THE JOURNAL
OF THE
Board of Arts and Manufactures

NOVEMBER, 1867.

ARTS AND MANUFACTURES AT THE PROVINCIAL EXHIBITION.

In our last number we briefly alluded to the recent Exhibition at Kingston, and promised in this issue to give a more detailed notice of some portions of it. In doing so, we shall take the various classes in the alphabetical order in which they stood in the prize list, commencing with *Cabinet ware and other Wood and Hair Manufactures.*

The only furniture shown on the occasion was from the Penitentiary workshops; and certainly their productions reflected great credit upon the manager of the works, and the workmen also. The articles exhibited were drawing-room, dining-room and bed-room sets, some of which were elaborately decorated with very fair carving, said to have been designed and executed by one of the prisoners, who had been instructed in the art subsequent to his conviction. Although it would not at all compare in style and workmanship with the productions of such establishments as Jacques & Hay's, of Toronto, Reid's, of Hamilton, and others, it demonstrates that convict labour may be so utilized as to produce articles of beauty as well as of use.

A. Shaw, of Portsmouth, and R. S. Williams, of Toronto, exhibited fair specimens of decorative carving. A. Williamson, of Kingston, entered a frame of inlaid woods, containing 3,498 pieces, and comprising 65 different varieties, collected from 16 different countries, and elaborately worked into various designs of scroll work, emblematical figures, &c., &c. The whole size of the frame was about 24 × 15 inches. A. Shaw also had a very fine specimen of inlaid work on exhibition. A. Green, of Hamilton, had a large and good assortment of Brushes entered in this class. An assortment of joiners' work, by A. Storms, Odessa, was very good; and W. Clements, of Newbury, had again on exhibition a superior lot of undressed veneers, from Canadian woods. Amongst the extras of this class were several articles of merit, which will be found duly acknowledged in the list of awards, in this number of the Journal.

The next class coming under our notice is carriages and sleighs. The competition in this department was very fair, and, we think, a decided improvement on what was shown in Kingston four years previously—less unmeaning and inappropriate decoration having been used on this occasion. W. G. Van Staden & Co., of Middlesex, exhibited good articles of bent shafts, top bows, rims and spokes. A. McKinley & Co., of St. Catharines, exhibited and took first prizes in the same sections, and also several extra prizes, and a diploma for assortments of sulky and cutter stuff, machine made spindles, whole seat backs, &c. Their whole collection was very large, and superior both as to material and finish. We are glad to learn that they are doing a large, and we hope profitable, business. Their goods are all machine-made, of the best Canadian forest timber. We understand that in spokes and felloes, alone, they turn out about 50 sets per day.

In the chemical class, Mr. Teepell, of Storrington, showed a fine collection of medicinal herbs, roots and plants, of native growth. Mr. Bond, of the same place, also had a collection to which was awarded the second prize. In resin, tar and turpentine, Mr. Irish, of Cramahe, again took first prizes.

In the important class of building materials and constructions, the sections were most meagrely represented—in many there being no competitors. Chown & Cunningham, of Kingston, took first prizes for water filter and iron castings for buildings. N. L. Piper & Son, Toronto, and W. Campbell & Co., of Hamilton, had also good filters on exhibition. In the various branches of lithography, W. C. Chewett & Co. took all the first prizes. Mrs. C. Hearn, of Montreal, took the first prize for collection of mathematical, philosophical and surveyor's instruments. She was also awarded a diploma for several novelties exhibited, of her manufacture, viz.: A pocket electro-magnetic machine for the use of the medical profession; a small Rumkorff coil and other apparatus for experiments in electro-magnetism—a complete set of Morse telegraph apparatus, for use in colleges or factories; an hygrodeik or moisture dial for indicating the amount of moisture in the atmosphere, or in dwellings. The latter is of Boston manufacture, and shown by Mrs. Hearn, as agent.

The assortment of stoneware in this department, by S. Skinner, of Picton, was very good, as was also the pottery by W. Campbell & Co., of Hamilton. The last named firm, and also Messrs. Plant and Warwood of Yorkville, both exhibited good articles of sewage pipes, and stench traps for house and other drains. With such good articles manufactured in the country, there is no excuse for importing them from abroad. The list of awards

before referred to, will indicate the several extra prizes in this class.

