscription of 50 cents per annum; and that parties sending \$5 for ten subscribers, will receive a copy free.

Correspondence.

To the Editor of the Journal of the Board of Arts and Manufactures.

SIR,—Believing it may be interesting to many managers of Mechanics' Institutes, among whom I understand your *Journal* largely circulates, to be informed of some of the details of the working of the library of the Institute in the city of Toronto, I beg the favor of space in your columns for that purpose.

The library referred to contains nearly 6,000 vols. of books, and is kept open for circulation and exchange each day, from 9 a.m. to 10 p.m.

The books in the library have, until lately, been arranged on the shelves according to their sizes, and not according to their subjects.

This system has been adopted so as best to economize space, and give an appearance of uniformity to the whole. The works were thus divided into about 20 sections, folios being marked A, quartos B, and so on down to the 24 mos, marked U; the vols. in each of these sections being numbered consecutively from 1 to whatever No. the section contained. In the catalogue, however, the works were all classified according to subjects, a shelf letter and No. being given before the title of each work, as in the following example:—

- L 184..... Sigourney's (Mrs.) Poems.
- N 141..... Smith's (Alex.) Poems.
- Q 2..... Songs, by the Ettrick Shepherd.
- Q 33..... Sophocles, by Francklin.
- N 242..... Spenser's Faerie Queene.
- O 165..... Surrey's (Lord) Poems.

During the present year the publication of a new catalogue had become necessary, and the directors deemed it advisable to attempt a classification of the works according to subjects on the shelves of the library, as well as in the catalogue, still retaining as far as possible the arrangement according to size. This having been accomplished, a new catalogue of some 90 pages has been issued.

The whole of the works are now arranged on the shelves, and in the catalogue, on the following plan of classification:—

- SECTION I.—Biography.
- “ II.—History (Civil.)
- “ “ “ (Natural.)
- “ “ “ (Religious.)
- “ III.—Novels and Tales.
- “ IV.—Poetry and the Drama.
- “ V.—Periodical Literature, Reviews, Magazines, &c.
- “ VI.—SCIENCE, ART, &c.,—
 - Agriculture, Botany and Gardening.
 - Architecture and the Fine Arts—Decorative Art—Music.
 - Geology, Mineralogy, &c.
 - Legal and Political Science, Political Economy.
 - Manufactures, Trades, Commerce—Mercantile Arts.
 - Medical Science, Physiology, Phrenology, &c.
 - Moral and Intellectual Philosophy, Education, &c.
 - Natural Philosophy, Astronomy, Mathematics, &c.
 - Science and Art, General.

- SECTION VII.—Voyages and Travels.
- “ VIII.—Miscellaneous.
- “ IX.—Religious Literature.
- “ X.—Library of Reference.
- “ XI.—Valuable Illustrated Works, &c.

Eight of these sections are each divided, upon the shelves of the Library, into three sizes of books, each division having an initial letter, as, for example, section I.—A B C, section II.—D E F, and so on to the end of the alphabet—section IX. having but two divisions, and sections X. and XI. being designated by double initial letters.

The advantages attending this system of using initial letters to designate the several divisions of the books, must be apparent to all having charge of libraries, from the facilities it affords for the consecutive numbering of the works on the shelves, or the recording and tracing of those taken out. The latter will be more apparent on consideration of the plan of the record book used for the purpose in our Institute, diagrams of which I here give, hoping your printer will be able to make them up with *printer's rules*.

The record book is divided into two sections, the first having one or more pages for each of the initial letters and progressive nos. in the respective divisions; the second containing an alphabetical list of members taking out books—each member also having a number attached to his name. This portion is also ruled in spaces for recording books taken out during any stated week. The mode of recording books taken out, and crediting those returned, will be best understood by the diagrams:—

(SECTION 1ST.)

A.

	1	2	3	4	5	6	7	8	9	10
	3				1		6			

B.

	1	2	3	4	5	6	7	8	9	10
		4		5		2				

(SECTION 2ND.)

Week commencing Monday.

