THE JOURNAL

OF THE

Board of Arts and Manufactures

FOR UPPER CANADA.

NOVEMBER, 1866.

THE ANNUAL EXHIBITION.

AGRICULTURAL ASSOCIATION, U. C., 1866.

(*Continued from page* 263.)

Agricultural and Horticultural Departments.

Having in our October number treated fully upon those features which more properly related to Arts and Manufactures, we shall now proceed to notice the sister departments of Agriculture and Horticulture, so as to thus render our report a comprehensive though brief review of the whole Exhibition.

Commencing, then, with the "staff of life," it must be admitted that the show of grain, &c., was not as good as might have been expected. No doubt the wet harvest season has had a deal to do with the quality of our wheat barley and oats as regards *good looks*, but with all these allowances the number of *entries* was little better than half of what were made last year; while of the number entered, not a few failed to put in an appearance, so that the actual display was so much the more meagre. The wheat, even that which carried off the best prizes, did not strike us as anything very superior, perhaps the Spring wheat, especially of the Fyfe variety, was better than the Winter grain; and the barley seemed light in the hand and dull in colour. The oats, particularly the black, were good, and the harvest of 1866 will be remembered for its unusually heavy crop of oats; but the peas were very superior both in weight and quality, and assuredly carried off the honours in the department allotted to cereal productions. It is a coincidence worthy of notice, that the two chief prizes offered for wheat have both gone to the County of Simcoe, Mr. F. Barclay. Innisfil, carrying off the Canada Company's first prize of $100, and Mr. J. Mitchell, Mono, the Association's first prize of $40, together with another prize of $10; this latter being a handsome and good article, superior probably, as a small sample, to anything exhibited. As a question pertinent to successful wheat growing, which by the way has retrograded rather than advanced of late years, it might be worth while to ascertain whether or not the two samples of prize wheat under notice were grown on new or old land, and what were the peculiarities, if any, of their cultivation respectively. In barley, which, failing to rely upon good wheat crops, has now become almost the great staple of Canadian grain for exportation, the first prize, for two-rowed, was won by Mr. J. L. Patterson, Scarboro', and for six-rowed by Mr. J. Mitchell, Mono, who has thus proved himself as skilful in the growth of barley as of wheat. The prizes for oats were adjudged to Messrs. J. Pile, Whitby, W. Riddel, Cobourg, and P. Bartholomew, Markham; and Messrs. J. Shaw, Nissouri, G. A. Mather, Etobicoke, A. Glendinning and W. Forfar, both of Scarboro', divided among them all the prizes for peas. Other parties exhibited some good samples of peas and other grains, but we have not space to go into further details, except to notice in this connection some good samples, in class 40, of manufactured cereals in the shape of pot and pearl barley, oatmeal, buckwheat flour, Indian-corn flour, and last, though by no means least, our fellow citizen, J. Nasmith's excellent show of biscuits, the only article of the kind on exhibition.

The horses, though numerous and of superior quality, were exhibited under difficulties, occasioned by the rain on Tuesday, which debarred all attempts to parade the "high-bred cattle" before the Judges' stand; and by the miry state of the ring on the following day, which compelled the Judges' to "look over" the various competitors just the best way they could according to circumstances. Owing to these "impediments" the mere "outsider," albeit he was the veriest horse-courser, had comparatively but a small chance of "nicking" the time when the "high-mettled racer," the powerful draught-horse, or the "steed of low degree" was "on show;" and consequently only a select few saw the horses to advantage, except on Thursday, when the splendid weather attracted a goodly muster of the "knowing ones" to "take stock" of what was then on view. In the class of "blood horses" the show was, as might be expected, small in number but they were good in quality, and an improving advance on previous years. We have always advocated a strain of "blood" in every class of our Canadian horses, as imparting activity and neatness to even the dray horse, and rendering our carriage and saddle horses handsomer and more serviceable. We hope to see the thorough-bred sire more and more encouraged as the only means of permanently improving our breed of horses. The Townships adjacent to Toronto have won much fame through the fine draught horses they have sent out, as witness the teams in Hendrie & Shedden's freight waggons,

and the horses employed for H. M. R. Artillery, which are models in their class; while others quite as good can be readily supplied when wanted. A really good horse for a carriage, or for a gentleman's own use in the saddle, is not however so easy to pick up, and this want can only be supplied by resorting to "blood" in breeding horses. We did not see the blood stock on exhibition at all, nor the agricultural stallions—a passing glance at the draught horses was all that came in our way,—and we got just a peep at the carriage and saddle horses, among which a slapping dark chestnut mare took our fancy mightily. It may be noticed as a defect in the horse arrangement that the *name* of a stallion is not made a part of the entry; so that it is difficult if not impossible to know what is meant when one reads in the list that the prize for thorough-breds has gone to Mr. Arkland of Oshawa! or that Mr. Fisher, of Colborne, has carried home the Prince of Wales' prize!—the "outsider" being thus left quite in the dark as to either the *name* or *pedigree* of the prize animals, a matter of far more importance than the *name* or even *residence* of his owner. Of blood horses of all ages, only 22 were exhibited; for the Prince of Wales' prize, 34; of agricultural horses proper, about 100; of road and carriage horses of all kinds, about 150; and of heavy draught horses about 50; say altogether very nearly 400 horses on the ground, which was certainly a large number of prize animals; and among the "heavy draught" class, Mr. Jas. Dalziel received an additional prize of $44 for a horse imported from Scotland since the last Exhibition; but the entry in the books fails to inform us regarding his color, pedigree, or the part of Scotland where he was bred. Altogether, making allowance for wet weather, the horse show of 1866 was a success, and well worthy of Canadian enterprise in this meritorious direction.

In Cattle the exhibition though not so very numerous was of undeniable quality. Good as they were at London, it must, we think, be admitted they were even better at Toronto; and nothing but the weather which made the ground a regular "slush" *outside* the sheds where the cattle (as also the sheep and pigs) were located, could have prevented their conspicuous merits from being fully appreciated. It is true the spectator had the choice of stretching his legs up and down a dry pathway under cover; but, to look at a well bred Durham or Ayrshire from a pathway two or three feet higher than the floor of the cattle pen, with the heads of all the animals towards the spectator, is not exactly calculated to gratify the tastes of even an amateur judge of cattle. One likes to walk all round and look at a short-horn on the level, and study its points from different directions; but unless some enthusiast risked being "mired" the cattle sheds afforded scant enjoyment on so wet a day.

The exclusive high-bred animals were housed in special quarters which it was not easy to find, and when found, it was not always possible to "feast the eye" with their bovine charms. In the Durhams, the Hon. D. Christie, Brantford, Mr. Snell, Edmonton, Mr. Stone, Guelph, and Mr. Miller, Pickering, were chiefly conspicuous for superior quality; and Mr. Christie's two cows, (though the judges awarded only the second prize to the younger,) took our eye as the *crême de la crême* of the whole exhibition; while his "grade" heifer, to all appearances so nearly thorough-bred as to take a first-rate judge to decide that it was not, carried off the "Fergus cup," liberally given by the Hon. Fergusson Blair. The Devons always command admiration for their good looks, "quite genteel," which are combined with good qualities—"handsome is that handsome does"—and though perhaps the Devons *may* not be quite hardy enough for our trying climate, yet their excellent qualities must always secure them favour; and where an agriculturist is not limited as to means, his farm would be sadly deficient unless it possessed, at least, a few Devons among the cattle. Among the prize exhibitors in this class we find Mr. Pencombe, Westminster, Mr. Courtice, Darlington, Mr. Peters, London, with others, and we regret that the limits of our article preclude a more extended notice of the many beautiful animals exhibited in the class of Devons. Not so *genteel*, but yet very handsome in their style, the useful Ayrshire, the pride of every good butter dairy, is deservedly the object of general admiration; and we hail with pleasure the self-evident marks of their increasing numbers far and wide among our breeds of cattle. As a dairy cow, the Ayrshire "bears the bell," yielding not only an abundance of milk, but of the richest butter—they suit northern latitudes admirably, and are easily kept in a healthy condition—and in towns and villages, where only one or at most two cows are kept, commend us to an Ayrshire, pure if it can be afforded, or a grade Ayrshire at all events. Among those who take "honours" in this class, are Mr. Wheler, Scarboro', Mr. Crawford, Brockville, Mr. Wright, Cobourg, Mr. Guy, Oshawa, with others too numerous to mention; and the large number of Devons and Ayrshires exhibited in 1866 proves how highly they are esteemed by good judges. The "black cattle," of both the Galway and Angus breed, were tolerably well represented. Mr. Snell, Edmonton, who devotes particular attention to this class, and Mr. Nimmo, Camden, another

extensive breeder, contribute the principal share of those exhibited. This hardy breed of animals would seem to be specially adapted to Canada—they yield the very finest of beef, and are pretty good milkers; they thrive on moderate food, and would fatten where another animal might almost starve — but, nevertheless, the "black cattle" do not appear to find the favour they deserve with our farmers; it is true they are not quite as "handsome as paint," but their many good qualities ought to make up for their plain appearance. In Herefords, Mr. Stone, of Guelph, was, we believe, the sole exhibitor; and we cannot help wondering how it is this fine breed is not more largely encouraged by our agriculturists, as they possess nearly all the best qualities of the other breeds, while they are more hardy and fatten readily on a less allowance of food; and those owned by Mr. Stone are a credit to his judgment in cattle. Of the grade or half-bred cattle, the specimens shown were many and good; while as regards fat cattle, some were exhibited of very superior character; and one in particular, bred and fed, we believe, by Mr. Vine, of St. Catharines, would have done credit by its proportions and handling to a Smithfield show *just about Christmas* time.

It would be impossible, within our limits, to do anything like justice to the exhibition of Sheep, which, both as to number and quality, may be safely pronounced as among the best, if not actually the very best, which Canada has witnessed; and whether considered as to wool for the coarser and finer fabrics made for home use by home manufacturers, or as to mutton, it would be difficult to find anywhere a collection of sheep better than what was on view during the Exhibition week. Much as Canada has advanced in the breed of horses and cattle, and greatly so in the breed of pigs, it is doubtful whether we have not made still greater progress in our breed of sheep. For example, in Leicesters, which continue to hold their ground as prime favorites, Messrs. Miller, Scarboro'; Smith, York; Ackrow, Etobicoke; Weatherstone, Bronte; and Blanchard, Nelson, produced animals that would command praise from the most critical judge in the old country. The same may be said of the Cotswold sheep exhibited by Messrs. Miller and Smith, quite worthy of a place side by side with their Leicesters, and by Mr. Stone, of Guelph. The Shropshire and Hampshire Downs, shown by Messrs. Spencer, Whitby, and Miller, Markham, were all first-class animals, and their owners literally "skinned the lamb" as regards a monopoly of prizes in this useful breed of sheep, second only, though some say equal, to the far-famed Southdowns in the excellence of the mutton they supply. But in the popular and admired Southdowns, Mr. Stone, of Guelph, as heretofore, heads the prize list in every section but one, where he gets third place for his ewe lambs; and Mr. Paxton, Whitby, with Mr. Forfar, Scarboro', take next honors; and assuredly this class (XV.) was as greatly admired as anything on four legs exhibited among the live stock. Fine wool is a necessity, and our looms must have it, or fail to make a cloth that will sell and pay the manufacturer; and therefore the Spanish and other varieties of Merino sheep have to be tolerated—as a necessary evil, we were about to say, for really the ungainly figure and uncompromising countenance of your high-bred Merino is almost an evil, and leads to the wish that fine wool could be produced through a less ugly medium. But, as Merinos go, those exhibited were very fine animals; but it is of no use to argue down the personal dislike we feel to the whole family. No doubt it is quite wrong to yield to prejudice; but, "I do not love thee, Dr. Fell," is a sufficiently good argument all the same. The fat sheep were also fine specimens of mere carcase. The writer pleads guilty to a weakness for well fed mutton, but it must be a Hampshire Down, or, better still, a Southdown; but what are termed, and prizes given to as, "fat sheep," he at once hands over to the chandler. There was, it appears, a good deal of feeling in this department, occasioned by alleged unfair shearing of certain sheep of undoubted merit, to which prizes would have been adjudged but for this circumstance.

Nothing is more significant of the great strides made in the breeds of animals, than the wonderful improvement achieved in the way of Pigs. In our remarks on this subject last year, we drew a comparison between the "aboriginal" pig of Canada, say twenty years syne, with his present representative; and if ever comparisons were "odious," they are as applied to our pigs, "past and present;" for certainly the "porkers," large breed and small, which met the eye at the recent Exhibition, were models of what a pig ought to be, and can be brought to be, by attention in breeding and a liberal care for his food. An extensive pork-packer enunciated the axiom, that "good breed and good feed" was sure to result in good pork; and if one may judge from the pigs exhibited here the other day, this axiom is likely to make its way through the length and breadth of the country; for let every farmer in Canada learn, understand and practise what we affirm, that not only in pigs, but in sheep, cattle, and especially horses, *the best bred animal will always be the most remunerative!* It would be difficult to say which were the best pigs

exhibited. The large breeds were undoubtedly very good; and the snug, plump and neat Berkshires were quite little beauties of pigs; but still the Suffolks, after all, combined the prominent qualities of both breeds, and, in our opinion, are entitled to the preference. Perhaps the philosophy of cultivation can supply no better example of how to improve an animal, than these very pigs afford. The transition from pigs to bacon is so natural that we close this paragraph by regretting that so poor a show should have been made in this direction. Toronto cures hams and bacon, of superior quality, to the extent of more tons weight than we could specify; but neither from the city nor its vicinity was there so much as one single specimen exhibited, a neglect which casts reproach upon our public spirit on our own vantage ground. Surely there might have been found at least one, to exhibit what Toronto hams and bacon claim to be, the best in the country.

The Poultry last year was highly commended, but we are disposed to consider that in variety and quality the show of 1866 excelled it. The location chosen for the display of poultry was, to say the least, unfortunate. The whole ground in front of the coops was a quagmire, impassable until a few boards had been thrown on the mire, and even then anything but pleasant to traverse. Like the Fine Arts, the Fruits and Flowers, and Ladies' work, the Poultry forms a popular element in the Exhibition. Among the particular few who delight in Dorkings, or wax eloquent about Polands, as well as among ladies and young people, the Poultry department is quite an institution, which attracts a large gathering of spectators; and it is to be regretted that this year it was in effect a sealed book to the multitude, owing to the causes above mentioned. The Cochin China family was well represented by the grown-up bird and the chicken, and some of the former were handsomely developed specimens of their class. The trim looking Dorkings, coloured and white, were all fine birds; and in this as well as in other instances, a very trifling difference turned the scale between a first-prize fowl and its less perfect competitor. Hard as it was to judge other classes, to give satisfaction in the Poultry class would have tried the wisdom of a Solomon. There were all sorts of Polands, crested, golden, silver, and plain white, all as handsome birds as any connoisseur could wish to own. Then came the Hamburgs, black, gold and silver spangled, gold and silver pencilled, all beautiful birds. The black Spanish, whose curiously shaped comb, expansive wattles and white cheeks render him so conspicuous, was represented in great numbers; there was the game chicken "in spurs," crowing lusty defiance to all and sundry, while, side by side, in striking contrast, the tiny bantam, despite his littleness, strutted and crowed as bold and as brazen as his next-door neighbours. There were white turkeys, black turkeys and colored turkeys of the finest description; and cowering in his coop was a woe-begone, bedraggled bird, exhibited as a wild turkey, although whether he was not more familiar with the poultry yard, where his progenitors had been cabined and confined, and had bred in their prison-house, remains to be settled; but to our eye there was small sign of his being a forest bird. Then there came geese, assorted; no end of Rouen ducks; a sprinkling of noisy Guinea fowls, and a marvellously fine collection of fancy pigeons, of which to win even a pair we would "hazard" a trifle. It would appear that some hundreds of various kinds of poultry were exhibited, and we venture to think there was not a really worthless bird among the whole collection. To particularize the comparative merits of so many, would be impossible, while to single out even a few for special mention would be invidious, and we therefore dismiss the Poultry class with a hearty commendation.

But before leaving this portion of our account of the Show, we ask permission to suggest to the authorities the advantages which would result from having all the prize horses and cattle paraded round the ring, say on the last day before being removed; so that this proceeding, being announced in good time, would thus enable a large number of persons to see all the finest animals in an easy manner, and much more to their comfort and instruction than by tramping through the dirt, and then left to judge for themselves which are prize animals. Publicity at all exhibitions is desirable; and it is not too much to say that many a purchase would be made under such circumstances, but which are rarely thought of under a different system. The purchases made for the Nova Scotia Government by Professor Lawson at the late Exhibition, may have had their origin in the parade—such as now suggested—which took place at London for the benefit of the Delegates; and though not many of them availed of the opportunity, yet those who did enjoyed it greatly, and spoke much as well as warmly in praise of what they had seen. In truth, that parade of the prize horses and cattle was *the* feature of the London show.