On the productions of the various artists in the fine arts, professional and amateur, we shall say but little. Year by year, through the improved taste of the country, and better arrangement of the prize list, this department is progressing and becoming more and more important. We congratulate the country on the fact, as we cannot hope to excel in the higher branches of manufactures, only as the people become educated in true art. W. N. Cresswell, of Seaforth; D. Fowler, of Amherst Island, Robt. Whale, of Burford, and a few other artists, have contributed largely, year by year, to the success of this department of the Exhibition, and to the improvement of the taste of visitors. We refer for awards of prizes to the list published.

In the grocery and provision class some good articles were shown, but nothing claiming special remark, except the hermetically sealed cans of fruits, vegetables and grains, by W. W. Kitchen, of Grimsby. Mr. K. informed us that his establishment was capable of putting up 4,000 cans per day, and that he would have during the season 30,000 cans for sale. We had a can each of Indian corn and green peas for dinner, and can testify to their goodness. Although not in this department, we would recommend to those who use the article at all, the home made wine Mr. Kitchen had on exhibition. Certainly, if people will drink wine, it is better that they should use the pure home made, than the imported drugged stuff often sold under that name. He advertizes that he has several hundred barrels of wine and over 100,000 choice grape vines, for sale.

In the two classes of Ladies' Work, there were very many beautiful specimens. Although we cannot but admire them, while inspecting them—we mean the specimens of work—we cannot but experience a feeling of regret, that so much precious time should have been expended—nay, wasted—on many objects of little value, either for ornament or use. How many back-aches, finger-aches and head-aches, and perhaps heart-aches, have been experienced over the manipulation of some patch-work quilt, we of the masculine gender can scarcely imagine; and when the work is completed, it is but a "patch-work quilt" after all. We admire lovely and beautiful objects, in nature or art; but cannot think but the labour expended on this class of work, and some others also, is time wasted to little purpose. We cannot particularise here, but refer our readers to the list of awards.

Next on the list is the important class of machinery, castings and tools. There was but little competition in the regular sections of this class. Horse-power cordwood sawing machines were shown by Hon. E. Leonard, of London, Ontario, and H. P. Barber, of Fredonia, N.Y. The judges awarded to the latter the first prize, "for cheapness, and simplicity, and general adaptability to farmers." S. Worthen & Co., of Coaticook, exhibited one of their patent hand looms, in operation. The advantages claimed for it, are 1st. That it weaves Tweeds, Satinets, Jeans, Union cloth, &c., &c., by one drawing through the harness. 2nd. It is particularly adapted to weaving home-spun yarn. 3rd. Any person can weave on it. 4th. It is thoroughly made, by the best mechanics, steel wire harness and steel reeds being used. 5th. It winds up the cloth, lets off the warp, throws the shuttle, and works the treadles, by turning an easy crank; and moves nearly as fast as a power loom. 6th. It weaves the goods any thickness required by the operator, and can be changed from one twill to another in two or three minutes. These advantages are surely sufficient to recommend it to parties requiring such a machine. We saw it in operation during the whole of the exhibition week, apparently working very satisfactorily. The price for 1½ loom is $100, 1¼ loom $105, including shifts, quilling apparatus, bobbins, and every article necessary to weave cotton and woollen goods.

G. L. Merrill, of London, Ontario, exhibited telescopic lift and force pumps, in operation. This pump is of metal, and of different sizes and prices, from $10 up to $100. It is easily worked, has great power, will work in any depth of water. The patentee claims that it is the most powerful hand fire-engine in use. It is now being manufactured by Messrs. Hamilton, Harding & Co., of Toronto. The McKelvy Refrigerator on exhibition requires no recommendation from us. Its merits are well known. The sash and moulding machines and turning lathes, by Messrs. McKechnie and Bertram, of Dundas, are well made machines, and deserving of the highest commendation we can give them. T. W. Glen, of Oshawa, successor to Joseph Hall & Co., exhibited a shingle splitting machine, four printing presses, a power loom, and a leather splitting machine. The printing presses comprised the Gordon's Nos. 1, 2 and 3 card and circular presses, and the Washington No. 5 hand-press. The presses were in operation, printing advertising circulars for the firm. They appeared to do their work with rapidity, and ease of movement. We notice the highest commendation from some of our Canadian printers, who have the presses in use.