No.	Name.	1862.				July.				August.			
		7	14	21	28	4	11	18	25				
1	Abram, J...	A. 5.											
2	Allen, T...	B. 6.											
3	Brown, S...	A. 1.											
4	Benson, W.		B. 2.										
5	Curtis, R...	B. 4.											
6	Cook, N. ...		A. 7.										

It will thus be seen that J. Abram takes out A 5, which is charged to him in the proper column, the Librarian then turns to the 1st section of the record book and enters under A 5 the number of J. Abram, which is No. 1. A second party enquires for the vol. marked A 5, and the librarian turns to that letter and No. in the 1st section, and finds it charged to No. 1—referring to No. 1 in the second section he finds the name of the party who has the work out. A third party enquires for B 5—the librarian turns to that letter and No. in the first section of the record book, and discovers that it is not charged to any one, consequently it should be found on the shelves. The party having out B 6, brings it in; the librarian, whether he knows the name of the party or not, turns to B 6 in the 1st section of the record, and finds it charged to No. 2, which No. he crosses with his pencil, and then turning to No. 2 in the 2nd section of the record, he crosses with his pencil the entry B 6, which stands charged against T. Allen. By this means a perfect record can be kept, and every book readily traced, by a reference to this one book.

Each record book is prepared to last for six months. Each folio in the first section should be ruled perpendicularly for fifty spaces; and the second section for 26 weeks, with horizontal lines for either 25 or 50 members' names. Each section

should be indexed, both with initial letters and progressive numbers, so as to facilitate references.

I am satisfied that the plan I have here imperfectly described is admirably adapted for libraries with an extensive, or even moderate circulation. The system originated, I believe, with the late secretary and librarian of this Institute, and is not, that I am aware of, in use in any other library; I therefore submit it for the consideration of all who may be interested in it. I would merely add, that between 600 and 700 members are regularly taking out books from our library, and that no inconvenience is experienced in making the necessary entries.

Respectfully yours,

Toronto, Nov. 28, 1862.

M. T. M. I.

ON THE IMPORTANCE OF AGRICULTURAL STATISTICS.

To the Editor of the Journal of the Board of Arts and Manufactures.

SIR,—In perusing the articles on “The use to be made of our Mineral Resources,” “The Agricultural Census of 1861,” “On the Cultivation of Wheat in Canada,” and on “The Season of 1862,” contained in the August and September numbers of your valuable and talented Journal, the importance of a correct statistical report of the agriculture and trade of the Province, was strongly impressed on my mind, by seeing some errors into which the writer had been led, by following the notion of the public, and of too many of our public men, in taking the Tables of Trade and Navigation, issued by the Customs Department, as data for the quantity and value of the surplus agricultural produce annually exported from the Province.

These tables truly represent the extent of the carrying trade, and the quantity and value of goods entered at the custom houses, both for import and export; but are not so arranged as to show the quantity and value of goods exported being the growth or produce of the country. Such facts are to be found dispersed through the different tables of the report, and it would be advantageous if the Customs Department collected and arranged them in convenient form, so that the public might have an annual exhibit of the import trade for consumption, as well as of the export trade, being the surplus growth, produce or manufacture of the Province, as well as the present tables of the carrying trade.

The subjoined tables, arranged from the official report for 1861, will show what may be done even from the present returns, and the peculiar facts therein disclosed will be both useful and interesting; sufficiently so, I trust, to warrant some of

our Boards of Agriculture or Trade in an endeavor to obtain a more full and complete set from official sources, and extended, at least, from the period of the union of the Provinces to the present time. The tables are numbered 1, 2, 3 and 4.

At page 260 of the Journal, the value of the exports from the farm are represented as \$14,259,225 in 1860, and \$18,244,631 in 1861." These figures in the official tables represent the value of agricultural produce, viz., grain and seeds exported in these years; but, to show the net surplus, must be lessened nearly one-half by imports of the same articles—the net surplus for 1861 being \$11,284,944.

In commenting on the exports of butter, beef, pork and cheese, on the same page, you have been misled by trusting to the tables.* The Province has exported butter for years, the annual value of which has lately increased very fast. Of salt beef and pork the import has always been large until 1861, when an export of \$23,431 appears to contrast with an import of \$1,219,437 in 1856. Table No. 2 shows this export of meats of all kinds as exceeded by that of poultry, and that is not one-fourth the value of the eggs exported in the same year. The import of cheese has always been large, and rather increased than otherwise. The fact that the import of hides and horns exceeds the value of the exports of cattle, sheep and pigs by \$36,065 is curious, but rather in favor of the industry of the Province than otherwise.