Having thus disposed of the cereals proper, and the live stock, let us turn to the agricultural seeds and roots as next in importance; and passing over the small seeds we stop at the flax seed, the association's first prize for which was awarded to Mr. Morton, Bradford; and then go on to hops, the first

prize for which fell to Mr. Bailey, London, and the second to Mr. Clark, Stanstead, and we are bound to state that these Canadian hops were of a superior class, promising by increased care and skill in culture to become in due time rivals to the imported article. But while taking so brief a notice of the aforesaid products, we would fain dilate at length upon the grand display of roots and vegetables, all of field culture, which for size and quality are this season prodigious: the turnips yellow and white, mangel-wurzel, field carrots and parsnips, sugar beet, field potatoes and gigantic cabbages, were of the best description, proving how well our soil and climate are adapted to the bountiful production of root crops, and how generally their cultivation is followed as winter food for cattle. In fact a farm without a proper head of cattle, and root crops to feed and fatten them, would soon become exhausted and comparatively worthless. The pumpkins and squashes were of enormous size, and among the latter were noticed some samples of a new variety grown from seed sent here from Australia. The potatoes were of many varieties, but the chief of those exhibited were pink-eyes, cups, garnet-chillis, "red, white and blue," and others more novel perhaps than practically valuable. The Indian corn was exceedingly fine, and one sample shown by Captain Shaw, Toronto, struck us as being unusually good. Chicory and cured leaf tobacco of Canadian production found representatives in this class. The Canada Company's prize for the best cwt. of scutched flax was adjudged to Mr. John Rea, Yarmouth, and a very fine sample it was and greatly admired; the Company's prize for hemp did not produce an entry; but we feel confident that, thanks to the zealous exertions of Mr. Donaldson, the cultivation of both flax and hemp will be largely extended, and that the exhibition of 1867 may be looked to for a very large increase in the amount grown and exhibited.

The Canadian Dairy was plentifully represented in quantity as well as quality. Owing to the wet and cool summer the pastures have been abundant and succulent all the time, thereby keeping all kinds of cattle in fine condition, and contributing by enriching the milk, to render the cheese and butter of 1866 quite memorable in the history of farm productions. Conspicuous above everything else was the Mammoth Cheese, which being on view as a regularly exhibited article was the centre of attraction, and was all the time surrounded by swarms of curious observers. This remarkable cheese measures about 20 feet round and about three feet in height, it is computed to weigh some 7,000 lbs. or 3½ tons,—the curd was obtained from nine milkings of 800 cows, and was put in the press, made for the purpose, so recently as the end of June last,—it hailed from Ingersoll, South Oxford, and was manufactured by James Harris & Co., of that locality. Whether so large a mass of pressed curd will mellow into good cheese remains to be determined; but be the result what it may, the skill and enterprise shown by its *constructors*—and no other term expresses it so well—makes this mighty cheese one of the wonders of the day, deserving of all possible encouragement. There were also other large cheeses, but they hid their heads and seemed as mere trifles by comparison, and the ordinary 10 or 20 lb. article sank into a mere morsel after you had seen and wondered at the mighty one of Oxford. But though these other cheeses looked small they were nearly all prime articles, and to the taste gave promise of great future excellence when time had given them his mellowing influence. The butter was quite as abundant and as good as the cheese; it is true there was no mammoth firkin on show, but a sweeter and better article was never tasted; and if the staple put up for exportation be anything like as good, we confidently predict for it such a price in the Home market as the Canadian article has never yet reached. John Bull is always willing to pay a good price for a good thing, and we do not hesitate to say that some of the samples of butter shown this fall are nearly if not quite equal to that of Epping celebrity—in fact our Canadian "bread and cheese" is rapidly becoming a household word, and without meaning to joke at all, it may be also said in plain truth that our bread is remarkably "well buttered." The specimens of maple-sugar were very good as was also the honey, clear and in the comb; and extra prizes were awarded to Mr. Bacon for the several swarms of bees which he exhibited, and which "improved each shining hour" for the entertainment and, let us hope, the instruction of the rising generation, to whom they were a source of attraction.

Horticultural products were exhibited in varied profusion in a spacious building, set apart for the purpose, but notwithstanding this increased accommodation the crowding was excessive, occasioned in part through visitors passing through "promiscuous," instead of in the same direction. Had all gone the round of the tables in one unbroken line, much of the bustling, pressing and discomfort of being jammed in a heap for minutes at a time would have been avoided, and all parties could have seen the flowers and fruit in something like decent comfort. For example, the writer went all through the horticultural buildings several times at different

periods on Wednesday and Thursday, but it was not until Friday morning when the crowd had abated that he was able to form anything like a judgment of the fruits, flowers and garden vegetables. Let us hope that next year an improvement will be realized in this direction. To attempt even the very shortest description of the many beauties in the Horticultural Department would of itself nearly fill all the space which can be allotted to the whole Exhibition. Only let it be borne in mind that of Fruits there were nearly 500 entries, of Flowers 160, of Garden Vegetables all but 600, say 1,250 altogether, and it will be self-evident that to give any details of such a collection of articles, all of the choicest kinds, would be simply impossible. Fain would our pen dwell upon the superb lilies, the splendid dahlias, the beautiful, pansies, and scores of other dainty and sweet-scented flowers, to say nothing of the magnificent collection of green house plants, rare and beautiful, sent by the Hon. Mr. McPherson, Judge Harrison and others. This assortment alone formed a fine show of itself. Nor must we omit to notice the gorgeous bloom and rich fragrance of the roses, and the beautiful asters and balsams all glittering in their varied colours. In fact one was actually overpowered by the variety of fine flowers, and as we really cannot pretend to discriminate between contending beauties, we shall limit our notice by admiring and praising the collection as a whole and some articles in particular but too numerous to mention. In fruits the exhibition was excellent and varied, though we confess to wishing that a larger sprinkling of amateurs had found a place among the exhibitors—professional gardening is a highly commendable branch of horticulture, but we venture to think that the more amateur gardening is practised, in like manner professional skill will advance and find its increased reward. The fruits generally were of good size and colour, but the want of the sun's genial rays was perceptible enough as regards the flavour, which was deficient in aroma and saccharine matter. It would be too much to say that there was hardly a well-ripened fruit to be found, but it is no more than the truth to assert that fully two-thirds, if not three-fourths, of the fruit exhibited, wanted the ripening influence of the sun's warmth; and but for this drawback, the fruit of 1866 would have been of the highest character. The grapes grown under glass were fine clusters, but lacked colour and flavour, while those grown in the open air, though fine enough as to size, were also very backward as to ripeness. The peaches and nectarines were only "so so," but the plums were very superior and of fine flavour. The pears were very fine and well grown, and among the numerous parcels we noticed many of the choicest varieties, wanting only a warm sun to develop all their rich flavour. In apples the display was large, remarkably good, and in varied assortment. Hamilton, St. Catharines and Niagara vied with Toronto in this delicious fruit; and we noticed conspicuous among the rivals fine specimens of the far-famed Sweezy pommegris, the Ribston pippin, the Gravenstein, the golden russet and the Fameuse, all meriting the highest praise; while the St. Lawrence, the Northern spy, and other popular kinds, were in great quantity, and of good quality. The melons wanted more sun to develop their richness, and other fruits, if any, came not under observation. But if the fruit suffered in quality through the backward season, the garden vegetables made up what fell short in grapes and peaches; for it will not, indeed cannot, be gainsayed that the vegetables shown at the Exhibition of 1866 have seldom if ever been surpassed, and rarely equalled. Although cauliflowers have not been generally first-rate this season, yet there was exhibited a profusion of very fine specimens, close and white; the cabbages, especially Savoys and Winnestadts, could not be excelled, being larger crisp, and closely grown; in "horn" carrots the show was also good; parsnips as well as salsify (which so nearly approaches the oyster in flavor), were also very fine, clean grown, and of good size; the celery, red as well as white, proved to be firm, crisp and succulent; of tomatoes the display, though diminished in value by the want of warmth to ripen the fruit, was fine and extensive, comprising almost every known variety in cultivation; the onions, red, yellow and white, it would have been difficult to excel, whether for size or proportions; and the choicer kinds of garden potatoes stood forth conspicuous for their quality, albeit whispers about the rot, in field as well as garden potatoes, went round; but let us hope the symptoms of decay noticed are attributable rather to too much rain than actual disease. We have some difficulty in touching on the debatable question of domestic wines. We know it is insisted that Canada is destined to be the vine-growing region of the world, and that Canadian wine is some day to excel the vintages of sunny France and the Rhine, but we confess to being sceptical on this point, though we are open to conviction; but thus far, however, the domestic wines we have had the courage to taste might have been pure, though we cannot say they were palatable or even comforting. Perhaps by more care in the cultivation, and in a fortunate season—we mean as regards a due amount of sunny influence—the Canadian grape may have its vinous qualities sufficiently

matured; and by the employment of experienced skill, may be made to yield a pretty fair wine.

In the class of artificial cattle-food, and artificial manure, the whole seven sections yielded no more than a dozen entries. Possibly our farmers are not as yet, fully aware of the advantages of combining artificial with natural food, for winter use among cattle and horses. For example, a judicious rotation of oilcake, with turnips and hay, forms not only the very best, but the cheapest food for cattle; while the greatly increased richness of the manure is an additional recommendation. An imported preparation, Thorley's food for cattle and horses, is used to some small extent. Oilcake is now a Canadian production, and is beginning to find its way among our best farmers; and there seems no reason why Canada should not have a Thorley of her own; but at all events, artificial cattle foods *must* from the force of circumstances and the nature of our climate, ere long become a large element in Canadian farm consumption. Bearing in mind that the want of a regular system of manuring the land, has caused so many of our old farms to become exhausted—and we have seen more than we should like to say, so worn out as to be hardly worth cultivating—it is a matter of some surprise that artificial manures are so little resorted to, not only as fertilizers of land in reasonably good condition, but as restoratives for land reduced to poverty if not starvation-point. To say that it is the duty, as well as the interest of the farmer to restore, by means of judicious manures, what he has taken out of the land by successive crops of grain, would be only a thrice told tale; but still little attention is paid to this important fact. Relying upon the productive element in a virgin soil, how many farmers go on year after year, taking crop after crop off the ground, without thought or care beyond present returns, and regardless of future consequences, until at last the soil is found to be so much impoverished that wheat can no longer be produced from it. Agricultural chemistry may sound strange enough in the ears of a Canadian farmer; but if we are to continue to be a grain exporting country, our farmers *must* employ both natural and artificial manures to keep the soil in "good heart" and maintain its productive qualities. For these reasons, ground bone, superphospate of lime, ground gypsum, and even Peruvian guano, forms a valuable element in the department of agriculture; and the specimens exhibited, though not very numerous, were good of their kind, and merit particular attention from all who are alive to the advantages resulting from sufficiently manuring the soil.

Chemical preparations, as well as groceries and provisions, are as much connected with the farm for the raw material, as with manufactures for the mercantile article, so that they may as well be noticed here as not. Oilcake has been already mentioned, and of linseed oil, both raw and boiled, excellent specimens of first rate quality were exhibited by the Toronto Oil Company, who also exhibited very superior specimens of paints in oil, which we are glad to learn, are finding their way into general use among our mechanics. Lamb's neatfoot oil was pronounced to be a good sample. Of pitch, tar, &c., the supply was insignificant; and most of the other articles in this class found their way into the "extras," which comprised some 25 varieties. Among these were Hugh Miller's "Tick-destroyer" which among sheep farmers deserves general encouragement—a collection of illuminating oils—Crawford & Co's. lard oil, and machinery oil—Lamb's waterproof blacking—National and Victoria bitters—all of home production and therefore deserving of more or less commendation. With regard to cured meat provisions, we have said our say already; and have only to notice home productions for domestic purposes in another direction. It is not easy to determine why, with such admittedly superior raw material, we should not *make*, rather than import, pearl and pot barley as well as oatmeal—but the exhibition, if taken as any criterion of their being an article of market value, was a very discouraging affair—as under these three heads there were no more than four entries, while buck wheat flour, cornmeal, and wheat flour, were represented by only seven entries. Chicory found three exhibitors, bar soap two, and fancy soap also two, but of this latter article, the large and excellent sample contributed by Messrs. Hearle & Co., Montreal, was a credit to the country, and would have compared favourably with almost any imported manufacture. Crawford & Co., exhibited a varied and good assortment of ground spices, mustard, coffee, &c. Mr. Pearce, samples of dandelion coffee; there were four samples of tobacco, Canada manufacture; Mr. G. W. Creighton, Kingston, exhibited bottled Ales and Porter, while our Toronto brewers, found their (more profitable) display in beer to be "drunk on the premises." A goodly sum of money is annually spent in the purchase of imported pickles and preserves; but we venture to ask why cannot we be satisfied with the home-made article, which might, by due care and attention, be produced of a sufficiently good quality. Canada home-spun woollens, flax goods, and other articles of daily use, are gradually taking ground against imported articles; and why should money be sent out of the

country for pickles? We are beginning to pride ourselves on home-made wines, and why not do as much for our preserves? Where there is a will there's a way; and let us hope that these matters will meet with a larger attention at future Provincial Exhibitions.

The ploughing match, which heretofore has formed an integral part of the Exhibition proper, did not take place during the week, but has been postponed until the end of October, when a grand display may be expected. About a thousand dollars will be offered in prizes, divided into four classes; but as the *Journal* will have gone to press before the match has commenced, notice of the same cannot appear until our next number. The usual comparative statement of the statistics of Exhibition entries must also be reserved for the December number.

On Friday, September 28th, the President of the Association, Mr. McGillivray, delivered the annual address, which, though of an eminently practical character, we regret that we cannot find room for. On Saturday the horses, cattle, sheep and pigs; manufactures and the fine arts; the useful and the ornamental, gradually disappeared; and so the Exhibition of 1866 came to a good end. While, within two days afterward, what had been the home of industrial resources became the abode of military power—the hum of thousands of country folk gathered together to celebrate the triumphs of peace, has given way to the call of the bugle and the arts of war. The farmer and the artizan have made place for the soldier, and the march of events has changed a crystal palace into a cavalry barracks. But the lessons taught during the Exhibition will not therefore be forgotten. Industrial progress has left its mark on the minds and feelings of our agriculturists and manufacturers. The success which has attended the Exhibition of 1866, will work good results for years to come. What has been done well now, will next time be done better if possible. A spirit of honorable emulation has been created by the combined influences of comparison and competition; so that each succeeding Exhibition may be expected to develop more and more our material resources, and stimulate our social advancement. And although we heartily rejoice that our gracious Sovereign has manifested a due appreciation of her colonial possessions, by sending for our protection the flower of her army—an assurance that "Canada is neither to be lost nor given away"—yet, at the same time, let us not relax one tittle of those self-reliant exertions without which we cannot be either contented or prosperous; and, while making it our pride to be loyal to the Crown, let us not forget that to be true to ourselves will form the safest and surest defence of our hearths against all or any invaders or disturbers of our peaceful homes.

TRICK OF AN EXHIBITOR.

At the Provincial Exhibition in London, last year, Miss Hattie Stephens of Cobourg, was one of the Lady Judges; at the recent Exhibition in Toronto Miss *Caroline* Stephens acted in that capacity. A lady competitor, who we will not name, after the Judges had handed in their report fancied she could make some improvement therein; but unfortunately for her she was not aware of their being two Miss Stephens', nor of how they spelt their name. The following piece of composition, handed into the Secretary's office on the last day of the Exhibition, by the lady in question, will speak for itself. We publish it with a view of exposing the trick, and attempted forgery of Miss Stephens' name:—

"you will pleas Pay Miss E. J. Lyons the first Prize on Braiding and allso the first on Bead Work the second on Worsted Work Raised as I recolect those are the awards we made to her Articals there must of ben some Mistake taking the number"

(Signed) Miss H Stevens

Transactions of Societies.

TORONTO MECHANICS' INSTITUTE EVENING CLASSES.

The Annual Meeting for organising Evening Classes in this Institution, was held on the evening of October 8th, at which the President, F. W. Cumberland, Esq., presided.

Although but few of the older members, or of the citizens generally, were present, the *youthful* portion of the membership of the Institute was pretty well represented. The President opened the proceedings in a very interesting address, dwelling upon the unselfishness of the Directors of the Institute in establishing these classes, their importance to and influence upon the present and future well-being of those who may join them, and his regret that they are not more generally appreciated. Mr. Richard Lewis, Mr. Daniel Spry, Mr. Robinson, and Mons. Pernet, severally addressed the meeting, all dwelling upon the nature of the instruction to be given, and its importance to those engaged in the industrial pursuits of life.

The following interesting article we copy from the *Daily Leader* of the 9th of October, which will be found worthy of careful perusal:—

"The Toronto Mechanics' Institute has laid out for itself a programme of labors, which, if fully

accomplished, must give it the claim to a very important position as an educational establishment. The evening classes, whose winter session the public meeting held last night inaugurated, are adapted to meet the special necessities of a very large body of the community; and when more fully developed and capable of embracing a still larger and higher range of subjects, will entitle the Institute to rank as a people's college. The character of our civilization, in which both special and general education is becoming more and more a leading and all-controlling power, the application of the 'knowledges,' as Lord Bacon aptly termed them, to every condition of human life—of science and art, to mechanical trades, and to every form of human industry, and of philosophy and political economy, and literature, to the progress and elevation of the common people, is fast destroying the idea of *class* education—one kind for the rich, and another very much inferior and very limited in extent for the poor, and leading to the conviction that the highest kind of knowledge or 'knowledges' necessary to complete mental culture, is the best kind of knowledge for every man. Class education was a very excusable thing when the work of government and the guidance of public opinion were supposed to be the privilege of a class; but the inevitable tendency of social and political power to the masses, the confusion and intermixture of ranks, in which the 'privileged few' are being pushed aside, and the bold and resolute of every rank take precedence, warns us that if we would preserve the State in its integrity, we must as liberally and as fast as we can educate to the highest point every member of the State. On the other hand, a deeper wisdom than that of self-preservation will suggest how, in every position of life, the peasant, the mechanic, and the statesman will have their usefulness, their power to increase the general happiness, by the appliances of knowledge enlarged in proportion to the amount of intellectual culture they receive.