The card clothing by J. Forsyth, of Dundas, and that also by Eyre Thuresson, of Ancaster, are

beautiful specimens of work, reflecting great credit upon the respective manufacturers. The latter also took prizes for card clothing setting machines, of both English and American patterns.

James Brown, jun., of Toronto, exhibited a model of a grain dryer, invented by Mr. Sutton, and patented by him in Great Britain, the United States and Canada. Mr. Sutton's right for Canada has been purchased, and a company formed in Toronto, under the style of the "Ontario Grain Drying Machine Company, limited," for the erection of these machines, wherever required, throughout the Province. Our flour exported to the Maritime Provinces this year, has to a certain extent, turned sour, causing great loss to the flour merchant, and destroying for the time, the character of our Ontario brand of flour. This apparatus, it is claimed, will so thoroughly dry the grain before being ground, as to render it equal for export to any in the world. Testimonials as to its efficiency have been given by Barker, Townsend & Co., of the Syracuse Mills, N.Y.; the Superintendent of the Michigan Central Railroad Co.; C. Spring, Produce and Commission Merchant, Boston; E. Peplow & Son, Millers, Port Hope; Edw. Lawson, Flour Inspector, Toronto. The following are the certificates given by Messrs. Peplow, and by Mr. Lawson:—

PORT HOPE, 19th Sept., 1867.

The Wheat as taken from the farmers is subjected to a loss in weight of from two to four pounds per bushel; but from actual tests it appears that the reduced quantity of the prepared Wheat produces as much flour as the original quantity of unprepared, and the loss in weight is in the bran, which from its increased dryness is divested in grinding of every particle of the flour, which in its natural state adheres more or less to the shell.

The ascertained cost of this new process,
Including the loss of from 18 to 20 lbs. of Bran.
850 lbs. of hard coal consumed per day,
Two horse power employed in the process,
Labour attending to machine,
Incidental expenses, and
Interest on cost of machine of $800.

Aggregates, exactly 15 cents per barrel of flour.

This process applies equally to oats, which are more thoroughly dried than by the old system and at less cost.

E. PEPLOW & SON.

OFFICE OF FLOUR INSPECTOR,
Toronto, 16th July, 1867.

Having been furnished by Thomas Clarkson, Esq., of this city, with a certain quantity of flour manufactured by Messrs. E. Peplow & Son, of Port Hope, from fall wheat, previously prepared under Sutton's Patent Drying Process. I hereby certify that I found the said flour, which inspected Extra Superfine, to be very superior in colour, texture and strength, and equal to any sample which has ever passed through my hands of this grade, and when subjected to the test of baking, was found to work easily, taking a much greater quantity of water than usual for fall wheat flour, and resulting in a yield of about six loaves of four pounds each over and above the yield per barrel of ordinary prepared flour manufactured from fall wheat.

I can safely declare the process which produced such flour to be a great success, which must ensure its condition in any climate and at all seasons.

EDWARD LAWSON, *Inspector.*

If this apparatus is as efficient as these testimonials would seem to indicate, no time should be lost in having them attached to all mills grinding flour for export purposes.

In sewing machines, the judges spent several hours in applying tests, as to superiority and efficiency of work done, and the adaptability of the respective machines to the different kinds of work. The result of their labours appears in a list of *extra prizes*, class 44, in this number of the *Journal*, and need not be further referred to here. Several other valuable machines were entered as *extras* in this class, and will be found noticed in the list of awards.

Messrs. Jones & Co., of Markham, exhibited steel amalgam bells. The advantages claimed by them are, that they only cost about one-third of the price of brass bells, are more durable, can be heard a greater distance, are manufactured at home, and warranted for twelve months.