The observations on the Cultivation of Wheat in Canada (p.257), and the comparisons made, further show the necessity of a more extensive statistical return, to confer on them the value to the enquirer into the true state of the agriculture of the Province which they might possess. The census for both Provinces was taken in 1851 and in 1860; both were years of most bountiful crops in Upper Canada; the returns must therefore be looked upon as accidental, and form no criterion of the produce of the wheat crops for each of the intermediate years. The deductions to be drawn from the return of the census must be checked by that of the annual export of each year within the series, and as I had previously arranged such a table from the official reports, I subjoin a copy, No. 4. From this, the risks attending this crop, and the uncertainty of the product will be evident; and the small increase of surplus between the years 1853 and 1861 must be far from satisfactory to either the agricultural or commercial men of the Province. The great falling off in the exports of 1857, 1858

* NOTE.—Our correspondent cannot have perused the "comments" to which he refers, with attention, otherwise he would find that the increase in the production and exportation of butter is shown in the tables.—(Ed.)

and 1859, from whatever cause it had arisen, evidently led to the extensive substitution of spring for fall wheat, as the general crop throughout the country. In contrasting my table No. 4 with the table of wheat exports from Lower Canada at page 257 of the Journal, the peculiar fact is disclosed that the wheat exported from Lower Canada in 1852 exceeded the quantity exported from both Provinces in 1859.

J.

No. 1.

Abstract Statement of the Trade of the Province for 1861.

IMPORTS.

	\$	\$
<i>Imports for Consumption:</i>		
Goods paying duties	25,086,735	
“ free.....	3,980,389	29,067,124
<i>Imports for Exportation, or to set free an equivalent of Canadian products:</i>		
Products of Fisheries.....	472,210	
“ Forest.....	23,473	
Animals and their Products	2,354,804	
Agricultural Products.....	6,953,532	9,804,019
<i>Casual Imports:</i>		
Coin and Bullion	3,304,675	
Military Stores.....	879,018	4,183,693
<i>Imports by the St. Lawrence in transitu for the United States</i>	522,514	522,514
Total Import Trade.....		43,577,350

EXPORTS.

	\$	\$
<i>The Produce or Manufacture of the Province:</i>		
Produce of the Mine.....	454,963	
Mineral Oil.....	8,155	
Produce of the Fisheries...	191,499	
“ “ Forest	9,549,172	
Animals and their Products	1,326,664	
Agricultural Products.....	11,282,944	
Manufactures.....	289,130	
Other Articles	154,718	
Val. of Ships b'lt at Quebec	1,411,480	
Estimated am't of Exports returned short at Inland Ports.....	1,806,947	26,565,663
<i>Re-Exports:</i>		
Produce of the Fisheries...	472,210	
“ “ Forest	23,473	
Animals and their Products	2,354,804	
Agricultural Products.....	6,953,532	9,804,019
<i>Casual Exports:</i>		
Coin and Bullion	244,513	244,513
<i>Exports by the St. Lawrence from the United States, in transitu to the sea-board...</i>	3,505,511	3,505,511
Total Export Trade.....		40,119,706

No. 2.

Statement of Canadian Trade in Animals and their Products, for 1861:

ARTICLES.	IMPORTS.	EXPORTS.	EXCESS	EXCESS
	Value.	Value.	IMPORTS.	EXPORTS.
			Value.	Value.
Horses	\$129,174	\$607,356	.....	\$538,181
Horned Cattle	136,535	384,599	.....	248,064
Sheep	18,697	149,220	.....	130,523
Pigs.....	54,200	161,279	.....	106,989
Other Animals	440	.....	\$440	.....
Poultry and Fancy Birds ..	2,622	34,581	.....	31,959
Butter	69,650	841,046	.....	771,096
Bristles	18,379	.....	18,379	.....
Cheese	185,930	23,937	161,993	.....
Eggs	1,176	93,341	.....	92,166
Furs and Skins, Pelts and Tails, undressed	126,770	315,602	.....	188,832
Grease and Scraps	11,031	.....	11,681	.....
Hides and Horns.....	645,678	23,937	521,641	.....
Hair	3,882	.....	3,882	.....
Honey.....	.....	4	.....	.....
Lard	14,928	9,769	5,169	.....
Ments of all kinds	507,472	530,903	.....	23,431
Tallow	242,474	683	241,601	.....
Wool	295,126	434,199	.....	139,073
Beeswax.....	.....	1,089	.....	1,089
Bear's Grease .....	.....	135	.....	135
Bones .....	.....	7,738	.....	7,738
Feathers.....	.....	641	.....	541
Tongues.....	.....	62	.....	62
Venison.....	.....	957	.....	957
Total Animals and their products.....	2,354,804	3,681,463	965,070	2,281,736

No. 3.

Statement of Canadian Trade in Agricultural Products, in 1861.

ARTICLES.	IMPORTS.	EXPORTS.	EXCESS	EXCESS
	Value.	Value.	IMPORTS.	EXPORTS.
			Value.	Value.
Broom Corn	\$50,887	.....	\$50,887	.....
Flax, Hemp and Tow	91,793	\$6,452	85,341	.....
Flour	711,935	6,614,065	.....	\$5,902,730
Barley and Rye	53,340	1,039,288	.....	1,085,942
Bran and Shorts.....	1,338	23,690	.....	22,352
Buckwheat	44	.....	44	.....
Oats	3,814	643,023	.....	639,209
Beans and Peas	2,254	1,503,240	.....	1,500,992
Indian Corn	1,087,277	310,637	776,640	.....
Wheat.....	4,260,340	7,634,309	.....	3,374,409
Meal of all kinds.....	17,511	255,330	.....	238,319
Rice.....	105,022	.....	105,022	.....
Vegetable	28,979	23,377	5,102	.....
Balsam .....	.....	2,825	.....	2,825
Pot and Pearl Barley.....	.....	3,646	.....	3,646
Green Fruit	245,259	12,258	233,001	.....
Hay.....	.....	1,443	.....	1,443
Hops .....	.....	6,026	.....	6,026
Maple Sugar.....	.....	369	.....	369
Seeds of various kinds	129,962	102,770	27,192	.....
Tobacco (unmanufact.)	163,771	1,622	162,149	.....
Total Agricult. Products.....	6,953,632	18,236,470	1,445,378	12,728,322

No. 4.

Statement of the net Exports of Wheat, Flour and Bran from the Province.

YEARS.	VALUE.	RATE PER	QUANTITY.
	\$	DUSHEL.	
	\$	c.	Bush.
1853	7,322,324	1 15	6,267,628
1854	6,742,200	1 31	5,146,795
1855	11,750,020	1 85	6,351,862
1856	10,476,327	1 39	7,536,925
1857	3,690,428	1 06	3,841,536
1858	2,763,509	0 97	2,848,977
1859	1,097,742	1 06	1,085,606
1860	6,867,061	1 13	5,637,222
1861	9,290,351	1 08	8,613,195

Selected Articles.

Copper Mining in Canada

A correspondent of the *London Mining Journal*, signing himself "A Cornish Agent in Canada," writes to that paper a very flattering and encouraging account of the Acton Copper Mines. He says :

The most important mineral deposit which has yet come under my notice is that at the Acton Mines; and a deposit it is, for in all my experience in mining, in different countries, I have met with nothing near a comparison. The lode is exceedingly large, and the ores of rich quality; it is no rare thing to quarry rocks of mineral, tons in weight, worth 20 per cent. for copper, from it. The operations here have been on a limited scale, when compared with what might have and would have been done had it been the property of a spirited English company. I believe it is about three years since the first ore was sold from these mines. The parties connected with it had neither the means nor ability of carrying it out successfully, and therefore it has now fallen into the hands of a Mr. Davies. This deposit was first discovered within a few inches of the surface, and although over 100,000l. worth of mineral has been sold from from it, their deepest workings can still be prosecuted by daylight. The copper ore sold has averaged about 17 per cent., and there is no doubt but that it would make a produce of at least 20 per cent., if dressed with good machinery and management. The largest sale of ores from these mines for one month I believe to be about 600 tons, and from all appearance there would be no trouble in doubling that quantity, if worked extensively, without any probability of being speedily exhausted. This is without doubt a wonderful discovery, and one from which immense profits will be realised for a period impossible to state.