The best educational arrangements we have now fail in accomplishing these ends. In the very best common school arrangement of any country not more than one-fourth of the pupils pass through the 'curriculum,' and that curriculum for want of means—because the public always grumble more against the cost of education than of crime, of prevention than of cure—is wretchedly inadequate to satisfy the great object in view. Besides all this, the best school knowledge can only be elementary and superficial. There is a special knowledge the mechanic and the man of business require, as much as the professional man, and there is a general culture, which can only begin when the boy leaves the school for the world, and which he can only then appreciate. It is with these views that we regard with deep interest the efforts of a Mechanics' Institute to raise itself to the usefulness and dignity of a public college. The Toronto Institute has, we believe, secured a staff of teachers fully qualified for their duties, and its curriculum of studies embraces many very important and practical subjects especially adapted to the wants of the class for whom they are designed. But because that class is not sufficiently sensible of its intellectual deficiencies, and because the Institute is destitute of those liberal endowments which wealthy men so freely give to churches and universities, its usefulness in this regard is narrowed and impaired. With proper means, such as many other institutions with no higher claims to public support enjoy, the evening classes might embrace many other subjects of instruction bearing upon the interests of the industrial classes. Physical science, chemistry, physiology, political economy, social science, history and ethics, are of equal importance in one point of view with book-keeping or penmanship, and a thorough people's college would not only give instruction in these, and be amply supplied with its special libraries and apparatus, but would be able to give the instruction at a price within the reach of all.

In the meantime, the Institute classes, may justly claim the aid of "moral suasion." Upon employers it has special claims. The educated mechanic at the bench, or the clerk in the store, has his commercial value. But a taste for study, the pursuit of any branch of useful knowledge, has a deep, moral force on character fully as important to the employer as business qualifications or mechanical skill. The monotony of work leads to its neglect, and is most felt by those who have no mental resources or enjoyments, and if employers suffer from the indifference or profligate habits of their employés, their recourse lies in pressing on their attention the advantages which such studies as evening classes provide for them, and urging them to become members, We fear that the prejudice still prevails with too many that a love for literary or scientific pursuits may distract the attention of young men from the duties of business, a prejudice that would argue that all young men who ignore study to devote themselves to business, are remarkable if not for their intelligence at least for their steady and regular habits, and never patronize saloons and 'gin-cock-tails.' We remember an example of this feeling in the life of Richard Cobden. When quite a young man, occupied in a London business house, he drew attention by his eagerness to acquire a position and the variety of his reading. His master, one of the old school, and steeped in this prejudice against study, warned him against so much reading, telling him he would be certain, if he persisted in the indulgence to spoil his prospects for life. We would not say how this prediction was falsified. The master lived to fail in business, and to see the youth whom the love of study was leading to ruin at the head of a prosperous and money-making firm, and a leader in the councils of the nation.

In addition to the development of adult education the Institute is also enlarging and exalting the character of its public entertainments. The celebrated Jullien began his famous entertainments with the most simple, and popular music. When however he had gained an influence on the public mind he gradually exalted the character of the music, introducing from time to time a higher order of productions, until finally he made the works of the great masters as intelligible and popular as the sentimental songs and ballads of the hour had previously been. This was the education of the public taste by simply bringing in comparison the works of genius and high art with those of mediocrity. There is an instinctive tendency to excellence and perfection in the human mind. The

false in art as in opinions will always yield to the true. A child or an uncultivated man is pleased with a daub which he calls a picture, but familiarize his eye, and correct his taste, with the higher production of art, and he turns with disgust from his first love. It is the same with music; and the intellectual and moral results are the same. The loftiest and purest music, like the best paintings, refines, softens and exalts the mind; and the passion for music which is so universal is transferred from the productions which are popular in drinking saloons and where coarseness and vice prevail, to the works of Handel, Haydn or Mozart.

It is due to the energy and talent of Mr. John Carter, aided by the liberality of the ladies and gentlemen who have successfully carried out his views, that we are now in this transition state. The Reunions inaugurated this kind of entertainments. But the Reunions were fast falling in the musical sense, and the great success that has already rewarded Mr. Carter's efforts in the higher direction are encouraging indications of advancement in musical taste. To gratify and strengthen this improved taste an excellent programme of musical performance, comprising selections from the works of Handel, Haydn, Rossini, Mendelssohn and other eminent composers, is promised for the winter season. No doubt the directors have an eye to the financial prosperity of the Institute in entering upon this new field of enterprise; but, as we trust, they are actuated by the same high purpose as that which leads to the establishment of evening classes, we suggest that to make them useful in a moral and social view as well as successful in a financial one, they should fix the rate of admission as low as possible. The popularity, combined with the purity of these entertainments would go far to weaken the attractions of drunken singing saloons, and would claim for them the sympathy and support of the best friends of social progress.

The usual provision for giving public readings are also included in the arrangements for the season, and include the names of Mr. Vandenhoff and of Mr. Taverner. The latter gentleman gives a series of reading this week, and will be shortly followed by Mr. Vandenhoff. We attach as much importance to these readings in their intellectual and social bearings as to the musical entertainments. For this reason we would suggest that means should be adopted to give them more frequently and to render them more accessible to the people. "Penny Readings" have become an institution in England, and have, to a great extent, superseded popular lectures, which from their dullness and absolute worthlessness* had long become unpopular. The "Penny Readings" are crowded with all classes of people, and are as unostentatious as their name. The readers are drawn from every and any rank or profession. The clergy, teachers of every rank, wealthy manufacturers and the humblest mechanic, have in their turn contributed to the general amusement, and while they have been the means of bringing forward a great amount of talent previously unknown, their high moral and social influence, has been as remarkable as their popularity. We have ample material in our city for carrying into effect "Penny Readings," and as Mr. T. C. Carpenter, the editor of the volume, entitled "Penny Readings," justly remarks, we have "both in music and in oratory many amateurs who can successfully compete with the professional, the distinction only existing in the necessity or non-necessity of exercising the same talent for a living." The directors of the Institute have had so much experience in the preparation of entertainments for the people, that it lies in their province to inaugurate this new movement in behalf of those who cannot afford to hear the higher class of readings, and the satisfaction following the success of so good an effort for the people would richly reward their labors, and strengthen the influence of the Institute.

[* We enter our protest against the view taken by the writer of the above article, as to the "absolute worthlessness" of "popular lectures." We have known many persons first prompted to study mechanical or scientific subjects, through an interest excited from attendance at such popular lectures; and many others have attained to a good general knowledge, sufficient to enable them to pass creditably in the Society of the more accomplished, by means of the information thus obtained. We would be pleased to see Popular Lectures revived.—Ed. Journal.]

Board of Arts and Manufactures
FOR UPPER CANADA.

TRADE MARKS.

Trade marks registered in the office of the Board of Registration and Statistics, and open for inspection at the Library of this Board.

(*Continued from page* 231.)

Wm. Matthews, Toronto. "Royal Glycerine Diamond." Vol. A, folio 141, No. 390. Dated, August 7th, 1866.

Edward Lawson, Toronto. "The Queen's Own Regiment Cigars." Vol. A, folio 133, No. 406. Dated August 18th, 1866.

John Radway, M.D., & Co., Montreal. "R. R. R., Radway's Ready Relief, &c." Vol. A, folio 134, No. 453. Dated September 1, 1866.

Samuel Davis, Montreal. "Cable Cigars." Vol. A, folio 135, No. 458. Dated September 3rd, 1866.

C. Martin, Montreal. "Concentrated Cardinal Food." Vol. A, folio 136, No. —. Dated September 8th, 1866.

Perkins & Stephens, Agents, Montreal. "The Robert's Petroleum Torpedo Co." Vol A, folio 137, No. 485. Dated September 18th, 1866.

C. L. Thomas, of Hamilton, C.W. "Western Pianoforte Manufactory." Vol. A. folio 143, No. 528. Dated October 16th, 1866.

John Francis Henry, Montreal, "Henry's Vermont Liniment." Vol. A. folio 141, No. 542. Dated October 18th, 1866.

P. E. Picault, "Clarified Spruce Chewing gum." Vol. A, folio 140, No. 542. Dated October 18th 1866.

Patents of Invention.

BUREAU OF AGRICULTURE & STATISTICS,

PATENT OFFICE, OTTAWA, July 16, 1866.

HIS EXCELLENCY THE GOVERNOR GENERAL has been pleased to grant Letters Patent of Invention for a period of FOURTEEN YEARS, from the dates thereof, to the persons who names are included in the following list.

Published by command,

J. C. TACHE,
Deputy to the Minister of Agriculture.

PETER SWEENEY, of the town of Windsor, in the county of Essex, Civil Engineer, for "A New and useful Rock-Boring Machine."—Dated Ottawa, 11th January, 1866.

JESSE MORNINGSTAR, of the village of Waterloo, in the county of Waterloo, Founder, for "A New and useful Grain Separator, called the self-regulating Grain Separator."—Dated Ottawa, 19th January, 1866.

LOUIS CHRYSANTHE THERRIEN, of the City of Montreal, Bailiff, for "A New and improved Stop-Cock."—Dated Ottawa, 23rd January, 1866.

CHARLES HOUGH, of the city of Quebec, Livery Stable keeper, for "A New and useful Strap to prevent horses from moving when left alone."—Dated Ottawa, 23rd January, 1866.

HUGH BAINES, of the city of Montreal, Railroad Signal Inspector, for "A New, useful and easy Railroad Track."—Dated Ottawa, 23rd January, 1866.

IRA GOULD, of the city of Montreal, Merchant, for "A New and useful self-acting drain Stench prevention Trap.—Dated Ottawa, 23rd January, 1866.

ARCHELAUS W. HILL, of the township of Stanstead, Farmer, for, "A New and useful improved Rotatory Harrow."—Dated Ottawa, 23rd January, 1866.

HENRY WOOD, of the city of Montreal, Mechanical Engineer, for "An improved Machinery for producing extract of hemlock, oak or other bark, and for manufacturing Sugar."—Dated Ottawa, 23rd January, 1866.

HENRY S. TAYLOR, of Stanstead, in the county of Stanstead, Watchmaker, for "A New and useful superheated Steam Generator."—Dated Ottawa, 26th January, 1866.

WILLIAM S. HALL, Esquire, of the township of Stanstead, Advocate, for "A New and useful improved Rotary Harrow."—Dated Ottawa, 30th January, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A New and useful apparatus for extracting Coal-Oil or Petroleum from Wells or Reservoirs by means of Hydraulic pressure, which apparatus he calls "Otto Rotton's adjustable Hydraulic Tubing for Oil-Wells."—Dated Ottawa, 30th January, 1866.

D'ARCY PORTER, of the city of Toronto, in the county of York, Machinist, for "A New and useful improvement in Rip Saws."—Dated Ottawa, 31st January, 1866.

THOMAS VALIQUET, of St. Hilaire, in the county of Rouville, Farmer, for "An improved Bee-Hive, to be called the Canadian Farmer's Bee-Hive."—Dated Ottawa, 31st January, 1866.

CHARLES HALE, of the village of Bobcaygeon, in the county of Victoria, Yeoman, for "A New and useful method of tanning named the Eclectic method of Tanning."—Dated Ottawa, 31st January, 1866.

LEON MOSES CLENCH, of the town of St. Mary's in the county of Perth, Esquire, and ALEXANDER NIVEN, of the same place, Civil Engineer, for "The application of compressed atmospheric air to the braking of speed or stopping of Railway Trains and Railway Cars, (the same being under the immediate control of the Engine Driver thereof) together with a plan for the above mentioned purpose, to be called "The atmospheric Car Brake."—Dated Ottawa, 31st Jan., 1866.

FRANCIS JOHNS, of the township of Ascot, Miner, for "A New and useful manufacture to be called "John's Patent Waterproof Safety Fuse."—Dated Ottawa, 31st January, 1866.

JOHN HALL, of the city of Toronto, in the county of York, Physician, for "A certain new and useful improvement in granaries and Fruit Houses."—Dated Ottawa, 2nd February, 1866.

SAMUEL STEVENS, of the town of Belleville, in the county of Hastings, Gentleman, for "A New and useful apparatus for distilling Petroleum, Alcohol, Turpentine and other things."—Dated Ottawa, 9th Feb., 1866.

NARCISSE PIGEON, of the city of Montreal, Manufacturing Chemist, for "The introduction of the art of the Revivification of Animal Charcoal by Watery process, "of which he has obtained a knowledge while in his travels in France."—Dated Ottawa, 13th February, 1866.

EDWARD ALEXANDER PRENTICE, of the city of Montreal, Esquire, "A New and useful apparatus for Carbonizing wood, &c, &c."—Dated Ottawa, 19th February, 1866.

CHARLES HORATIO WATEROUS, of the town of Brantford, in the county of Brant, Machinist, for "A New and useful improvement in the Steam-Engine, known as "Waterous combined portable and Stationary Engine."—Dated Ottawa, 23rd February, 1866.

JESSE MORNINGSTAR, of the village of Waterloo, in in the county of Waterloo, Founder, for "A New and useful Mower and Reaper Knife, called "The Tension Mower and Reaping Knife."—Dated Ottawa, 23rd February, 1866.

GEORGE WOODS, of the city of Ottawa, in the county of Carleton, Gentleman, for "A New and useful medicine which he has named "Woods unrivalled Canadian Pain Killer."—Dated Ottawa, 23rd Feb., 1866.

JESSE MORNINGSTAR, of the village of Waterloo, in the county of Waterloo, Founder, for "A New and useful invention called "The Revolving Steam Generator."—Dated Ottawa, 23rd February, 1866.

ANDREW KIRK, of the village of Kincardine, in the county of Bruce, Yeoman, for "A New and useful Cultivator Tooth."—Dated Ottawa, 23rd February, 1866.

LESLIE B. CALDWELL, of the village of Myrtle, in the County of Ontario, Clerk, for "A New and useful Equalizing Spring."—Dated Ottawa, 23rd February, 1866.

JESSE MORNINGSTAR, of the village of Waterloo, in the county of Waterloo, Founder, for "A New and useful machine called "Morningstar's oscillating reaction churn."—Dated Ottawa, 23rd February, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A New and useful composition for cementing barrels or other vessels and preventing leakage of petroleum and its distilled products from barrels or other vessels so cemented called "The Compound Silicate Barrel Cement."—Dated Ottawa, 23rd February, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A machine for Cementing Petroleum and other Barrels or vessels, called the "Centrifugal Barrel Cementer."— Dated Ottawa, 23rd February, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A New and useful Cement for rendering barrels or other vessels impervious to Alcohol and its extracts and wines, colognes, fixed oils and water, with its extracts as also some kinds of Petroleum, the said invention to be known as "The Paraffine Barrel Cement."—Dated Ottawa, 23rd February, 1866.

RICHARD HATCH, of the town of Whitby, in the county of Ontario, Merchant, for "A New and useful central pipe and damper for Dumb-Stoves."—Dated Ottawa, 23rd February, 1866.

THOMAS STEVENSON, of the city of Hamilton, in the county of Wentworth, Moulder, for "A New and improved method of casting the threads or screws and the ends of Axles."—Dated Ottawa, 23rd February, 1866.

DANIEL THOMAS AIKMAN, of the township of Dumfries, in the county of Brant, Yeoman, for "The Dairy-Queen Church Motion."—Dated Ottawa, 23rd February, 1866.

DANIEL F. HORNER, of the township of Markham, in the county of York, Yeoman, for "A New and useful machine for making butter into rolls of any required weight."—Dated Ottawa, 23rd February, 1866.

GEORGE WASHINGTON LOGAN, of the United townships of Sherbrook and Moulton, in the county of Haldimand, Mechanic, for "A New and useful bored or drove well."—Dated Ottawa, 23rd February, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A New and useful Composition of matter for the purpose of Cementing barrels or other vessels and rendering them impervious to Petroleum or other fluids impregnated with water or otherwise as the case may be, called "The Resistant Gluten Compound."—Dated Ottawa, 23rd February, 1866.

DAVID DAWSON, of the township of Blandford, in the county of Oxford, Yeoman, for "A New and useful Root-Cutter, called "The Woodstock Swing Root-Cutter."—Dated Ottawa, 23rd February, 1866.

JONATHAN WILLIAM ACRES, of the town of Paris, in the county of Brant, Batchelor of Arts, School Master, for "Certain new and improved means of preventing the bursting of water pipes."—Dated Ottawa, 23rd February, 1866.

THOMAS HART POWERS, of the township of North Fredericksburgh, in the county of Lennox and Addington, Clerk, "A New and useful improvement in Brooms and Brushes."—Dated Ottawa, 23rd February, 1866.