We next notice the class of metal work, miscellaneous. Few of the articles receiving first prizes in the several sections require any special remark, further than to say that they were well deserving the prizes awarded them. The goods exhibited by the Provincial Hardware Manufacturing Company, Kingston, Ontario, comprise locks, butt hinges, and malleable iron castings. The locks are principally made from cast iron, and are the same in quality and description as those heretofore imported from the United States, and are both cheap and useful; and we think the merchants of our new Dominion, who deal in these goods, need not look elsewhere than among ourselves for their supplies. The malleable castings comprised a very general assortment of articles used by coachmakers and saddlers; and as a sample of its toughness and malleability, a piece of cast iron was exhibited twisted, when cold, without shewing any sign of break about it. The butt hinges were, we understand, the first ever exhi-

bited in Canada, and although better fastened and stronger than the English made, are sold at prices to compete with any imported hinges. It is said that all the goods manufactured by this company are sold at prices below that at which they can be imported. Whatever can be profitably made at home is, to that extent, so much wealth stored up in the country that would otherwise go to enrich others. Of this class of manufactures may also be named the cast iron enamelled ware, by R. Campbell & Co., of Hamilton, a large quantity of which is used for domestic purposes, and which, until now, has all been imported from abroad. Several other interesting specialties of manufacture will also be noticed, by referring to the list of extra awards in this class. H. T. Smith exhibited, and had in continuous operation, a soda water machine, syrup pump for soda bottles, and a soda water fountain. These appeared to be almost perfect machines for the uses for which they were intended.

Mr. Sweet, of Montreal, exhibited a patent atmospheric bell-pull. This invention is intended to supersede the old wire and crank system. It consists in two perfect instruments, connected by a quarter-inch gas or composition pipe, placed under the floors, or otherwise. It is not expensive, and said to be not liable to get out of order. It is easily repaired, without the aid of a bell-hanger.

The Canada Horse Nail Co., of Montreal, exhibited a most excellent article of horse shoe nails, for which a diploma was awarded them.

The department of musical instruments was a very interesting one, from the number of fine-toned and well-finished instruments on exhibition. The harmoniums shown were by J. C. Fox, Kingston; R. S. Williams, and Coleman & Sons, Toronto; and Bell, Wood & Co., Guelph. The melodians were by the three last named makers, and by H. Smith, Kingston, and R. H. Dalton, Toronto. Although but two in each section could take the prize, all were deserving of the highest commendation. The same may be said of the pianos shewn by J. C. Fox, Kingston; Heintzman & Co., Toronto; and J. F. Rainer & Co., Whitby, —the latter showing his patent elliptic pianos only. All these makers exhibited instruments of fine tone, and some of them of great power. The church and parlor organs, by S. N. Warren & Co., of Montreal, were fine instruments, and well deserving the encomiums passed on them.

The Natural History class was very poorly represented on this occasion. The collections were small, and generally not properly classified and named. Mr. Macoun, of Belleville, was awarded a diploma, in addition to the 1st prize, for a collection of native plants; and Mr. J. O. Sullivan, of Kingston, exhibited a very fine anatomical preparation, for which he received a diploma.

In class 48 there was but little competition. A few specimens of letter-press printing; some admirable specimens of penmanship by Musgrove & Wright, of the Commercial College, Toronto; and some fine specimens of paper hangings, by M. Staunton, Toronto, was all that was worthy of note.

The show, in almost all the sections of the saddle and harness department, was larger than usual, and comprised some very good specimens both of work and material. The prize awards very fairly represent the merits of the respective articles on exhibition. We would like to see our woollen manufacturers pay more attention to the cloths shown in this class, such as kersey for horse clothing, check for horse collars, horse blankets and saddle serge. A good deal of stuff is entered under these respective heads, every year, that do not come within the description of goods required. The improvement in the whole class, however, both of material and manufactured articles, is very marked, and speaks well for the progress of the Province in leather manufactures.

The boot and shoe department, except in leather and other raw material, was poorly represented in quantity, although good in quality. The different kinds of leather were of first class, and shew a continuous advancement in this respect.