There are several other mining properties, which have been explored and found to contain large and productive copper lodes. I have examined some two or three of them, which have exceedingly good prospects, and are capable of yielding (though only just opened on at the back), from present appearances large quantities of mineral. At the Roxton, where the lode had been opened on at surface, I found it to be from 6 to 8 ft. wide, the whole of which, as broken, without dressing, would make a produce of 8½; and on being properly dressed I consider it worth as much as the Acton ores. Such a thing as this in Cornwall would soon be at a market value of £100,000, when at the same time it is here lying idle, for want of a little capital and proper persons to carry it out. Other properties, equally as good to all appearance, remain in the same neglected state, and the whole district, within 30 miles of the Acton Mines, appears to be full of mineral wealth, as in almost every instance where explorations have been carried on copper ore has been found to exist, and my opinion is that a district which will surpass it, when developed for copper ore, is not yet discovered. It appears to me as if this part of the colony has been, and still is, sadly neglected, both by gentlemen in this country and English capitalists. However, I am fully

satisfied that the war in the States has seriously made against the mining interest here, for had there been peace many more mines would undoubtedly have been working. The Acton Mines are visited almost daily by gentlemen from the principal cities and towns in Canada and the States, and several of the parties from New York and other state cities express their willingness and intention to work mines here at the termination of the war. I consider the present an unusual opportunity for the investment of English capital, and have often wondered the reason why there is not more doing in the matter. The climate is healthy, labour abundant and cheap, the ores can be sent to market on very reasonable terms, either to England or the United States, as the Grand Trunk Railway passes through the centre of the mining district, which would take the mineral to Montreal (a distance of about 50 miles) for exportation to England; or, in connection with other railways, to the United States smelting works. The country is well wooded, of which plenty can be obtained at a trifling expense for fuel and all other purposes. The advantages attending mining here are not equalled in any other British colony, especially as regards the abundance and cheapness of labour, and transit of ores to market.

ON REFINING PETROLEUM.

The crude oils may at once be submitted to chemical treatment; but as a general rule, and especially when they are heavy and contain much tar, they should be first distilled. This distillation is made in a common iron still, protected from the action of the fire by fire-brick, which equalizes the heat, consequently, the expansion of the metal, and lessens the risk of fracture.

The charge of oil, prepared as above, may be run into the still and distilled, without the use of steam. But when it has been run off to four-fifths of the whole quantity, or when the part remaining in the still will be a thick pitch when cold, common steam should be gently let into the neck or breast of the still. The steam immediately produces an outward current through the condensing apparatus, and brings over all the remaining part of the oils, leaving a compact coke as the only residuum. Furthermore, it gradually diminishes the heat of the iron, and prevents it from breaking. When the steam is thus let in, the fire is to be removed from beneath the still.

Common steam, under moderate pressure, has been introduced into stills, both above the charge and into it throughout the entire distillation. In the latter instance, the steam soon becomes superheated after the lighter oils have been run off. Again, steam previously superheated is driven into the charge during the distillation, and for the distillation of the heavy oils and paraffin this mode has the preference; yet steam is advantageous, however applied. When it is superheated the condensing apparatus should be extensive.

In the first distillation of the crude oils, as they come from the retorts, and in subsequent ones, the oils may be slowly admitted into the stills after it has become sufficiently heated, and the oils begin to flow freely from the worm or condenser. By the adjustment of a cock, a stream of the crude

product may be permitted to flow through an iron tube into the still while it is in operation. The tube should dip beneath the oil in the still, the inflow of oil into which must not exceed the outflow from the condenser. A greater amount of heat will be required for this operation than for the common method, as much of it is taken up by the cold oil constantly flowing inward. By this mode, a still working 1000 gallons may be made to run double that quantity without interruption, and steam may be applied in any manner before described.