THOMAS STEVENSON, of the city of Hamilton, in the county of Wentworth, Moulder, "A New and useful machine for moulding and casting the thread or screw in nuts."—Dated Ottawa, 23rd February, 1866.

EBEN CLARKE TUTTLE, of the township East Whitby, in the county of Ontario, manufacturer of Agricultural implements, "A New and useful machine for rolling out and forming Hoes, Spades, Scythes, Forks, and other articles, made of Iron and Steel or partly of both materials, called "Tuttle's Patent Rolling Mill."—Dated Ottawa, 23rd February, 1866.

JAMES HOUGHTON, of the town of Dundas, in the county of Wentworth, Machinist, "Certain New and useful improvements in the manufacturing, building and working of the improved Excelsior combined Reaping and Mowing Machine."—Dated Ottawa, 23rd February, 1866.

HENRY FRYATT, of the village of Aurora, in the county of York, Joiner, and JAMES CHARLES FITZGERALD, of the same village of Aurora, Joiner, "An improved Sawing Machine."—Dated Ottawa, 23rd February, 1866.

WILLIAM JAMES LUCAS, of the city of London, in the county of Middlesex, Carpenter, and HENRY W. LYONS, of the township of London, in the same county, Yeoman, "A New and useful Spinning wheel called "The Victoria Spinning Wheel."—Dated Ottawa, 23rd Feb., 1866.

GEORGE RAILTON, of the village of Bothwell, in the county of Kent, solicitor, "An oil well and artesian Drill."—Dated Ottawa, 23rd February, 1866.

LESTER BRUCE BROWN, of the town of Simcoe, in the county of Norfolk, but now residing temporarily at Storey Farm, in the county of Venango, in the State of Pennsylvania, in the United States of America, Machinist, "A New and useful machine for washing clothes, called "Brown's Vacuum and Wabler Washer and Churn."—Dated Ottawa, 23rd February, 1866.

JAMES STUTT, of the township of York, in the county of York, Machinist, "A New and useful machine called "Stutt's Machine for preparing wood for paper pulp."—Dated Ottawa, 23rd February, 1866.

ROBERT T. SUTTON, of the town of Lindsay, in the county of Victoria, Builder, "Certain new and useful improvements in drying and cleaning Grain."—Dated Ottawa, 23rd February, 1866.

JONATHAN HILTON HAVERNO, of the village of Queenston, in the county of Lincoln, Clerk, "An improved motive power."—Dated Ottawa, 24th Feb., 1866.

GEORGE WILSON, of the village of Warwick, in the county of Lambton, Machinist, "A New and improved method of procuring a well of water."—Dated Ottawa, 24th February, 1866.

DALRYMPLE CRAWFORD, of the city of Toronto, in the county of York, manufacturer, "Certain New and useful improvements in the preparation and use of Palm-Oil."—Dated Ottawa, 24th February, 1866.

BELA BREWSTER BRIGHAM, of the city of London, in the county of Middlesex, Gentleman, "A New and useful improvement in the sinking of Well-Tubes."—Dated Ottawa, 24th February, 1866.

ALEXANDER GORDON, of the city of Hamilton, in the county of Wentworth, Mechanic, "A New and useful composition of matter which he denominates "Compound Petroleum Paint Oil."—Dated Ottawa, 24th February, 1866.

JAMES CHASE, of the village of Brooklin, in the county of Ontario, Mechanic, "A New and useful wood lathe attachment."—Dated Ottawa, 28th Feb., 1866.

PETER ROW HIGLEY, of the village of Oshawa, in the county of Ontario, Gentleman, "A New and useful mop-head, called "Higley's Mop-head."—Dated Ottawa, 2nd March, 1866.

EBEN CLARKE TUTTLE, of the township of East Whitby, in the county of Ontario, manufacturer of agricultural implements, "An improved socket for Hoes, Forks and Spades, called "Tuttle's improved Socket."—Dated Ottawa, 2nd March, 1866.

EDWARD PHILLIPS HANNAFORD, of the city of Montreal, Civil Engineer, "A New and useful Railway Rail joint and expansion and contraction movement." —Dated Ottawa, 2nd March, 1866.

FRANCOIS AGUSTE LAMONTAGNE, of the city of Montreal, Gentleman, "A New and useful visiting card case to be called "Lamontagne's improved card case."—Dated Ottawa, 6th March, 1866.

THOMAS FOGG, of the city of Montreal, Railway Inspector "An improved and useful Railway Switch." —Dated Ottawa, 6th March, 1866.

RICHARD EATON, of the city of Montreal, Engineer, for "An Improved fire grate and ash pan suitable for Locomotive Engines."—Dated Ottawa, 6th March, 1866.

ROBERT W. LAIRD, of the village of Stanstead, in the county of Stanstead, Blacksmith, for "A New and useful composition of matter to be called Laird's patent composition for welding and refining Steel and Iron."—Dated Ottawa, 6th March, 1866.

HENRY YATES, of the city of Montreal, Engineer, "An Improved Railway Joint Chair."—Dated Ottawa, 6th March, 1866.

ALEXANDER KIRKWOOD, of the city of Ottawa, in the county of Carleton, Gentleman, "A New and improved chemical process for the production of a material for the manufacture of paper from wood shavings or wood saw-dust."—Dated Ottawa, 14th March, 1866.

ALEXANDER KIRKWOOD, of the city of Ottawa, in the county of Carleton, Gentleman, "A New and useful combination or combinations of materials to produce a vendible substance or substances, for use as fuel."—Dated Ottawa, 19th March, 1866.

AIME NICHOLAS NAPOLEON AUBIN, of the parish of Belœil, in the county of Verchères, Engineer of Gas Work, "An apparatus for impregnating illuminating Gas or atmospheric air with hydrocarbon vapour."— Dated Ottawa, 23rd March, 1866.

JAMES GEORGE SCOTT, of the city of Quebec, merchant's clerk, "A side rubber for vessels."—Dated Ottawa, 23rd March, 1866.

HENRY WELLINGTON OSTROM, of the township of Sidney, in the county of Hastings, Yeoman, for "A triple faced Rail for use on Railways, together with chairs and keys for the said Rail."—Dated Ottawa, 23rd March, 1866.

ORPHEUS ROBINSON, of the town of Brantford, in the county of Brant, Provincial Land Surveyor, for "A New and useful improvement in the structure of Bridges and other Fabrics, called "The extended Truss."—Dated Ottawa, 23rd March, 1866.

WILLIAM AMOSA FIELD, of the town of St. Catharines, in the county of Lincoln, Gentleman, for "A New and useful improvement in Pumps."—Dated Ottawa, 23rd March, 1866.

JOHN WALMSLEY, of the town of Berlin, in the county of Waterloo, Wheel-wright, for "A New and useful implement, called "Walmsley's Potatoe Raiser." —Dated Ottawa, 23rd March, 1866.

JESSE KINNEY, of the village of Drumbo, of the township of Blenheim, in the county of Oxford, Tanner and Currier, for "A New and useful Root Cutter called "The Dollar Root Cutter."—Dated Ottawa, 23rd March, 1866.

WILLIAM COUCH MACEY, of the village of Richmond Hill, in the county of York, Stone mason, for "A New and useful composition of matter or material for building purposes."—Dated Ottawa, 23rd March, 1866.

SAMUEL JOSEPH HOPKINS, of the city of Toronto, in the county of York, Dentist, for "A New and useful Sash Fastener."—Dated Ottawa, 23rd March, 1866.

JOHN DOTY, of the city of Hamilton, in the county of Wentworth, Machinist, for "A New and useful machine for tapping nuts, called "Doty's nut tapping machine."—Dated Ottawa, 23rd March, 1866.

THOMAS FORFAR, of the township of Scarboro' in the county of York, Carpenter, for "A New and useful double or single action Washing machine."— Dated Ottawa, 24th March, 1866.

The Right Honorable STEPHEN, EARL of Mountcashell, Viscount Mountcashell, &c., &c., &c., of Lobo House, in the county of Middlesex, for "A New and useful Double Window, called "The Mountchashell Double Window."—Dated Ottawa, 24th March, 1866.

WILLIAM MOODIE, of the city of Montreal, Gentleman, for "New and useful Tap."—Dated Ottawa 28th March, 1866.

CHARLES POWELL, of the township of York, in the county of York, Pump maker, "A rod coupling or joint for securing and fastening together wood or iron rods for pumps or other purposes."—Dated Ottawa, 13th April, 1866.

JAMES TAYLOR, of the township of Blandford, in the county of Oxford, Yeoman, "A New and useful improvement in the Regulator for Tue-Irons, known as "Barrett's Patent Tuyer," the said improvement to be called "Taylor's improved Tue-Iron Regulator." —Dated Ottawa, 13th April, 1866.

RICHARD SPARLING, of the township of Mosa, in the county of Middlesex, Gentleman, "A New and useful machine for digging potatoes, called the "Canadian Potatoe digger."—Dated Ottswa, 14th April, 1866.

WILLIAM WEST, of the town of Peterborough, in the county of Peterborough, Mill-wright, "An improved Grain Separator."—Dated Ottawa, 14th April, 1866.

JOHN PRINCE, of the township of Ascot, in the county of Compton, Tinsmith, "A New and useful Sap feeder."—Dated Ottawa, 21st April, 1866.

HORATIO NELSON FLEMING, of the township of Compton, in the county of Compton, Farmer, "A New and useful double-dash churn."—Dated Ottawa, 21st April, 1866.

RICHARD FULLER, of the city of Hamilton, in the county of Wentworth, contractor, "A New and useful invention for reducing Bamboo Cane into Pulp, for making paper, cordage and twine."—Dated Ottawa, 30th April, 1866.

JOHN LAZIER, of the town of Belleville, in the county of Hastings, Merchant, "A New and useful Wool Spinner, designated as "Lazier's Domestic Spinner." —Dated Ottawa, 30th April, 1866.

JAMES MONROE HIGGINS, of the town of Belleville, in the county of Hastings, Photographist, "A New and useful perforated Pipe, for the purpose of sinking wells, called "Higgins' Excelsior Well Pipe."—Dated Ottawa, 30th April, 1866.

ALEXANDER PATTERSON, of the village of Gananoque, in the county of Leeds, Cabinetmaker, "A New and

useful combined Yarn Reel and Cloth-holder."—Dated Ottawa, 30th April, 1866.

JAMES BOGART LAZIER, of the township of Reach, in the county of Ontario, Agricultural Implement Maker, "A New and useful Barley Fork, called "Lazier's improved Barley Fork."—Dated Ottawa, 30th April, 1866.

DAVID CARRUTHERS MCGREGOR, of the town of St. Mary's in the county of Perth, Blacksmith, "An Axle Sett for carriage and other wheels, to be called "McGregor's Axle Sett."—Dated Ottawa, 1st May, 1866.

THOMAS HENRY BOTTOMLEY, of the city of Toronto, in the county of York, Machinist, "A New and useful Double Cultivator."—Dated 3rd May, 1866.

MOSES C. DOOLITTLE, of the township of Malahide, in the county of Elgin, Cabinetmaker, "A New and useful Spinning Machine, called "Doolittle's improved Spinning Machine."—Dated Ottawa, 3rd May, 1866.

WILLIAM MURPHY, of the town of Paris, in the county of Brant, Gentleman, "A New and useful improved Double Check Spirit-Meter."—Dated Ottawa, 3rd May 1866.

THOMAS M. OTTLEY, of the village of Fort Erie, in the county of Welland, Yeoman, "A New and improved method of lubricating the Axles of Carriages." —Dated Ottawa, 3rd May, 1866.

ALEXANDER GORDON, of the city of Hamilton, in the county of Wentworth, Cordwainer, "Certain New and useful improvements in the working mechanism for drilling oil-wells and for raising oil from the same." —Dated Ottawa, 3rd May, 1866.

THOMAS M. OTTLEY, of the village of Fort Erie, in the county of Welland, Yeoman, "A New and improved mode of constructing Wells, which he denominates "The Subterranean Reservoir Well."—Dated Ottawa, 3rd May, 1866.

JACOB WARD, of the village of Morpeth, in the county of Kent, Yeoman, "Certain New and useful improvements in the Corn Planter, such implement with the said improvements to be called "Ward's improved Corn Planter."—Dated Ottawa, 3rd May, 1866.

THOMAS DEWITT, of the village of Morpeth, in the county of Kent, Blacksmith, "A certain improvement called "DeWitt's improvement on the Thimbleskein for Lumber Waggons."—Dated Ottawa, 3rd May, 1866.

ROBERT POPE, of the village of Newcastle, in the county of Durham, Plate-Layer, "A New and useful Main-line and siding protecting Switch."—Dated Ottawa, 3rd May, 1866.

WILLIAM FRASER COCHRANE, of the township of Malahide, in the county of Elgin, Engineer, "A New and useful improvement in the feeding of the meal to the bolting Reel in Flouring Mills."—Dated Ottawa, 3rd May, 1866.

THOMAS M. OTTLEY, of the village of Fort Erie, in the county of Kent, Yoeman, "A New and improved Surcingle."—Dated Ottawa, 3rd May, 1866.

EDWARD MIALL, the younger, of the village of Oshawa, in the county of Ontario, Cabinetmaker, "A New and useful Dove-tailing Machine, called "Miall's Dove-Tailer."—Dated Ottawa, 3rd May, 1866.

HUGH SELLS, of the village of Vienna, in the county of Elgin, Machinist, "A new and useful improved Cider-Mill."—Dated Ottawa, 9th May, 1866.

JOHN HAGGERT, of the village of Brampton, in the county of Peel, Iron Founder, "A New and useful Axle-nut or mode of securing Wheels to their Axles." —Dated Ottawa, 9th May, 1866.

MARTIN CENTERS, of the township of Longueil, in the county of Prescott, Plasterer, a certain new and useful improvement in Rotary-Dash Churns, called "Centers' improved Churn."—Dated Ottawa, 10th May, 1866.

ALEXANDER GORDON, of the city of Hamilton, in the county of Wentworth, Cordwainer, "A certain improvement in the operating of the Walking-Beam for Oil Wells."—Dated Ottawa, 10th May, 1866.

ANTHONY NEVILLE, of the township of Ernest-town, in the County of Lennox and Addington, Gentleman, "A certain improvement in Lamps."—Dated Ottawa, 14th May, 1866.

SOLOMON DELL, of the village of Strathroy, in the county of Middlesex, Mill-wright, "A New and useful Lever Spinning Wheel."—Dated Ottawa, 15th May, 1866.

JOSEPH CLINTON HENDERSON, of the town of Brockville, in the county of Leeds, Iron Founder, for "A New and useful Bituminous Coal Burner, to be called "Henderson's New Bituminous Coal Burner."—Dated Ottawa, 18th May, 1866.

MICHAEL TROYER, of the township of Houghton, in the county of Norfolk, Yeoman, "A New and useful Cane Mill."—Dated Ottawa, 15th May, 1866.

RICHARD SMITH, of the town of Sherbrooke, Machinist, "A New and useful improvement in Tobacco Cutters and Nut Crackers."—Dated Ottawa, 23rd May, 1866.

RICHARD EATON, of the city of Montreal, Engineer, "A New and improved Fire Grate for Locomotives or other Furnaces."—Dated Ottawa, 23rd May, 1866.

RICHARD EATON, of the city of Montreal, Engineer, "Improvements in the construction of Railway Freight Cars."—Dated Ottawa, 23rd May, 1866.

AIME NICHOLAS NAPOLEON AUBIN, of Belœil, in the county of Verchères, Gas works Engineer, "A New and useful Hydrostatic Blower to be called "*Acrophas*." —Dated Ottawa, 23rd May, 1866.

GEORGE R. PROWSE, of the city of Montreal, Merchant, "An improved Refrigerator."—Dated Ottawa, 23rd May, 1866.

ORLANDO DARWIN CHASE, of the township of Sutton in the county of Brome, Carpenter, "An improved Washing and Churning Machine."—Dated Ottawa, 29th May, 1866.

RICHARD DOVER CHATTERTON, of the town of Cobourg, in the county of Northumberland, Esquire, "A new and improved self-acting Coupler for Railway Carriages, called "Chatterton's self-acting Bar or Boss-coupler."—Dated Ottawa, 30th May, 1866.

JOHN ISRAEL ENSLEY, of the city of Toronto, in the county of York, Machinist, for "A New and useful Apparatus for the purpose of manufacturing Gas, Bone-black, Phosphorus, Ammonia, Pyroligneous acid, Turpentine, Tar and other useful substances, from refuse of animal and vegetable matter, called "The Economical Gas Works."—Dated Ottawa, 31st May, 1866.

LEVI RICHARDSON COMSTOCK, of the city of Ottawa, Tin and Copper Smith, for "A Revolving-Flue-Radiator."—Dated Ottawa, 31st May, 1866.

SAMUEL HATT HAYCOCK, of the city of Ottawa, in the county of Carleton, Civil Engineer, for "A conical-headed Ball for firing from rifled Guns and Ordnance."—Dated Ottawa, 1st June, 1866.

EKENS HAND, of the town of Cobourg, in the county of Northumberland, Machinist, for "An improved Piston for a Pump."—Dated Ottawa, 2nd June, 1866.

THOMAS STERRY HUNT, of the city of Montreal, Chemist and Mineralogist, "Certain improvements on the Manufacture of vegetable extracts for Tanning and Dyeing."—Dated Ottawa, 2nd June, 1866.