In the class of woollen, flax and cotton goods, the entries were numerous,—especially so in some sections, such as woollen blankets, fulled cloths, counterpanes, flannels, shawls, and white and dyed yarns. We are pleased to see a lively competition in this, one of our staple manufactures. There is still room for great improvements in the making up and patterns of our woollen fabrics, and especially so in the matter of dyeing. In this latter point we fail more than in any other. It would be a well spent appropriation on the part of the Government and Legislature, to establish a school of instruction in this branch, and to bring out some first-class instructors from England for that purpose. Our cloths will not, to any great extent, meet with the approval of the middle and upper classes until a better system of applying the dye colours is initiated. In this class were some fine specimens of ropes, cordage and twines; and also assortments and specimens of ladies' and gentlemen's furs, of good quality.

Space forbids us going more into details on the present occasion. Next year we hope to meet our friends in the city of Hamilton.

INDUSTRIAL EDUCATION.

In the October number we gave several extracts and articles from what we deemed competent authorities, bearing upon this subject. We proposed in this number to consider what steps the Government of Ontario should take, to supply the want of such an education here, if such a *want* really exists. Two esteemed correspondents have, however, taken up the discussion of the question, and propose to continue it in subsequent numbers; and having so much other matter on hand for the pages of the *Journal*, we propose to defer for the present any further remarks we may have to make upon this important subject. We ask a careful consideration of the question as already presented, and as now being submitted by our correspondents.

THE "AMERICAN AGRICULTURIST."

The October number of this valuable publication has been received. It deserves all the encomiums lavished upon it by our cotemporaries. For those interested in Agriculture and Horticulture—and who is not?—we know of no publication in which, for the price, so vast an amount of valuable and interesting information can be found. Each number contains from 32 to 40 quarto pages, and 30 to 50 engravings. These latter are in the best style of the art, and of themselves are worth the whole amount of subscription. The cost of the *Agriculturist* is but $1.50 per year, or four copies for $5, in advance, American funds. *A good investment.*

The publishers offer this valuable journal *free* for the remaining two months of this year to all *new* subscribers for 1868, (Vol. 27) who send in their subscription *during this month.* We advise all our readers to secure it on these terms. It will be sure to benefit all fathers and mothers, and interest and instruct the children. Subscriptions should be sent to the publishers, Orange Judd & Co., Broadway, New York City.

THE CONVENTION OF DELEGATES.

Mechanics' Institutes, and the other Societies concerned, will bear in mind that the Convention of Delegates on the Agricultural and Arts and Manufactures Bill, will meet in Toronto, on Tuesday, Nov. 12th, at two o'clock, P. M.

It is a suggestive statement, if correct, that an atmosphere of hydrogen supplies to plants the want of light, enabling them to grow green in the dark.

TWENTY-SECOND ANNUAL EXHIBITION OF THE AGRICULTURAL ASSOCIATION OF UPPER CANADA.

Official List of Prizes awarded at the City of Kingston, September 24th, 25th, 26th, and 27th, 1867; in the Department of ARTS AND MANUFACTURES.

(*Competition open to the world.*)

CLASS XXXV,—CABINET WARE AND OTHER WOOD MANUFACTURES.

Judges—William Porter, Ottawa; H. McDonald, Kingston.

Bed-room Furniture, set of, 1st prize, S. T. Drennan, Kingston, $15.

Carving in Wood, decorative, 1st prize, A. Shaw, Portsmouth, $10; 2nd do., R. S. Williams, Toronto, $6.

Centre table; 2nd prize, S. T. Drennan, Kingston, $4.

Drawing-room Sofa, 1st prize, S. T. Drennan, Kingston, $8.

Drawing-room Chairs, set of, 1st prize, S. T. Drennan, Kingston, $8.

Dining-room Furniture, set of, 1st prize, S. T. Drennan, Kingston, $15.

Inlaid Work, of Canadian Woods, 1st prize, A. Williamson, Kingston, $8; 2nd do., Angus Shaw, Kingston, $4.

Side-board, 1st prize, S. T. Drennan, Kingston, $8.

Miscellaneous.

Brushes, an assortment, 1st prize, A. Green, Hamilton, $6.