The first distillate of the crude oil should be separated into two parts, each of which requires somewhat different treatment. The first part is that which distills over from the commencement of the run until the oils in the receiver have a proof of 36° by hydrometer, or a specific gravity of 0.843.

These light hydro-carbons, and the eupion they contain, form the lamp-oil. The quantity produced will depend upon the quality of the coal, or whence they have been derived. This part of the distillate being pumped from the receiving tank, the remainder, or second part, is allowed to flow on till it assumes a greenish colour at the end of the worm pipe, when steam, if not previously employed, may be let into the still, and continued until the whole distillation is completed, the fire in the furnace being withdrawn. A quantity of coke will be found to remain, amounting to ten or fifteen per cent. of the whole charge. When steam is not employed in the residuum, the still must not be run down lower than a thick pitch. Coking in the still without steam is unsafe, and hazardous to the iron.

The first part is then to be placed in an iron cistern, and therein thoroughly agitated from one to two hours, with from four to ten per cent. of sulphuric acid, the object being to bring every particle of the impurities in contact with the acid. The quantity of acid to be used depends upon the character of the oils.

If too much acid is applied, the oils will be partially charred and discoloured; if too little, the impurities will not be oxidated, and the oils will change colour. After the agitation of the oils and acid is completed, the mixture must remain at rest from six to eight hours, when the acid, with the chief part of the impurities, will have settled at the bottom of the vessel. They are then to be drawn off, and the remaining oil to be washed with ten or twenty per cent. of water. The water removes a part of the remaining acid, and carries off the soluble impurities. After the water is withdrawn, the charge is to be agitated two hours with from five to ten per cent., by measure, of a solution of caustic potash, or soda, of specific gravity 1.400—caustic soda is generally preferred. Like the acid, the strength and quality of the alkali must be varied according to the quality of the oils. After a repose of six hours, or more, the alkali is to be withdrawn from the oil, and further impurities washed out with water. When the water is withdrawn from it, it is to be run into a still for final rectification. During the whole of these operations, the oils and the several washes applied to them are to be kept at a temperature not lower than 90° F. This is done by means of steam coils fixed at the bottoms of the tanks in which the agitations are made. Finally, the oil is to be care-

fully distilled, with or without steam. A small quantity of the lightest product, or eupion, which comes first from the condensing worm, is usually discoloured, and may therefore be transferred to the succeeding charge.

The last distillation should be made slowly and with care, avoiding all fluctuations produced by an unsteady heat. If desired, the eupion may be taken off at the commencement of the distillation. It should be at proof 60°, or specific gravity, 0.733, or it may be allowed to run in with the lamp-oil. When the distillate has reached proof 40°, or specific gravity 0.819, the remainder is to be transferred to the next charge, or the heavy oil, as being too dense for illuminating purposes. The mixed oils intended for lamps have their disagreeable odour chiefly removed by allowing them to remain in flat open cisterns over weak solutions of the alkalies during a period of some days. Exposure to light also improves their colour. The alkalies employed in the foregoing treatment may be restored and used in subsequent purifications. The oils of the second or heavy part of the first distillate are purified by the same means as described for the lighter oils, except that they require the application of more acid and stronger alkalies. All the oils distilled from them at proof 40° are added to the lamp-oils. At the close of each distillation, and as the oils acquire greater density, the colour grows dark and changeable; finally, they are partially charred, and especially when they have been distilled without steam. These dark-coloured oils may always be renovated by the use of acids and alkalies, the permanganates of potash and soda, and, finally, by distillation. The colour of the lamp-oils should not exceed a tinge of greenish yellow, when viewed in a clear glass flask six inches in diameter. If by accident, carelessness, or negligence, the oils treated by the fore-going method should be impure, they must be submitted to washing and re-distillation.—*Philadelphia Coal Oil Circular.*

PURIFICATION OF WATER FOR PHOTOGRAPHIC AND OTHER PURPOSES.

An interesting and valuable pamphlet has recently been published by Mr. Condy, in which the removing from water of a variety of impurities is described. For this purpose the well-known action of alkaline permanganates is made available.