AIMÉ NICHOLAS NAPOLÉON AUBIN, of Belœil, in the county of Verchères, Gas works Engineer, "A Safety Can, called *Burette de sûreté*."—Dated Ottawa, 5th June, 1866.

CHARLES DAVIS, of the village of Wallaceburg, in the county of Kent, Engineer, for "A New and useful hollow Grate or Furnace-Bars."—Dated Ottawa, 7th June, 1866.

HUGH BAINES, of the city of Toronto, in the county of York, Gentleman, for "A New and useful reversible Forge-Rolling Machine for manufacturing all kinds of Malleable metals."—Dated Ottawa, 7th June, 1866.

WILLIAM HENRY DELL, of the township of Adelaide, in the county of Middlesex, Yeoman, for "A Pendulum Spinning-Wheel."—Dated Ottawa, 11th June, 1866.

OTTO ROTTON, of the city of Kingston, in the county of Frontenac, Doctor of Medicine, for "A new and useful art or method of rendering barrels or other vessels impervious to penetrating fluids, by forcing cement between barrels or other vessels made double, called "The Union Cementing Process for cementing petroleum and other Barrels and Vessels."—Dated Ottawa, 13th June, 1866.

HUGH MILLOY, of the village of Erin, in the county of Wellington, Blacksmith, for "An improved Mould Board for Ploughs, to be called and known as "The Wellington Mould-Board."—Dated Ottawa, 13th June, 1866.

RICHARD FULLER, of the city of Hamilton, in the county of Wentworth, Gentleman, for "Certain new and useful improvements in the construction of Grain and Hay-Rakers."—Dated Ottawa, 14th June, 1866.

THOMAS STEERS, junior, of Melbourne, in the county of Richmond, Civil Engineer, for "A New and useful Apparatus for manufacturing Dye, Saccharine Salts, or extracts of vegetable substance."—Dated Ottawa, 18thJune, 1866.

ALFRED JAMES LEMON, of the township of Beverley' in the county of Wentworth, Yeoman, for "A Potatoe Digger."—Dated Ottawa, 18th June, 1866.

ANDREW KIRK, of the township of Kincardine, in the county of Bruce, Yeoman, for "A self-lifting Cultivator."—Dated Ottawa, 20th June, 1866.

JAMES MARR, of the township of Woodhouse, in the county of Norfolk, Yoeman, for "A New and useful Plough-guide and Holder."—Dated Ottawa, 21st June, 1866.

JOSEPH DICK, of the village of Oshawa, in the county of Ontario, Machinist, for "Certain new and useful improvements in the Self-Raking Reaper, the said improvements being embodied in a machine, to be called "Dick's Harvester."—Dated Ottawa, 21st June, 1866.

ABRAHAM FAREWELL, of the village of Oshawa, in the county of Ontario, Gentleman, "A New process for the preparation of lubricating oil from Crude rock and Mineral Oils; for the Deodorization of all Rock and mineral oils, and for rendering refined oils, obtained from the same, non-explosive, up to about one hundred and fifty degrees of Fahrenheit, by the application of certain chemicals, steam and heat."—Dated Ottawa, 27th June, 1866.

JOSEPH WINTER, of the village of Aylmer, in the county of Elgin, Chandler, "A new and useful discovery to be called 'Winter's Improved Method of Manufacturing Potash.'"—Dated Ottawa, 3rd July, 1866.

JOHN DOYLE, of the village of Sweabergh, in the county of Oxford, Gentleman, "A new and useful Self-shooting Burglar Battery, to be called, 'Doyle's Self-shooting Burglar Battery.'"—Dated Ottawa, 3rd July, 1866.

JOHN MACINTOSH, of the city of Hamilton, in the county of Wentworth, Boiler Maker, "A new and useful Portable Engine Boiler, called, 'The MacIntosh Portable Steam Boiler.'"—Dated Ottawa, 3rd July, 1866.

ELIJAH GIBBS, of the city of Toronto, in the county of York, Machinist, "A new and useful Last Block Fastener."—Dated Ottawa, 3rd July, 1866.

DENNIS BARTHOLOMEW, of the township of East Zorra, in the county of Oxford, Yeoman, "A new and useful Field Roller, to be called, 'The Excelsior Field Roller.'"—Dated Ottawa, 5th July, 1866.

MATTHEW WATHROK HEATHFIELD, of the city of London, in the county of Middlesex, Druggist, "A new and useful compound which he names, "Salmoni's English White Oil."—Dated Ottawa, 6th July, 1866.

JOHN STEELE, of the city of Montreal, Manufacturer and Trader, "A new and improved Brick-making Machine."—Dated Ottawa, 16th July, 1866.

PHILIP ETCHES, of the village of Bothwell, in the county of Kent, Merchant, "A new and useful improved Stop-Cock."—Dated Ottawa, 31st July, 1866.

GEORGE PIERCE, of the village of Kingsville, in the township of Gosfield, in the county of Essex, Wheel-Wright, "A Corn Sheller and Separator."—Dated Ottawa, 31st July, 1866.

SAMUEL SILAS WOOD, of the township of Blenheim, in the county of Oxford, Yeoman, "An Improved Bolt Cutter."—Dated Ottawa, 31st July, 1866.

GEORGE HENRY OVERHOLT, of the township of Grimsby, in the county of Lincoln, School Teacher, "A new and useful Reading and Writing Frame."—Dated Ottawa, 31st July, 1866.

GEORGE CRAMPTON WILSON, of the township of Oro, in the county of Simcoe, Yeoman, "A new and useful Multiplier."—Dated Ottawa, 31st July, 1866.

JOSEPH WILLIAM ROBINSON, of the village of Bridgewater, in the county of Hastings, Machinist, "The axe-rolling and Swaging Machine for making Chopping Axes."—Dated Ottawa, 31st July, 1866.

MICHAEL BARRETT, of the city of Toronto, in the county of York, Physician and Surgeon, "A new and useful art for the revivification of Sulphuric Acid spent in the refining of Coal Oil."—Dated Ottawa, 31st July, 1866.

GEORGE JOSEPH D'ARCY, of the village of Oil-Springs, in the county of Lambton, Gentleman, "A new and useful mode of extracting Gas, Lubricating Oil, Burning Oil, and Tar from Shale Rock."—Dated Ottawa, 31st July, 1866.

Selected Articles.

MIGHT AND MAGNITUDE.

Little by little the belief is gaining ground that fat is not force, nor size strength, nor plethora power. If we are to trust the most modern deductions of science, Goliath ought to have been a monster of weakness, while Samson, whose feats proclaim his prowess, can hardly have reached the middle height. Hercules, too, must have been quite a small man. "Long and lazy, little and loud," are proverbial expressions physically accounted for. The Pygmæi of Thrace, who went to war with the cranes, were indeed a valiant race, if only three inches high.

The bodily frame of any animal is as much a machine as a steam engine is a machine. Now the more carbon a machine consumes, the more force it is capable of producing.

We must be careful to avoid forgetting that, in strict fact, at the present epoch, not a single thing in nature is either created or annihilated. It is transformed and that is all. Thus, you may *burn* a piece of paper; but you do not *destroy* it. You simply make it suffer a metamorphosis. If such be your desire you can find it again, and collect its substance weight for weight. Instead of retaining its primitive shape, the greater portion has passed into a gaseous state. It has become partly gas, which mingles with the atmosphere, and partly ashes, which fall to the ground.

Force undergoes similar transformations. *We* do not generate our own strength, as we are apt in our pride, to fancy we do. We receive it ready generated, and then we transform it or displace it. Charcoal, for instance, in obedience to our will, supplies us with heat, that is, with force. Do you think that it really creates that force? Indeed it does not. It derives it from the sun. And when, in the depth of winter, a bright sea-coal fire is blazing in the grate, all the light and heat it gives are bestowed at the expense of the solar heat.

In truth, every vegetable substance has been actually built up, bit by bit, organ by organ, by rays of light and heat from the sun. The materials so grouped remain together; but only on one condition, namely, that the solar force, which originally assembled them, shall not quit them.

Coal is a mass of vegetable matter, which has been buried in the earth for a considerable lapse of time. It is solar light and heat put into a savings bank ages upon ages ago. It is power and action from the sun, imprisoned in the bowels of the earth. To us ninteenth centurians falls the lucky task of making it our slave, by setting it at liberty from its primeval trammels. Throw a piece of coal or wood into the fire; it is absolutely as if you took a small quantity of sun heat in your hand, to manipulate it according to your requirements. And this is not a mere form of speech; it it is a correct expression of the real fact.

When an animal exerts his strength, do you also believe that *he* creates that strength? Not more than the coal creates the steam engine's strength. Here again it is entirely derived from the sun. The animal eats. *What* does he eat to keep himself alive? Alimentary substances, composed, in few words, of carbon, oxygen, azote, and hydrogen.

In an animal organism, those elements undergo a veritable transformation. Outside the animal, before they were eaten, they were combined, aggregated, united together, and in that state constituted food. Inside the animal they are disunited, decomposed; the force which held them together quits them, allows them to separate, and so is free to do other work. It causes the creature's body to grow; endows it with vital and muscular force; and, in short, produces all the phenomena of life.

Who created the aliment? The Sun—himself created by the Great Maker of all things. Here again, therefore, the life and strength possessed by an animal are actually engendered by the sun.

Throughout your whole existence you will find, by following up the same reasoning, that your most trifling act, your most thoughtless movement, derived its origiu from the sun. A blow with the fist, a breath, a sigh, can be exactly estimated in rays of sunshine. Whether you trifle or whether you work, to make such an effort you have been obliged to expend so much strength; and that strength had already been stored in you by the sun, through the agency of a series of transformations. Your clothing is all borrowed from the sun. It is he who spun every thread of your linen, and fed every fibre of your cloth and flannel. He either bleaches it snowy white, or dyes it purple and scarlet with indigo and madder. He furnishes leather for useful service, and furs and feathers for finery and parade. He gives you your bedding; whether you repose luxuriously between eider down and wool, or stretch your weary limbs on straw, chaff, Indian corn husks, seaweed, or even on a naked plank, as is the lot of not a few, it is the sun who gives both one and the other. And what do we receive from regions where the sun, as it were, is not—from the immediate neighborhood of either pole? We receive just nothing. We cannot even get to them. The absence of the sun bars our progress with an impenetrable zone of ice and snow.

In like manner, your fine cellars of hock, burgundy, and claret are nothing but bottled sunshine from the banks of the Rhine, the slopes of the Cote d'Or, and the pebbly plain of the Medoc. Your butter and cheese are merely solid forms of sunshine absorbed by the pastures of Holland and Cambridgeshire. Your sugar is crystallized sunshine from Jamaica. Your tea, quinine, coffee, and spice are embodiments of solar influences shed on the surfaces of China, Peru, and the Indian Archipelago. It is the sun's action which sends you to sleep in opium, poisons you in strychnine, and cures in decoctions of tonic herbs. You taste the sun in your sauces, eat him in your meat, and drink him even in your simplest beverage—water. Without the sun, no blood could flow through your veins; your whole corporeal vitality, your very bodily life, is the result of the overflowings of his bounty.

Nor is this all we owe to our great central luminary. The physical forces with which we are acquainted—heat, light, electricity, magnetism, chemical affinity, and motion—dancing their magic round, and alternately assuming each other's form

and action, and now believed in all probability to be one in their common birth and origin—are direct emanations from the sun.

But how grand and beautiful is the theory that *all* material blessings here below come to us entirely and alone from the sun? Its simplicity and unity are completely consistent with the attributes of the Maker. Given motion, and given matter, all the rest follows as an inevitable consequence. All nature, from the simplest fact to the most complex phenomenon, is nothing but a work of destruction or reconstruction, a displacement of force from one point to another, according to laws which are absolutely general.

With this much said about might, let us now look at the question of magnitude. From the foregoing statements, it may be easily conceived that the more an organized being is capable, in consequence of its physiological structure, of assimilating a given amount of aliment, the more effective force it will set at liberty, or, in other words, the more strength it will have at its own disposal.

Now, the solar forces, thus rendered active within the frame of a living creature, have, by determining its growth, to construct the animal itself. They have to generate its own proper vitality, as well as the result of vitality, its muscular power. It may therefore be asserted that the effective force at the disposal of every living creature will increase in proportion to its alimentation, and will diminish in proportion to its weight. Otherwise expressing the same idea; The more food an animal consumes and the less it weighs, the more muscular strength it will possess.

These deductions have lately been confirmed by curious experiments instituted by M. Felix Plateau, who has determined the value of the relative muscular power of insects—power of pushing, power of drawing, and the weight which the creature is able to fly away with.

It had already been remarked that animals of small stature are by no means proportionally the weakest. Pliny, in his "Natural History," asserts that, in strength, the ant is superior to all other creatures. The length and height of the flea's leap also appear quite out of proportion to its weight. No very definite conclusion, however, had hitherto been arrived at. M. Plateau has settled the question by employing exact science as the test. Insects belonging to different species, placed on a plane surface, have been made to draw gradually increasing weights.

A man of thirty, weighing on an average a hundred and thirty pounds, can drag, according to Regnier, only a hundred and twenty pounds. The proportion of the weight drawn to the weight of his body is no more than as twelve to thirteen. A draught horse can exert, only for a few instants, an effort equal to about two-thirds of his own proper weight, The man, therefore, is stronger than the horse.

But, according to M. Plateau, the smallest insect drags without difficulty five, six, ten, twenty times its own weight, and more. The cockchafer draws fourteen times its own weight. Other coleoptera are able to put themselves into equilibrium with a force of traction reaching as high as forty-two times their own weight. Insects, therefore, when compared with the vertebrata which we employ as beasts of draught, have enormous muscular power. If a horse had the same relative as a donacia, the traction it could exercise would be equivalent to some sixty thousand pounds.

M. Plateau has also adduced evidence of the fact that, in the same group of insects, if you compare two insects notably differing in weight, the smaller and lighter will manifest the greater strength.

To ascertain its pushing power, M. Plateau introduced the insect into a card paper tube whose inner surface had been slightly roughened. The creature perceiving the light at the end through a transparent plate which barred its passage, advanced by pushing the latter forward with all its might and main, especially if excited a little. The plate, pushed forward, acted on a lever connected with an apparatus for measuring the effort made. In this case also it turned out that the comparative power of pushing, like that of traction, is greater in proportion as the size and weight of the insect are small. Experiments to determine the weight which a flying insect can carry were performed by means of a thread with a ball of putty at the end, whose mass could be augmented or reduced at will. The result is that, during flight, an insect cannot carry a weight sensibly greater than its own body.

Consequently, man, less heavy than the horse, has a greater relative muscular power. The dog, less heavy than man, drags a comparatively heavier burden. Insects, as their weight grows less and less, are able to drag more and more. It would appear, therefore, that the muscular force of living creatures is in inverse proportion to their mass.

But we must not forget that it ought to be in direct proportion to the quantity of carbon burnt in their system. To put the law completely out of doubt, it would be necessary to determine the exact weight of the food consumed, and the quantity of carbonic acid disengaged in the act of breathing. Some chemist will settle it for us one of these days.—*All the Year Round.*

ANTIQUITY OF NOMINALLY "NEW" DISCOVERIES AND INVENTIONS.

Bold and reckless philosophers of these modern times often with oracular gravity declare that "this is the age of progress." Progress in what? The explosive power of steam, the composition of gunpowder, the peculiar properties of the magnetic needle, were known ages ago. Plutarch could have written a work on chemistry which would have been prized by the schools of to-day. Livingstone, the traveller, found in the wilds of Africa germs of science and crude ideas of chemical combinations as applied to the arts, among rude tribes who did not possess even an alphabet. The gold of California was known long ago, and forgotten; Cortez knew of its riches through tradition.

Ships were no original invention; man copied the idea from the nautilus. Suspension bridges were borrowed from the spider's web; and in the tropics may be found the curious cockle-shell which—half insect, half fish—on the approach of danger draws in a quantity of air, dives to the bed of the ocean, and uses the air as long as oxygen remains and then

comes up for more. Man saw this and made a diving-bell. *Patent rights* are not a modern institution. Over a century and a half ago Louis XIV. granted a patent to one De Beaumont for the sale of manufactured snow and ice; but the old Roman had the same luxuries. The Duke de Bouillon took out a patent for a "rat and vermin exterminator." Madame de Maintenon, shortly before she became virtually queen of France, took out a patent for an improved oven. A Frenchman secured the sole right to make and vend rotary steam engines, the idea of which he is said to have stolen from Hero of Alexandria. An enterprising Englishman went into one of the museums at Rome and saw a "portable kitchen" dug from the ruins of Herculaneum; he then returned home and patented the creation of some gastronomic philospher who won fame and fortune out of the same "cooking stove" two thousand years ago.