Coopers' Work, 1st prize, A. Bridge, Westbrook, $6; 2nd do., Geo. Thompson, Kingston, $3.

Handles for tools of carpenters, blacksmiths, gunsmiths, watchmakers, &c., collection of, 1st prize, A. Bridge, Westbrook, $8.

Joiners' Work, assortment of, 1st prize, Anson Storms, Odessa, $6.

Turning in Wood, collection of specimens, T. F. Waggoner, Glenburney, 2nd prize, $6.

Turned Hollow Wooden Ware, assortment of, 1st prize, F. B. Scofield, Woodstock, $6.

Veneers, from Canadian Woods, undressed, 1st prize, W. Clements, Newbury, $8.

Veneers, from Canadian Woods, dressed and polished, T. B. Clench, Cobourg, 1st prize, $10; 2nd do., F. S. Clench, Cobourg, $6.

Wash Tubs and Pails, factory made, three of each, 1st prize, A. Bridge, Westbrook, $4.

Extra Prizes.

H. H. Tomlinson, Portsmouth, Fancy Row Boat; C. Duffy, Collingwood, Elastic Spring Bed Bottom; T. Forfar, Flamboro', Washing Machine; T. B. Clench, Cobourg, Show Case (jewellers), 24 assorted Handscrews, Backgammon and Chess-board, and Writing Desk; W. H. Wormouth, Kingston, two sets Minia-

ture Furniture; John Kinghorn, Kingston, Schooner Yacht; H. P. Cusack, Newbury, 100 Flour Barrel Hoops; R. Pigeon, Napanee, Anglers Rod; A. McCorkell, Kingston, Pleasure Skiff (diploma); J. Kearney, Toronto, Model of Steamboat; Wm. Peacock, Montreal, assortment of Cricket Bats and Wickets; J. F. Kellogg, St. Catharines, half dozen patented Corn Brooms; W. H. Simpson, Kingston, fret work Portfolio, bracket, and basket; M. L. Smith, St. Mary's, Patent Ladder; W. W. Kitchen, Grimsby, Patent Washing Machine (diploma).

CLASS XXXVI.—CARRIAGES AND SLEIGHS, AND PARTS THEREOF.

Judges—James Johnston, Smith's Falls; John C. Richards, Ameliasburg; Jas. St. Charles, Belleville.

Axle, wrought iron, 1st prize, John Doty, Hamilton, $4.

Bent Shafts, half-a-dozen, McKinley & Co., St. Catharines, 1st prize, $3; 2nd do., W. G. Van Staden & Co., Strathroy, $2.

Bows for carriage tops, two sets, 1st prize, R. McKinley & Co., St. Catharines, $3; 2nd do., W. G. Van Staden & Co., Strathroy, $2.

Buggy, single seated, 1st prize, John Dennison & Co., Picton, $8; 2nd do., T. W. McCrae, Kingston, $5.

Carriage, two-horse, pleasure, 1st prize, T. W. McCrae, Kingston, $18; 2nd do., Hart & Son, Picton, $12.

Carriage, one-horse, pleasure, 1st prize, Hart & Son, Picton, $12; 2nd do., T. W. McCrae, Kingston, $8.

Carriage, child's, 1st prize, Hart & Son, Picton, $4; 2nd do., N. L. Piper & Son, Toronto, $2.

Carriage Rims or Felloes, and machine-made Spokes, the best assortment, 1st prize, R. McKinley & Co., St. Catharines, $7; 2nd do., W. G. Van Staden & Co., Strathroy, $4.

Sleigh, two-horse, pleasure, 1st prize, Hart & Son, Picton, $15.

Sleigh, one-horse, pleasure, 1st prize, Hart & Son, Picton, $10; 2nd do., John Dennison & Co., Picton, $6.

Wheels, one pair of carriage, unpainted, 2nd prize, Hart & Son, Picton, $2.

Extra Prizes.

J. Kinney, Woodstock, half-a-dozen Metallic Seats for carriages; R. McKinley & Co., St. Catharines, Whole Seat Backs, Sulkey Stuff assortment, Cutter Stuff assortment, machine-made Spindles and Carriage Hubs, $10 and diploma.