“By the peculiar chemical properties of the permanganic acid it is capable, when employed in appropriate combination, of not only destroying every trace of organic matter in a water, but it also removes many of the mineral constituents which are sometimes almost as objectionable. An experiment of Mr. Condy's shows this in a striking manner. He made a saturated solution of oxide of lead, by shaking common whitelead in distilled water, and filtering; this, on being tested with hydrosulphuric acid, gave a black precipitate. Four ounces of this liquid were then taken, and to it were added two drops of a weak solution of permanganate of lime. Upon standing for half an hour, the pink colour had disappeared; and when filtered off from the precipitated peroxide of lead and binocide of manganese, there was only a brown tint communicated to it on testing with hydrosulphuric acid. Another similar experiment was tried, in which a little more permanganate of lime was added,

and the liquid allowed to stand for some hours, when, upon filtering again, not a trace of lead was found in solution. Lead is a most difficult impurity to remove from water, whilst it is the most poisonous of ordinary metallic contaminations, but is thus easily removed, as well as all metals capable of assuming the form of peroxides. Water containing iron in solution can also be purified in the same manner, so as to render it fit for use in dyeing and other industrial purposes.”

The presence of organic impurities is, however, most detrimental to the photographer; and Condy's fluid is preëminently valuable in removing these. On this point the author says, “Filtration through charcoal or bone-black has no doubt considerable effect in absorbing certain gases, which are products of the decomposition of organic matter; but it acts only very partially on such matter when not in a decomposing state. Hence water which has been more or less deodorized by charcoal will often be found, on being allowed to stand to become again offensive from the further decomposition of organic matter, which the charcoal had been inadequate to remove. The presence of such organic impurities in water which has been treated with charcoal can always be readily detected by permanganates. Nothing proves so distinctly the superiority of those substances for purifying water as the certain and delicate way in which they discover the imperfections of all other methods of purification, whereas no substance that I am acquainted with is capable of revealing the presence of organic matter after their use as purifiers. The permanganates, then, not only afford a ready and efficacious means of doing what charcoal is supposed, in a tedious and imperfect manner, to perform, but likewise of producing changes similar to those effected by most of the other modes of purification which are usually recommended or occasionally practised. Thus they do all that alum, caustic alkalies, alkaline carbonates, and caustic lime are capable of accomplishing; while they even surpass ebullition and distillation in their power of removing organic matter, at the same time that, by the formation and precipitation of oxide of manganese which take place at all points of the water during their contact with substances of an organic origin, they have the effect of mechanically drawing down impurities held in suspension. Add to this, that water purified by the permanganates is, in most instances, pure enough for every ordinary purpose, and so charged with oxygen as to be highly agreeable to the palate, and beneficial to digestion. When absolutely pure water is required for some special scientific object, it can be readily procured with one distillation, by the use of an alkaline permanganate.”

The advantages of this system, so far as simplicity and efficiency are concerned, cannot very well be over-estimated, whilst its economy is beyond impeachment. “The quantity of permanganate necessary to purify 10,000 gallons of water would be contained in one gallon of Condy's Fluid, the price of which is only 10s.; at this rate 200 gallons, or one ton, of water could be purified at an outlay of 2½d.” A series of interesting experiments and instructions as to the method of proceeding are given in the pamphlet, one or two of which we shall quote. In order to test water for organic impurities, proceed as follows:—

“Take any number of tumblers; fill up one with distilled water, another with ordinary drinking-water from a pump, rain-water-butt, or other supply, and the rest with various samples of water more or less contaminated with organic impurities such as sewage water. Add to each of them, drop by drop, Condyl's Fluid (crimson) till the contents begin to assume a decidedly pink hue. This effect will be produced, in the case of the distilled water, if pure, by a single drop; more will be required by the drinking-water, which, after standing a little while, will show some signs of muddiness; and a still larger portion by the other samples, in which a brown precipitate will soon form. The quantity of fluid required and the amount of muddiness produced in each will be the measure of the relative impurities of the several waters.”

Here is a method by which the photographer can readily purify sufficient water to last for a few weeks' use:—

“Pour into a hogshead of offensive drinking-water one wineglassful of Condyl's Fluid, and mix with a stick or lath. Generally this quantity will render it as sweet as fresh water: should it require more, add half a wineglassful. So long as organic matter remains—which is known by the pink colour of the fluid gradually vanishing—add the fluid. If a trace too much has been used, continue stirring, or immerse a stick or lath, and the colour will disappear. Let it stand, and any suspended matter present will subside or filter.”