The use of illuminating gas, the distillation of sea-water, the process of disinfecting the air, the method of preserving fresh fruits, the hydraulic press, the fire-engine, and the construction of iron ships, are all "borrowed ideas." Captain Congreve, while in the employ of the East India Company, witnessed the great destruction of life caused by the fiery projectiles thrown by the Mahrattas. He went to England and introduced the formidable "Congreve rocket;" but India had had it for a thousand years. Philostratos called them "torrents of fire" and "flaming clouds for the destruction of armies." The air gun was an idea of Hero of Alexandria; and the steam gun a dream of Leonardi da Vinci. Many governmental usages supposed to be of modern origin date from remote antiquity. The Athenians had a stringent custom-house law. Aristophanes in one of his plays hit hard the socialistic theories of the modern Fourier. He was also the first writer to notice the fact that when good money and depreciated money are thrown together into circulation the bad currency drives out the good. In 1373, shortly after the battles of Crécy and Poitiers, Nicholas Oresme, a French churchman, wrote a "Theory of Money" that was as clear and practical as Adam Smith gave to the world. Copernicus wrote as well on the subject of wealth and its creation as he did on the true economy of the heavens. Zenophon and Aristotle preached upon the beneficial effect of the division of labor, so much enlarged upon by the modern political economists. The world then had its "Society for the Suppression of Cruelty to Animals." The Athenians were so rigdly strict in protecting the brute creation from useless tortures, that the Areopagus on one occasion pronounced sentence of death against a child for tearing out the eyes of a monkey.

The Romans had their "Census Tables." Life assurance was practised, the principle of calculation being the same as our own. Hotels had their registers in Rome in the Augustine period, and Marco Polo says the same system was enforced by the Khan of Tartary. Maritime insurance was in force in 1425. Life-insurance originated in Denmark. Plato endorsed the establishment of agencies to establish matrimonial alliances. Franklin did not discover the principle of conducting the electricity; the Etrurian priest had often brought it to the earth; Photius alludes to the iron-pointed rod for the dispelling of thunder clouds; and Tullus Hostilius was killed while trying the experiment which Franklin succeeded in. Magnetic attraction and repulsion were plainly indicated by Lucretius. Theophrastus and Pliny had a faint idea of the modern telegraph. Homeopathy was understood by Paracelsus, who recommended the cure "like by like;" and the negroes of Africa escape the effects of the poisonous, bite of the "tampon" by an administration of one of these insects, bruised in the medicine they administer. Hydropathy was practised by the Romans. Sea-sickness was warded off by the ancients with the means advocated to-day —a tight belt around the waist.

Jenner did not discover vaccination; the Persians and Hindoos have practiced it for ages. Phrenology was in vogue with the Hindoo Brahmins a thousand years ago. China had artesian wells two thousands years ago. Pisciculture has long been practiced in China. Metallic pens made of silver were used by the Turks centuries ago. In 1760 one Tighaine de la Roche foretold the invention of the daguerreotype. Many of our threatrical appliances were in vogue among the ancients, especially the plan of inflating the popularity of actors; plaudits were bought and sold. By the order of Nero a great "army of admiration" was organized and salaried in Rome; and any *claqueur* failing to "come in" at the right point in the play, or the fight, was thrown to the wild beasts! —*Journal of Applied Chemistry.*

THE COMBUSTION OF COAL—ECONOMY IN FUEL.

It is unpleasant to see the waste so generally practiced in regard to that high priced necessity, fuel. Our people for geuerations have used wood as a fuel. Coal, though extensively used, is comparatively a new substance, and hundreds of families who burn it, know but little practically, and understand less chemically, of its properties. It is simply a condensed carbon—condensed as compared with wood—capable of generating an intense heat when properly managed, and liable to disappoint the housewife when not properly managed. It requires a large amount of oxygen to produce perfect combustion, and as we have no ready means of producing this gas in our dwelling, apart from its natural admixture with the other gases which make up the volume of the atmosphere, we must use that atmosphere as a means of combustion.

But some, in the management of their fires, seem to suppose that an addition of fuel will insure an increased combustion, and develop an additional degree of heat. No idea can be more mistaken. Coal, and especially anthracite coal, should be always furnished with a sufficient amount of oxygen to keep the fire bright. It is only smothering and retarding the fire to put on a thick layer of coal, or as some do, fill the fire box, from a layer of two inches of ignited coal, to its utmost capacity, with fresh fuel. The consequence is, that for a time the fire is choked; until the heat of the lighted or igneous mass has received sufficient vitality from the admission of air to impart a portion of its heat to the new coal.

Evidently, then, it is important in the management of coal fires that oxygen, sufficient to pro-

duce combustion, should combine with the carbon; but, as we cannot, except in a limited way, regulate the admission of oxygen, the element of combustion, or at least, we cannot increase or diminish the amount contained in a certain volume of atmospheric air, it is requisite that we should do the next best thing; gage the amount of fuel subjected to the action of the atmosphere. No more coal should be put on a fire at one time than will readily ignite and give off a pure white blaze —not a blue flame, which denotes the presence of unconsumed gases—and that the fire should be undisturbed on the top.

This is an important element in the management of coal fires. "Jack Downing" once said. in his celebrated letters, that a coal fire was like a politician, "poke him on the top, his popularity, and he went down. Punch him at the bottom, his character, and he went up." The trouble with some of our politicians now is, that they have so little bottom or character, that if poked they go out like an insufficiently attended coal fire.

In clearing the grate in the morning there is a quantity of unburned coal, which has been externally subjected to combustion. It is covered with ash, and looks to the inexperienced eye like cinder. It is often relentlessly dumped into the ash box. The fact, in many cases, is, that the lump is only roasted on the outside, not even coked, and is in a better condition for igniting than the green coal. We have stated that coal is a *condensed* form of carbon. The superficially burned lumps found in our grates or among our ashes, sufficiently prove this. But take a lump of anthracite coal from the fire red hot and all alive. Throw it into water until the ashes are washed from it, and it is black externally, and cool. Take it out and break it open with a hammer and you will find it red hot and glowing inside. This shows that time and a plentiful supply of air are necessary to burn coal, and that large amounts of what we call ashes and cinders are really excellent fuel.

To prove this fact, let any one carefully sift his ashes, throwing out the inevitable slate, which can be readily detected, and start his coal fire on wood or charcoal, kindling his coal fire with the savings. He will find that he can get a good bed of incandescent coal sooner than with green coal on the kindlings. We have experimented with coal for twenty years, both in the house and under boiler, and we know whereof we speak. We shall allude to this subject again, taking up the burning of bituminous coals and the different plans of stoves and furnaces.—*Scientific American.*

The Iron and Copper of Great Britain.

The products of the British iron mines in 1865, were 9,910,045 tons, valued at the place of production at $16,644,025. This was used to feed 656 blast furnaces, and was converted into 4,819,254 tons of pig-iron. Of this 543,018 tons were exported, and the remainder occupied 6,407 puddling furnaces; and 730 rolling mills were employed in converting it into finished iron. The production of copper has been for some time declining, both in quantity and quality. Last year 82,562 tons of ore was imported, in addition to vast quantities in cakes, and manufactured.

Machinery and Manufactures.

DYEING FABRICS AND YARN.

A Mr. John Lightfoot has taken out an English patent for dyeing, the object of which is to dye, print, or stain a fast black from analine on wool, silk, feathers, or other animal substances or fabrics made from wool, and also fabrics made of a mixture of animal and vegetable substances, such as delaines, and similar mixed goods.

For mixed goods I wince or steep them in a solution of hypochlorite of lime, commonly known as a chemick, or a mixture of hypochlorite of lime, hydrochloric acid, and water, for the purpose of preventing the deoxidizing properties of the animal fibres and substances, thereby rendering them capable of receiving the aniline black.

Although I have here named only hypochlorite of lime, I wish it to be understood that other similar oxidizing agents will answer the purpose, such as hypochlorous and chlorous acids, hypochloric, chloric, and perchloric acids or a solution of their salts of alkaline or metallic bases. Other oxidizing acid salts, such as nitric acid, nitromuriatic acid, bichromate of alkalies, and permanganate of alkalies, will produce a certain effect; but I prefer as more economical and of greater utility, the chlorine mixtures before described. When the wool or animal substance is thoroughly oxidized to its maximum, and in a fit state to receive the aniline black already named (by oxidation being understood the change, whatever it may be, that animal fibres undergo, when exposed to the substances described), it may be known by the following simple test;—Take a dilute solution of permanganate of potash in two test tubes, and into one put a piece that has not been oxidized, and apply a gentle heat; the solution containing the one that is in a fit state to receive the aniline black remains pinky, but the other is decolorized immediately.

The proportions for preparing the wool are about as follow;—I take for every pound of cloth, wool, yarn, silk, delaine, feathers, or animal substance (well cleaned) six gallons of water at about 100 deg. Fah., two and a-half ounces by weight of hydrochloric acid of commerce, and one pint of hypochlorite of lime in solution, containing sixteen ounces of hypochlorite of lime per gallon. I keep the goods in this solution for from twenty to thirty minutes, or until the wool becomes quite yellow; I then wash well in water and dry.

I am aware that wooden fabric and fabrics of mixed wool and cotton have been previously steeped or prepared in mixtures containing chlorine or hypochlorus acid for the purpose of subsequently printing or dyeing such fabrics with ordinary colors not aniline black, but the chlorodizing or oxidation sufficient for such purposes is not applicable to aniline black, and a point of oxidation or chlorodizing is required which would not be advisable to give to fabrics intended for ordinary colors.

In dyeing coburgs and similar goods the present processes involve two operations; first, the cotton has to be dyed, and then the wool or silk. I avoid this twice dyeing by preparing the mixture of cotton, wool, silk, or other animal substance as

above, so that they will both take a black dye at one and the same time. I steep or pad the goods either before dyeing or after in the following dye:—One gallon of water, four ounces of chlorate of potash, twelve ounces of chloride of aniline crystals, six ounces of sal-ammoniac, two ounces of sulphate of copper. I then dry the goods at as low a heat as possible and age for two or three nights in a moist room at from about 76 deg. to 80 deg. Fah., and when the color is thoroughly developed it becomes an intense myrtle green, almost black. I raise the goods either in water or any weak alkali, or in a weak cold solution of neutral chromate of potash, which I use in preference; and if a brownish black is required, the goods may be subsequently dyed in a weak hot solution of archil or cudbear.

When the prepared cloth is used for printing, I print on the aniline black color, and dry and age in a warm moist room, and raise in a weak alkali as before. I then pass the goods through a warm solution of sulphite or hyposulphite of soda, or a solution of any suitable deoxidizing agent to improve the white or whites; or the goods may be passed through one of Mr. Thom's sulphuring apparatuses, which restores the white in the parts not printed, but does not injure the black. It is preferable after sulphuring, to repass the goods through a weak alkali.

Boiler Explosions.

Mr. L. E. Fletcher, Chief Engineer to the "Association for the prevention of Boiler Explosions," in Manchester, in a late report said:—

"*Corrosion.—Internal.*—Some corrosive waters not only waste and indent the surface of boilers internally, but also destroy the vitality of the metal, so that the edge of the overlap may be cut away with a few slight blows with the hammer, and the rivet heads knocked off with a hand-chisel only, and easily pulverized. Such was the character of the defects found in one of the boilers examined during the past month, which was at once laid off by the owners, and condemned as soon as its condition was pointed out by the association. The above shows the importance of carefully testing corroded rivet-heads with a hammer.

"*Corrosion.—External.*—Both the dangerous cases referred to arose from leakage at the joints of boiler mountings, in consequence of their being bolted to the shell instead of riveted. The plates were so eaten away that in one case the inspector scraped a hole through with his chisel, while this could easily have been repeated in the other. One of the mountings was a cast iron man-hole mouth piece of somewhat large size, and as the corrosion extended in a groove all round it the boiler was clearly unsafe to be worked, and was immediately laid off. This encircling groove was not very easy of detection, since, although nearly eating through the plate, it was only three-eights to half an inch wide, and almost buried under the edge of the casting; added to which it was filled up with tar, with which the boiler had been coated. There may be others in a similar condition, for which this may be a caution. All mountings, instead of being bolted to boilers, should be attached with suitable fitting blocks riveted to the shell.

"*Deficiency of Water.*—This arose at night time, when the fires were banked up, from the attendants omitting to close the feed stop-valve, there being no self-acting back-pressure valve, and the feed inlet being below the furnace crowns. The importance of every boiler being fitted with a good self-acting feed back-pressure valve, as well as of the feed inlet being above the level of the furnace crowns, has been frequently pointed out in previous reports. The furnace crown was fitted with one of those fusible plugs in which the alloy is in the shape of a washer about the size of a penny-piece, having a copper button in the center of it. This did not, however, prevent the plates becoming red-hot. The plug did not put out the fire, or properly speaking, go off at all. A little piece of alloy melted away on one side and allowed a slight escape of steam, which attracted the attention of a workman, who at once examined the boiler and found the furnace crown red-hot."

New Railway Turn-table.

The *Mobile Tribune* says Capt. G. B. Massey of that city "has obtained letters-patent for the United States for an improved railway turn-table, which is pronounced by scientific men at the North to be one of the most valuable patents ever issued by the United States Patent Office. Capt. M. exhibited a model of this invention to a few friends before leaving for Washington a few weeks since, and all were impressed with a sense of the great value of the improvement. It is generally known that locomotives, with their tenders, are now turned or reversed, at each end of their route, by hand, requiring the labour of four or more men. By Capt. M.'s invention, the locomotive is made to do this work without the assistance of any one unconnected with the engine, and in one-fourth of the time usually required by the present mode."

Fire Engine Hose.

The *American Artisan* says: Riveted hose cannot be so strong as hose that is sewed with two or more seams—shoemaker's stitch. Such sewing can now be done, with some help from machinery, such as is used to sew boot-legs. The leakage from rivited joints is often excessive; and repairs are more difficult than they would have been with sewed hose. Without having studied this subject, we venture to say, from some observation, that a good boot-maker or harness-maker, who has an inventive faculty can make an improved sample of hose if he will labour resolutely to do so; and that there will be a demand and probably a fair reward for sewed hose, if it can be made at moderate price; and we think it can be made for less than riveted hose."

[We are satisfied, from nearly Forty years experience with sewed and riveted hose, that the former can neither be made so cheaply or as durable as the latter, nor can it be so easily repaired. Ed. Journal.]

The Effect of Color upon Health.

A correspondent of the London *Builder* says:—"From several year's observations in rooms of various sizes, used as manufacturing rooms, and occupied by females for twelve hours per day. I found that the workers who occupied those rooms which had large windows with large panes of glass

in the four sides of the room, so that the sun's rays penetrated through the room during the whole day, were much more healthy than the workers who occupied rooms lighted from one side only, or rooms lighted through very small panes of glass. I observed another very singular fact, viz: that the workers who occupied one room were very cheerful and healthy, while the occupants of another similar room, who were employed on the same kind of work, were all inclined to melancholy, and complained of pain in the forehead and eyes, and were often ill and unable to work.

Upon examining the rooms in question, I found they were both equally well ventilated and lighted. I could not discover anything about the drainage of the premises that could affect the one room more than the other; but I observed that the room occupied by the cheerful workers was wholly whitewashed, and the room occupied by the melancholy workers was colored with yellow ochre. I had the yellow ochre washed off, and the walls and ceilings whitewashed. The workers ever after felt more cheerful and healthy. After making the discovery, I extended my observations to a number of smaller rooms and garrets, and found, without exception, that the occupants of the white rooms were much more healthy than the occupants of the yellow or buff colored rooms; and wherever I succeeded in inducing the occupants of the yellow rooms to change the color for whitewash, I always found a corresponding improvement in the health and spirits of the occupants."

Miniature Steam Engine.

Perhaps the most curious specimen of minute workmanship ever constructed was a high-pressure engine made by a London watchmaker in 1845. Each part was made according to scale; it worked by atmospheric pressure instead of steam; yet it was so small that it stood on a fourpenny piece, with room to spare, and, with the exception of the fly-wheel, it might be covered with a thimble.

The "Cycloscope" for setting Curves.

At a recent meeting of the Institution of Civil Engineers, Mr. H. T. Humphrey, C.E., exhibited and explained with diagrams an instrument called the cycloscope, for setting out railway or other curves without the aid of the transit, theodolite, etc. Externally it somewhat resembled a box-sextant. It was composed of two essential parts only, viz.: two plane mirrors, one of which was silvered over the whole of its surface, and the other over one-half of its surface. By a law of physical optics, which was called either combined or successive reflections, a series of images would be formed in the half mirror by applying the eye to the eye-hole in the back of the whole mirror, and at the same time setting the two mirrors an angle with one another equal to the required tangential angle. Then the several successive reflected images of a ranging-rod, for instance, were seen to lie upon the circumference of a mathematically true circle. The curve was then readily set out in the field by simply placing other ranging-rods in lines with these several images. This could be done by looking through the universal half of the half mirror, and planting the rods opposite to and overlapping the successive reflections. No errors could arise in the manipulation, and the whole process of setting out a true curve was shortened and simplified. After setting the mirrors to the requisite tangential angle, no further adjustment or support was needed than could be afforded by the top of a ranging-rod placed at the commencement of the curve, and shifted occasionally to any stake on the curve that the limits of distinct vision might require.—*American Artisan.*

Useful Receipts.

Black-color of Zinc and Brass.