Where water is required absolutely pure, the simplest mode of procuring it is to mix with permanganate of potash and distil; the result will be water of unusual purity.—*Photographic Journal.*

Miscellaneous.

Electric Lamp for Miners.

An electric lamp for miners has been submitted to the French Academy of Sciences by MM. Dumas and Benoit. They do not claim the merit of the first idea, but state that hitherto they have met with no apparatus perfectly suitable for the purpose, although experiments relating to it have been made with good results by MM. Du Moncel and Despretz. The new apparatus consists of three essential parts—a small voltaic battery, a Ruhmkorff's induction coil, &c., and one of Geissler's illuminating tubes. The whole are so arranged as to produce a light sufficient for the miner to work in an atmosphere where other lamps would be extinguished. The light produced is cold, or rather does not heat the tube in which it is produced, and it is inaccessible to gas. The entire apparatus is perfectly isolated; it is quite as solid as the lamps now in use; no injurious or disagreeable emanation proceeds from it; and it can be instantaneously lit or extinguished at pleasure. It will act for many consecutive hours without the light diminishing, and without any particular attention being required. The workman will have only at long intervals to agitate the charcoal with a wire. The greatest difficulty to contend with was the association of a battery of such an intensity with a coil constructed in such a manner that the bulk and weight of the apparatus should be as limited as

possible, and with a light of very great regularity to endure for at least 12 hours. MM. Dumas and Benoit state that they are certain of being able to reduce the dimensions of their apparatus still further, although it is now already sufficiently portable for its purpose.

Mr. Glaisher's Balloon Ascents.

The attention of the scientific world has lately been called to the balloon ascents of M. Glaisher, and several interesting facts have been brought to light which deserve to be recorded. It appears that when the voyagers reached the clouds they found themselves surrounded with a dense mass of moisture, about two thousand feet in thickness, which, being passed through, a beautiful clear blue sky presented itself, with the mass of clouds floating below. After this, being above a mile and three-quarters from land, they could not perceive any clouds, but the air seemed to possess such expansive power that the balloon shot up very rapidly, so that Mr. Glaisher failed to obtain a photograph of the scene below. Several pigeons were thrown out, but dropped as heavy as a stone. Blindness began to be felt at five miles' altitude, and M. Glaisher's last entry of the thermometer was *minus* five, or thirty-seven below the freezing point. Subsequently he saw but was unable to register, the barometer at 10°, after which he became almost unconscious; and when they had attained an altitude of six miles Mr. Coxwell's hands turned black and he began to faint. M. Glaisher then recovered sufficiently to hear his companion say, “I have lost the use of my hands: give me some brandy to bathe them.” The temperature was then below zero; and the water in the vessel supplying the wet-bulb thermometer was one solid mass of ice. At this point, the aeronauts seemed to incur great risk; for while M. Glaisher could not move, Mr. Coxwell was seized with intense cold, and everything seemed now to depend upon the latter gentleman, whose self-possession and ease seemed quite wonderful. M. Glaisher says, “it was quite characteristic of Mr. Coxwell.” For he had never seen him without a ready means of meeting every difficulty when it has arisen; and so it proved, for just at this juncture, as the hoar frost surrounded his neck, and his hands were helpless, he seized the line between his teeth and pulled the valve open until the balloon took a turn downwards.

The height attained was certainly unprecedented, and from the description which has appeared in the daily papers, written by M. Glaisher himself it seems to have been attended with no ordinary danger. M. Glaisher wisely concludes his interesting scientific notations by observing, that “it would seem from this ascent that five miles from the earth is very nearly the limit of human existence. It is possible, as the effect of each higher ascent upon myself has been different, that on another occasion I might be able to go higher, and it is possible that some persons may be able to exist with less air and bear a greater degree of cold; but still I think that prudence would say to all, whenever the barometer reading falls as low as 11 inches, open the valve at once; the increased information to be obtained is not commensurate with the increased risk. (See Mr. Glaisher's paper on another page of this number.)