In order to impart to zinc a permanent black coating, the metal is first to be thoroughly cleaned, which is done best by friction with a paste made of powdered quartz and diluted sulphuric acid. This will soon render the surface of the metal bright and shiny. The zinc is then dipped into a solution of sulphate of sub-oxyd of nickel and ammonia in water in the proportion of four parts of the salt to forty of water, the latter being acidulated with one part of sulphuric acid. After a few minutes the metal is removed from the solution, thoroughly rinsed in pure water and dried. This black coating is permanent, which is not the case with the precipitates formed by the nitrate and chlorite of copper. If the zinc, rendered black in the manner mentioned, is rubbed with a hard brush, it will assume a bronze hue, which improves the appearance of some articles. Brass may be coated with a fine black by dipping it into a solution of one-half part of sulphuric acid, in twenty parts of water, the liquid being heated to 106° Fah. After being withdrawn the brass is to be washed and dried. If the brass during its immersion is touched with a zinc staff, the deposition of metallic arsen will be accelerated, consequent upon the ensuing hydro-electric process.

Cement for Metals.

A good cement for the temporary closing of small holes or cracks in metals may be made of starch, by forming it into a paste with a concentrated solution of of chlorate of zinc. This cement hardens rapidly, but remains soft under water. It remains efficient for a year.

Water-proof Paper.

Tissue paper, soaked in Paraffine, is said to be both water and air-proof.

Collodion for Corns.

A property of collodion well worth mentioning is that of rendering corns not sensitive for a longer period, if they are painted with it after being cut down.

Cement for Luting.

The New York *Druggists' Circular* states that an excellent cement for luting chemical apparatus and for other purposes may be prepared by mixing paste made from starch with glycerine and gypsum. It will retain permanently its plasticity.

By an addition of glycerine to glue (one-fourth part of glycerine to one part of glue) the cracking and scaling-off will be prevented. This glycerine-glue possesses also the property of caoutchouc to remove the marks of lead-pencil from paper.

Belladonna an Antidote for Opium.

A correspondent, a professional physician, in a letter to the *Medical and Surgical Reporter*, details the circumstances of a case where the patient had taken three ounces of opium tincture, or laudanum, which had exerted its effects three and a half hours. Fluid extract of belladona was then administered in doses of twenty drops every ten minutes, which, in twenty minutes, arrested the progress of the opiate, and in about eight hours the patient was so far recovered as to sit up and converse. The writer says he is sure that belladonna saved this man's life.

The Virtues of Borax.

The excellent washerwomen of Holland and Belgium, who "get up" their linen so beautifully white use refined borax as a washing powder, instead of soda, in the proportion of one large handful of powder to about ten gallons of boiling water. They save in soap nearly one-half. All the large washing establishments adopt the same mode. For laces, cambrics, etc, an extra quantity of the powder is used; for crinolines, requiring to be made stiff, a strong solution is necessary. Borax being a neutral salt, does not in the slightest degree injure the texture of the linen. Its effects is to soften the hardest water, and therefore it should be kept on every toilet table. To the taste it is rather sweet; it is used for cleaning the hair, is an excellent dentifrice, and in hot countries it is used, in combination with tartaric acid and bi-carbonate of soda, as a cooling beverage. Good tea cannot be made with hard water. All water may be made soft by adding a teaspoonful of borax powder to an ordinary-sized kettle of water, in which it should boil. The saving in the quantity of tea used will be at least one-fifth.—*Druggists' Circular.*

Practical Memoranda.

Coal Oils as Lubricators.

It is stated that American manufacturers, especially those employing fine machinery, have found, by a thorough system of tests, that coal oils as lubricators are superior to sperm oils in the ratio of 100 to 84, a discovery extremely satisfactory from the great difficulty heretofore of obtaining regularly a grade of sperm or whale oil of uniform denstiy, free of gum and foreign mixture.—*American Artizan.*

Test for Acids.

Cyanine blue has been found to be a most sensitive test for free acids. Well-boiled water, which has been slightly tinted with the reagent, loses its color the moment a few bubbles of air are blown through it from the lungs, thus showing the action of so feeble an acid as carbonic in so small a proportion.

A Table Showing the Relative Value of Gold and United States Bills.

(*Continued from page 22.*)

Prem.	Value of a Cur. Dollar.	Prem.	Value of a Cur. Dollar.
151	66¼	176	56¼
152	65⅞	177	56½
153	65⅝	178	65⅛
154	65	179	55¾
155	64½	180	55½
156	64⅜	181	55¼
157	63⅞	182	55
158	63¼	183	54¾
159	62⅞	184	54⅜
160	62½	185	54
161	62	186	53¾
162	61¾	187	53½
163	61⅜	188	53¼
164	61	189	53
165	60⅝	190	52⅝
166	60¼	191	52⅜
167	59⅞	192	52⅛
168	59½	193	51⅜
169	59¼	194	51½
170	58⅞	195	51
171	58⅝	196	51½
172	58⅜	197	50¾
173	57¾	198	50¼
174	57½	199	50¼
175	57⅛	200	50

Oxyd of Lead.

The solubility of oxyd of lead in water is, as is well known, so slight that many have doubted its very existence; though unrecognizable by sulphuretted hydrogen, it is shown by the cyanine test.

Cleansing Hair Brushes.

Soda, dissolved in cold water, is better than soap and hot water. The latter very soon softens the hairs, and the rubbing completes their destruction. Soda, having an affinity for grease, cleanses the brush with very little friction.

Bleeding from the Nose.

Some two years ago, while going down Broadway, in New York, blood commenced running from my nose quite freely. I stepped aside and applied my handkerchief, intending to repair to the nearest hotel, when a gentleman accosted me, saying, "Just put a piece of paper in your mouth, chew it rapidly, and it will stop your nose bleeding." Thanking him rather doubtfully, I did as he suggested, and the flow of blood ceased almost immediately. I have seen the remedy tried since quite frequently, and always with success. Doubtless any substance would answer the same purpose as paper, the stoppage of the flow of blood being caused doubtless by the rapid motion of the jaws, and the counter action of the muscles and arteries connecting the jaws and nose.

Physicians state that placing a small roll of paper or muslin above the front teeth, under the upper lip, and pressing hard on the same, will arrest bleeding from the nose—checking the passage of blood through the arteries leading to the nose. H. C. K.—*Scientific American.*

Notes on Iron and Steel.

Cast-iron and wrought-iron may be welded together in the following manner: Filings of soft cast iron are to be mixed and melted with calcined borax, and the mixture sprinkled on both the cast and wrought iron. These are to be then heated, when they may be welded the same as two pieces of wrought-iron.

Cast-iron may be case hardened by being rolled at a red heat in equal parts of powdered prussiate of potash, saltpetre, and sal-ammoniac, and by being then placed, whilst yet hot, in a bath containing 2 oz. prussiate of potash and 4 oz. sal-ammoniac in every gallon of cold water.

Homogenous metal, so called, is made by melting Swedish wrought-iron, cut into scraps, along with about 1 per cent. of powdered charcoal; 6 oz. of the latter being allotted to a charge of 40 lbs. of iron.

Iron is said to have been successfully welded after being heated by electricity to a dull red *in vacuo*.

The highly polished surface of Russia iron is produced by rolling it under great pressure while in a cold state.

To show that iron is converted into steel by the absorption of carbon alone, Mr. S. B. Rogers states that, a hole having been drilled in a lump of iron, some small diamonds were inserted and hermetically sealed up, and the iron then subjected to heat. It was by these means converted into steel.

Excellent steel may be made by passing purified coal gas over Swedish or other good wrought iron, at a high heat, The process, however, is an expensive one.—*London Engineer.*

Notes on Steam Boilers.

The Admiralty marine-engine contracts stipulate for ·68 of a square foot of grate and for 18 square feet of heating surface per nominal horse-power.

Gum catechu is extensivly used in the United States for removing scale from the interior of locomotive boilers. It is found not to injure the boiler or tubes in the least.

The heat transmitting power of boiler tubes has been considerably increased by cutting their exterior surfaces into ridges like screw threads.

The Giffard injector will commence working, throwing a jet of water into a locomotive boiler, when the pressure of steam is so low as to be incapable of blowing the whistle. It will often start when the steam-gage pointer stands at zero, although, of course, in such case, the gage cannot be correct in its indication. Few high-pressure gages, indeed can be depended upon, to a pound or so, at the commencement of the scale.

Feed-water heating apparatus has been suddenly and violently collapsed on the sudden admission of cold water while the exhaust steam was passing through.

The whole ordinary pressure upon all the internal surfaces of a locomotive boiler of the largest class (including the tubes) is about 15,000 tons.

In some experiments recorded in Mr. D. K. Clark's "Recent Practice," it appeared that a single-riveted seam in ½-inch plates was only 40 per cent as strong as the whole plate, or 20 per cent as strong as a solid plate 1 inch thick; a similar seam of $\frac{7}{16}$-inch plate was 50 per cent as strong as the whole plate, or nearly 22 per cent as strong as a solid plate 1 inch thick, while a similar seam of ⅜-inch iron had 60 per cent of the strength of the whole plate, or 22½ per cent of the strength of a solid 1 inch plate, the ⅜-inch iron, when riveted, being actually stronger than ½-inch iron similarly riveted!

In the experience of the officers of the Manchester Association for the Prevention of Steam Boiler Explosions, one boiler in eight is found to become defective, every year, from corrosion alone.

The pressure of the air upon the safety valves of steam boilers varies with the pressure of the air upon all other objects. When the barometer is high, therefore, a boiler, of which the safety valve is weighed to a given pressure, will work stronger steam than when the atmospheric pressure is lower.

With large and heavily worked engines there is a disturbance of the pressure in the boiler at every stroke of the piston. A sensitive steam gage will always show this to be the case.

In many cases there is a sudden increase of pressure in steam boilers immediately after starting the engine. This occurs, no doubt, from the ascent of water upon some of the plates which have been heated beyond their proper temperature, as well as from the sudden conversion of water into steam by being raised in a divided state into intimate contact with steam already superheated.—*London Engineer.*

Disinfectants.

Mr. W. Crookes, F. R. S., of London a distinguished chemist, in a reprort on the application of disinfectants, quoted in the August No. of this Journal, "gives the preference to tar acids (carbolic and cresylic) as, under all circumstances, the most powerful in arresting all kinds of fermentative and putrefactive changes."

Carbolic acid is now used by the New York Board of Health, as a cholera disinfectant; and the Medical Health Officers of this city (Toronto) strongly recommends this acid, and carbolate of lime—a powder prepared by Lyman & Elliot, similar to but stronger and cheaper than McDougald's Disinfecting Powder.

Fleas and Musquitoes.

A correspondent of an American journal says that oil or essence of penny-royal is "a specific against the attack of fleas. I have always used it when fleas were in my bed or about my clothing, and found that it would banish them entirely, and am now using it with equal success to banish musquitoes; they will not come near where it is."

The amount of steam-power employed at all the ironworks in the kingdom has been estimated at that of 340,000 horses.

During the present year, the *Scotia*, an English iron ship, made the voyage from Queenstown to New York in 8 days and 17 hours; the fastest trip on record.

Statistical Information.

Railroads in Canada.

Number of Railroads in Canada, in 1865	13
Length in Miles:—	
Grand Trunk Railway	1,377
Great Western "	345
Northern "	97
Brockville and Ottawa Railway	86½
Prescott and Ottawa "	54
Stanstead and Chambly "	44
Port Hope and Lindsay "	43
Welland "	25½
London and Port Stanley "	24½
Cobourg and Peterborough	14
Port Hope and Peterborough	13
Carillon and Grenville	13
St. Lawrence and l'Industrie	12
Total miles open for traffic	2,148½
" Cost of all the roads	$121,543,189
Cost of Grand Trunk	80,704,095
" Great Western	23,855,881
" Northern	3,457,789
" all the other roads	13,525,424
Total Receipts for all the roads in 1865.	10,910,678
Grand Trunk Receipts "	6,470,998
Great Western " "	3,370,637
Northern " "	506,748
All the other roads " "	562,295
Working expenses of all the roads "	5,778,343
" " Grand Trunk "	3,857,806
" " Great Western "	1,305,267
" " Northern "	275,941
" " all other roads "	339,329
Cost of renewals on all the roads, in addition	$1,355,759
Number of Passengers carried by Grand Trunk in 1865	1,380,917
Number of do. by Great Western, in 1865	714,142
" " Northern "	105,372
Tons Freight carried by Grand Trunk "	1,001,687
" " Great Western "	455,073
" " Northern "	120,000
Men in employ of Grand Trunk	5,370
" " Great Western	2,851
" " Northern	446
Locomotive Engines, Grand Trunk	293
" " Great Western	94
" " Northern	18
Cars employed, Grand Trunk	4,369
" " Great Western	1,522
" " Northern	355
Deaths by accident, Grand Trunk	38
" " Great Western	15
" " Northern	5

The War Powers of Europe.

The strength of the three following European countries prior to the recent war, is thus stated:—Austria, square miles, 236,311; population, 36,795,000; army, 800,000. Prussia, square miles 180,212; population, 19,304,000; army, 700,000. Italy, square miles, 98,784; population, 21,703,710; army, 400,000.

Increase of Population in France.

Of all European nations France shows the slowest rate of increase in population. The 27,000,000 of 1801 had only increased by 9,000,000 in 1861. During the same period Great Britain had increased from 10,000,000 to 23,000,000, and this in spite of emigration.

Telegraph Lines in Canada.

	Montreal Company.	Provincial Company.	Vermont and Boston Company.	Total of all the Companies.
Length of Lines in Miles, in 1865,	4,326	609	43	4,978
Number of Stations "	331	37	1	369
" Instruments "	370	40	1	411
" Messages sent "	444,878	25,000	9,453	479,331

The Provincial is a new line, and rapidly extending its operations throughout the Province.

Production of Salt.

The *Scientific American* says:—"The most important salt mines in the world are those of Cracow, in Poland, and Salzburg, in Austria, which supply large quantities of rock salt. In the United States large quantities of salt are used for pickling and curing meats for foreign markets, and of the 30,000,000 bushels annually consumed, about one-half is imported; but as the home supply is rapidly increasing, it will ere long equal the demand.

The saline springs of Onondago county, in this State, yielded last year 2,928,187 bushels, which shows an increase of 714,000 bushels over the previous year. In 1860 the Saginaw salines, of Michigan, yielded only 20,000 bushels, while in 1865 the product reached 3,200,000 bushels. The Hocking Valley and Pomeroy mines, in Ohio, yield very largely, as also do those in Pennsylvania, Texas, Illinois, Louisiana, Missouri, and West Virginia. The Kanawha, W. Va., salt works produced before the war annually 300,000 bushels, and the Pennsylvania springs yielded about 1,000,000 bushels. There are two methods of procuring salt from the springs—by boiling and by solar evaporation—but with the exception of Ohio and Pennsylvania, where fuel is at hand and cheap, solar evaporation is generally resorted to.

The brine is brought to the surface by force pumps from wells from 100 to 300 feet deep, the deepest water yielding most salt—the proportion being about 56 pounds of salt from 30 to 45 gal-

lons of the best brine. It is then exposed in vats to the sun or placed in kettles and boiled, and the residuum—salt—is dried for sale.

From the rapid annual increase, it is fair to presume that in a short time, comparatively, the supply of salt will be more than sufficient for home consumption, and American provisions shipped to the Old World will be wholly cured with American salt."

Miscellaneous.

The broken Atlantic Cable.

The London *Spectator* tells the following singular and most interesting story :—

"Night and day, for a whole year, an electrician has always been on duty watching the tiny ray of light through which signals are given, and twice every day the whole length of wire—one thousand two hundred and forty miles—has been tested for conduction and insulation. * * * The object of observing the ray of light was of course not any expectation of a message, but simply to keep an accurate record of the condition of the wire. Sometimes indeed wild incoherent messages from the deep did come, but these were merely the results of magnetic storms and earth currents, which deflected the galvonometer rapidly, and spelt the most extraordinary words, and sometimes even sentences of nonsense, upon the graduated scale before the mirror. Suddenly, last Saturday morning, at a quarter to six o'clock, while the light was being watched by Mr. May, he observed a peculiar indication about it which showed at once to his experienced eye that a message was at hand. In a few minutes afterward the unsteady flickering was changed to coherency, if we may use such a term, and at once the cable began to speak, to transmit, that is, at regular intervals, the appointed signals which indicate human purpose and method at the other end, instead of the hurried signs, broken speech, and inarticulate cries of the still illiterate Atlantic. After the long interval in which it brought us nothing but the moody and often delirious mutterings or the sea stammerings over its alphabet in vain, the words 'Canning to Glass' must have seemed like the first rational word uttered by a high-fever patient when the ravings ceased.

The Atlantic Cable of 1865.

The grappling and raising of the cable of last year in 1,900 fathoms, or a little less than 2¼ miles of water(instead of three miles, as has been so widely understood), affords, perhaps, an even more striking proof of the resources of telegraph engineering than the successful laying of this year's cable. There was, of course, no difficulty in finding the precise spot in mid ocean where the end of the broken cable lay. But it was a question whether the grapnel would drag steadily along the bottom at such a depth, or whether it would catch and jump successively from one point to another. It was not certain even that, with such a weight of grapnel wire out, it could be told when the cable was hooked, and it was a matter of the greatest doubt whether even if once hooked, the cable could be hauled to the surface, supposing furthermore, that it was hooked within two or three miles of the broken end, so as to oppose but little friction in "coming home" along the bottom, as a cable laid with but little slack must have done to be lifted at all through two miles of water.

It is well understood that the course of the cable was first marked by buoys, and that the ship engaged in grappling—and there were four ships engaged in the task—first went according to the wind, three or four miles to the north or south, and then drifted broadside on across the course of the cable, with her grapnel dragging. To pay out 2,300 fathoms of grapnel wire took from one hour and twenty minutes to three hours, and the strain on the dynamometer in 1,900 fathoms of water was 7½ tons, increasing to 8½ or 9 tons according to the motion of the ship. The cable itself weighed 14 cwt per nautical mile in water and a breaking strength of 7¾ tons. When the steady strain on the grapnel line at the depth named exceeded 8 or 9 tons, it was concluded that the cable was hooked, and this was generally found to be the case. Hauling in occupied five or six hours, the resistance occasionally reaching 10½ tons. As the wire came in with the cable, the resistance due to the weight of the former lessened, and that of the cable itself increased. When at the surface, the strain on the dynamometer was from 7½ to 8 tons, and the strain on the cable was nearly up to its breaking weight. It was grappled ten times in all, and, besides being raised to considerable heights from the bottom, and then breaking or slipping off the grapnel, it was twice raised to the surface. The bottom of the ocean where the cable was raised is proved to be of ooze containing microscopic shells, and no accident can happen to the cable there unless it is purposely dragged for and broken, as it unquestionably may now be, by an evil-minded skipper having grappling gear of sufficient strength or unless a wreck fell across it. It is now being confidently predicted by certain writers that both cables will soon be destroyed by icebergs. It is, of course, possible that they may, but the more the probabilities are examined the less they appear. Even if thus destroyed, however, in the iceberg track, which is only two hundred miles wide, the cable,, being in shallow water there can easily be raised and repaired.—*Engineering.*

A Powerful Microscope.

The most powerful microscope ever made has been constructed by Messrs, Powell & Lealand, and described in a paper recently read before the Royal Society of London. The power of this instrument is fully double that of any which had ever been constructed previously; and it altogether supersedes what had before been considered the utmost attainable limit of perfection in this instrument, This microscope magnifies 3,000 diameters with its lowest eye-piece, and 15,000 diameters with its highest; the latter being equivalent to making an object appear 1,575,000,000 times larger than it really is! How immensely must such an instrument increase our knowledge of the lower organisms! May it not even enable us, eventually, to determine the ultimate constitution of matter? It must at least greatly aid savans in their researches in that direction.—*Mechanics' Magazine.*

The Cincinnati Suspension Bridge.

This immense structure is now rapidly approaching completion. The bridge was designed and is being built by John A. Roebling, Esq..... The total length of this bridge, including the approaches from Front Street, Cincinnati, and Second street, Covington, will be 2,252 feet; length of main span from center to center of the towers, 1,057 feeet; length of each land suspension, 281 feet; width of bridge in the clear, 36 feet; its hight above low water, 100 feet; hight of towers from foundation, without turrets, 200 feet; hight of turrets, 30 feet; number of cables, 2; diameter of cables, 12½ inches; strands in each cable, 7; wires in each strand, 740; wires in both cables, 10,360; weight of wire, 500 tons; deflection of cables, 88 feet; strength of structure, 16,800 tons; masonry in each tower, 32,000 perches; masonry in each anchorage, 13,000 perches; total amount of masonry, 90,000 perches; size of towers at base, 86 by 52 feet; at top, 74 by 40 feet.....There will be 500,000 feet of lumber in the bridge-way, all of which will be thoroughly soaked in tar in tanks on the Covington side, where the planing mill is located. The wrought-iron floor beams (the length of two of which makes the width of the bridge) are each 19 feet long by 5 inches wide; and there will be two joined in every five feet of the bridge—one to each suspender. The weight is 20 pounds per foot. Two iron trusses 10 feet high will separate the foot roadways, one on each side, from the carriage-ways; and flat-iron tracks, of accomodating width, will be laid for wheels to run upon. The wrought-iron girders, 30 feet long and 12 inches wide, will run the entire length, under the middle of the bridge. Ornamental iron railings will protect the foot-passages on either side. The estimated total cost of this bridge will be $1,750,000.....Mr. Roebling may well feel some professional pride in the boldness and sagacity which he has shown in designing such structures as the Niagara and Cincinnati bridges. They are both an honor to American engineering.—*American Railway Times.*

Secretion in Ague.

During the prevelence of ague in the malarial districts of Ohio and Mississippi, Dr. Sailsbury undertook a series of experiments and succeeded in discovering large quantities of algæ, fungi, etc., in the mucous secretions of his patients.

Rinderpest Meat.

At the Royal Veterinary College at Camden Town, a number of healthy dogs have been fed upon portions of cattle that had died from rinderpest. The result of the experiment has been that the dogs are fatter and healthier than ever—the doctors are nonplussed.

Quick Travelling.

A feat of almost unrivalled travelling was recently accomplished on the Great Northern Railway. On the occasion of the late fire at Newcastle, when the safety of the high-level bridge was endangered, a telegram was sent to London requiring the attendance of Mr. Harrison, the engineer of the North Eastern Railway Company, and that gentleman was conveyed by an engine belonging to the Great Northern Company from King's Cross to York, a distance of 191 miles, in 3 hours, 43 minutes, including a stoppage of 8 minutes at Newark for water and lubricating the engine.—*Mechanics' Magazine.*

How Gutta Percha is Obtained.

This gum is obtained from the trees when they are about thirty years old. The natives of the Malayan peninsula and of Borneo, obtain it by the destruction of the trees. Attempts have been made to induce them to procure the sap by tapping, but the coagulation of the gum at the apertures, by exposure to the atmosphere, makes it difficult to obtain it in paying quantities. The natives boil the mass in water to soften it, cut it into strips, and then knead it with their feet while plastic, forming it into cakes.—*American Artizan.*

The Art of Dining.

The following sensible advice in the art of dining is from the pen of Prof. Blot, whose work on the art of cookery we have so often had occasion to refer to in these columns:—

"The mind has its diseases as well as the body, and I think vegetarianism is one of them. It is by a practical experience that we learn what food is proper for us, and not by chemical analysis. Every thing we eat, with the exception of salt, can be turned into charcoal, yet who can live on charcoal? An experiment has been made by the great chemist, Magendie. He fed geese on gum only and they died on the 16th day; he fed some upon starch only, and they died the 24th day; he fed others on boiled white of eggs, and they died on the 46th day, he fed others on the three kinds mixed together and they fattened instead of dying. So we must vary our food as much as possible in order to supply the waste of every part of our system. In cooking vegetables, green vegetables, such as cabbage, spinach, etc., should be put into water at its first boiling, with salt. Dry vegetables, like beans, peas, etc., should be put over the fire in cold, soft water, after having been soaked in luke-warm water—beans for twenty four hours. Potatoes should be steamed but never boiled. Steam with the skin on. Bear in mind that a potato must never be pealed: the part immediately under the skin contains the most nutriment. Cut out the eyes or germs if any; if young and tender, the skin can be taken off with a scrubbing brush; if old, scrape the skin off and then roast them. In selecting the potato, remember the smaller the eye the better the potato. By cutting a piece from the thickest end, you can tell whether they are sound. They must be either white or pink, according to the kind. Always select beans without spots. Milk and eggs partake of the nature of animal as well as vegetable food. Fish is less nutricious than meat, containing only 20 per cent of nutricious matter, but ought to be partook of at least twice a week. It contains more phosphorous matter than other food and is very good to supply the waste of our system, especially of the brain. The brain of an idiot contains about one per cent of phosphoric matter, while that of persons of sound intellect contains from two to two and a half per cent. The brain of a maniac contains three

and a half per cent. We need not fear however, of losing our senses from eating too much fish. It supplies the waste, but does not augment the proportion of the phosphoric matter."

The chemistry of the matter might, perhaps, be stated with more precision. For instance, instead of saying that every thing we eat may be turned into charcoal, it would be more accurate to say that carbon, being the one solid of the four organic elements, the others may be driven off by heat, leaving the carbon behind in the form of charcoal.—*Scientific American.*

Rancid Butter for Cooking.

Many persons sneer at the common notion that butter too rancid to be eaten raw upon bread, may be used without objection in cooking; but this notion, like many other popular ideas, is more in accordance with the truth of the matter than the imperfect knowledge that ridicules it. All fats are compounds of acids with glycerin. Butter is a mixture of several fats, and one of them, constituting, however, only a small portion of its mass, is butyrine; this is a compound of butyric acid with glycerin. Butyrine, like other fats, is a neutral substance, but when it is decomposed—in other words, when the butyric acid is separated from the glycerin with which it is combined—we then have the two substances, the acid and the glycerin, exhibiting each its peculiar properties. Butyric is a very powerful acid, caustic and sour, and having that peculiar strong odor which is characteristic of rancid butter. One of the early steps in the decay of butter is the decomposition of the butyrine, which is made manifest by the odor of the butyric acid set free, and by the sour and biting taste of this acid. Now, at a temperature of 315 degrees, butyric acid is evaporated, hence it is only necessary to raise the temperature of the butter to this point in order to drive off the acid which makes it rancid, and to leave the remainder perfectly sweet. If rancid butter is mixed in cake, a portion of the butyric acid will be absorbed by the water in the cake and it may not be all expelled by the heat in baking; but if the butter is used for frying in an open pan, it is pretty certain that the butyric acid will all be evaporated. With a knowledge of the properties of butyric acid, a skilful cook ought to be able to use rancid butter in such ways as to retain none of the rancidity in the cooked articles. *Scientific American.*

New Mode of Embalming.

M. Audiger, a French chemist, has invented or discovered a new mode of embalming, which consists in pouring down the throat of the corpse two glasses of a liquid, whose composition is still a secret. The operation lasts but twenty minutes, and in two or three months the corpse becomes as stone. Experiments have been made with this new mothod at Marseilles, Algiers, and in the public hospitals, with complete success.

Fortunes of an Inventor.

Mr. James Gale, the inventor of the method for making gunpowder non-explosive, was born in Tavistock, in the west of England. He is the son of poor parents, and received but little education at the school of that town. During his school-days he earned his livelihood by selling cakes of blacking on saturdays, going from house to house. A sad calamity befell him while thus engaged. He became perfectly blind, after every effort had been made to restore his sight without success. He then resumed his former pursuit, walking his rounds alone. Having an ear for music, he soon became an accomplished player on the concertina, which, with his blacking business, furnished him lucrative employment. Having made a little money, he married the schoolmistress of the Tavistock workhouse. Her friends blamed her much, but their advice was of no avail. They were married and removed to Plymouth, where they opened a bread store. The wife managed the shop, and the husband devoted his attention to galvanism and electricity; and on learning of the explosion of the powder-train at Balaklava he conceived the idea of the possibility of making gunpowder non- explosive without deteriorating its power, so that by a mechanical change it was restored to its original strength. This he has succeeded in doing, and is now raised from comparative poverty to wealth. He has already received $150,000 for his invention, with an interest in the company which has undertaken to manufacture the article, and carry on the buisness of carriers of the combustible article at non-explosive rates, saving the merchant £5 per ton for transportation.

The Inventor of the Needle-gun.

Herr von Dreyse, the inventor of the needle-gun, is now 87 years old, and, notwithstanding his advanced age, his mind is so fresh and his whole appearance so vigorous, energetic, and active, that he may well be taken for twenty years younger. He rises at four every morning, and spends the whole day in working out his inventions. His attention is chiefly engrossed with the rectification and perfecting of the different weapons he has invented. He has several workshops for this purpose, to which few persons have access, where he is busy several hours a day. When the weather is fine, he practices shooting in the neighbouring fields, and he is so scrupulously exact and conscientious in testing the powers of his new improvements that very often many months elapse before he pronounces himself satisfied with this or that weapon. Perpetual changes and readjustments have to be made, and he is so painfully anxious on all matters of the kind that he does not speak to his most intimate friends, not even to his own son, about a new discovery until he himself can say he approves of it. It is rumoured in the neighbourhood of Sömmerada, where Hera von Dreyse resides, that he is about to submit to the King of Prussia a newly-invented cannon calculated to work as important a revolution in the Prussian artillery as the needle-gun has in the infantry. —*Cor of London Times.*

Nitro-glycerin.

The Academy of Sciences has received a paper from M. Ropp on the application of this highly explosive substance to blasting the sandstone quarries of the Vosges. The catastrophes at Aspinwall and San Francisco having proved how dangerous it is to convey this substance from place to place, M.

Ropp has his nitro-glycerin manufactured on the spot. For this purpose smoking nitric acid is mixed in a sandstone trough, standing in cold water, with double its weight of concentrated sulphuric acid, while at the same time a quantity of glycerin, exempt from either lime or lead, is evaporated in a caldron to the consistency of sirup, making from 30 deg. to 31 deg. of Beaumé's areometer. When this glycerin is perfectly cool, 500 gms. of it are slowly poured into a glass balloon immersed in cold water, and containing 3,300 gms. of the mixture of acids, which must also be cold. While this is doing the liquid must be well stirred. It is then left to stand for ten minutes, after which it is poured into about six times its bulk of cold water, which is made to turn round all the time. The nitro-glycerin is immediately precipitated in the shape of a heavy oil, which is separated by decantation, and then bottled. To use it for blasting, a hole is drilled into the rock, and 1,500 gms. to 2,000 gms. of nitro-glycerin are poured in. A cylinder made of tin or pasteboard, about one and a-half inches in diameter, and two inches in hight, and filled with gunpowder, is gently let into the hole, till the operator feels that it touches the liquid. A slow match is affixed to this cartridge, and the hole is filled up with white sand, the match is lighted, and in about ten minutes the gunpowder will catch fire, and give the nitro glycerin the necessary shock to make it explode. The whole mass of rock is then seen to shake, waver, and then settle down again. No piece is projected to a distance, and it is only on examining the spot that it is possible to form an idea of the immense force developed. Formidable masses are found slightly displaced, and rent in every direction. In this way from 40 to 80 cubic meters of hard rock may be detached at a time. Nitro-glycerin, when long exposed to moderate cold, will crystallize in needles In its liquid state it is a yellow or brownish oil, heavier than water, and insoluble in it. It does not easily catch fire, nor does it explode without a smart shock, except when by long keeping it gets decomposed. Its taste is sweet and aromatic; it is poisonous, and a very small quantity will cause violent headache.—*London Mining Journal.*

The Inventor of the Steam Hammer.

In an article upon the invention of the steam hammer the London *Mining Journal* observes that, although Patricroft was undoubtedly the birthplace of the steam hammer in its present compact and manageable form, it is now conclusively proved (by the testimony of Mr. Gaskell and Dr. W. Fairbairn) that Mr. Smiles was not justified in giving, as he has done in his "Industrial Biography," the credit of its invention to Mr. Nasmyth. The first practically useful hammer made in England was produced at the works of Messrs. Nasmyth, Gaskell & Co., at Patricroft, but Mr. Nasmyth's hammer was similar to, and no advance upon, the hammers of James Watt and Deverell, patented nearly half a century previously, until the self-acting motion was designed and applied by Mr. Robert Wilson, then manager to the firm, and now managing partner in the works at Patricroft. From the time of Mr. Wilson's invention being applied, the steam hammer has become a necessity in every engineering workshop, its introduction making a new era in the history of mechanical progress.—*Mechanics' Magazine.*

Administration.

Exhibitors are invited to write after their names, or that of their firms, the names of those having had a special part in the production of the objects exhibited as inventors, designers of models, mechanical processes or by their exceptional skill as workmen.

The cash price and place of sale may be affixed to objects exhibited. This indication is required for all objects belonging to class ninety-one. In all classes the prices marked shall be binding for the exhibitor; any deviation from this rule shall exclude the exhibitor from competing for the prizes. Objects sold cannot be removed before the close of the Exposition without a special permit of the Imperial Commission.

A free ticket admitting them to the Exposition shall be delivered to every exhibitor. These tickets are personal. It shall be withdrawn if it is found to have been lent or given to another person, and the exhibitor will be liable to be prosecuted. To regulate this portion of the service, the tickets shall be signed by the exhibitors. These shall enter by stated doors, and may be required to prove their identity by signing a register.

Exhibitors shall be at liberty to have their goods guarded by agents of their choice, who shall, however, have been accepted by the Imperial Commission. Personal tickets of admission will be delivered gratis to such agents, subject to the regulations contained in the preceding article. Any person acting as agent for exhibitors can receive but one of these tickets, whatever number of exhibitors he may represent. Exhibitors and their agents shall refrain from inviting visitors to make purchases; they shall only answer questions addressed to them, and hand card, handbill or price list, when asked.

An international jury, divided into nine groups, corresponding to the nine groups of agricultural and industrial productions named in the system of classification, shall be appointed to award the prizes. Future regulations shall determine the number, the nature, and the degrees of the prizes awarded, as also the composition and the powers of the jury appointed to award them.

Studies and experiments shall be made under the supervision of the members of the jury of the prizes, and of a scientific agricultural and industrial commission appointed by the Imperial Commission. Such results of these experiments as may be of interest for the public shall be published.

Puget succeeded in adjusting the eye of a flea so that by the use of the microscope he was enabled to see objects through it. It multiplied and diminished every object. Thus a soldier appeared like an army of pigmies.

In a history of the Royal Porcelain Works, by Mr. R. W. Binns, it is stated that English pottery now employs 110,000 persons.

The curvature of the earth amounts to seven inches per mile. A man six feet high cannot be seen from a distance of ten miles