CLASS XXXVII.—CHEMICAL MANUFACTURES AND PREPARATIONS.

Judges—Dr. S. P. May, Toronto; Dr. Beatty, Cobourg; Joseph Danson, F.C.S., Kingston.

Glue, 14 lbs., 1st prize, G. W. Banks, Kingston, $2.

Herbs, Roots and Plants, native growth, 1st prize, Wm. Teepell, Storrington, $12; 2nd do., Wm. Bond, do., $7.

Oil, Neat's Foot, half-gallon, 1st prize, G. W. Banks, Kingston, $2.

Resin, 30 lbs., 1st prize, W. C. Irish, Cramahe, $3.

Tar, one gallon, 1st prize, W. C. Irish, Cramahe, $3; 2nd do., Wm. Bond, Storrington, $2.

Turpentine, Spirits of, 1st prize, Wm. C. Irish, Cramahe, $5.

Extra Prizes.

Hugh Miller, Toronto, Miller's Illuminator; F. H. Benson, Kingston, Refined Rock Oil.

CLASS XXXVIII.—DRAWINGS, ARCHITECTURAL AND MECHANICAL, ENGRAVINGS, BUILDING MATERIALS AND CONSTRUCTIONS, POTTERY, &c.

Judges—John Power, Kingston; George Cormack, Whitby.

Bricks, one doz. pressed, 1st prize, John Watson, Guelph, $2.

Engraving on Copper, with proof, 1st prize, G. Spangerburg, Kingston, $6; 2nd do., O. Meeves, Kingston, $4.

Filter for Water, 1st prize, Chown & Cunningham, Kingston, $3; 2nd do., N. L. Piper & Son, Toronto, $2.

Iron Castings for building construction, 1st prize, Chown & Cunningham, Kingston, $8.

Lithographic Drawing, plain, 1st prize, W. C. Chewett & Co., Toronto, $6; 2nd do., W. Snow, Montreal, $4.

Lithographic Drawing, colors printed, 1st prize, W. C. Chewett & Co., Toronto, $6.

Lithography, commercial work, in black or colors, 1st prize, W. C. Chewett & Co., Toronto, $6.

Mathematical, Philosophical, and Surveyor's Instruments, collection of, 1st prize, Mrs. C. Hearn, Montreal, $15.

Pottery, assortment of, 1st prize, W. Campbell & Co., Hamilton, $6.

Stoneware Sewerage Pipes, assortment of sizes, 1st prize, Plant & Warwood, Yorkville, $8; 2nd do., W. Campbell & Co., Hamilton, $5.

Sign Writing, 1st prize, George Booth, Toronto, $5.

Stoneware Stench Traps, for drains, 1st prize, Plant & Warwood, Yorkville, $3; 2nd do., W. Campbell & Co., Hamilton, $2.

Assortment of Stoneware, 1st prize, S. Skinner, Picton, $8.

Extra Prizes.

H. Scroder, specimen of Phonography; W. H. Wormouth, Kingston, Miniature Church and glass-case of Miniature Figures; W. C. Chewett & Co., Toronto, Frame of Labels; R. Phillips, Toronto, Washable Gilt and Enamelled Mouldings; W. Carter, Kingston, specimen of Shell-work and specimen of Emblazoning; Mrs. C. Hearn, Montreal, collection of Electric Telegraph Apparatus, Medical Magnetic Machines and Magnetic Engines and apparatus for scientific experiments, diploma; A. Jaeckli, Cornwall, patterns for Printed Goods; Angus Shaw, Kingston, Model of House in Leather.

CLASS XXXIX.—FINE ARTS.

Judges—Judge Logie, Hamilton; James Spooner, Toronto.

Professional List.—Oil.

Any subject, 1st prize, W. N. Cresswell, Seaforth, $15; 2nd do., J. C. Forbes, Toronto, $10.

Animals from life, 1st prize, W. N. Cresswell, Seaforth, $12; 2nd do., Robert Whale, Burford, $8.

Flowers, grouped or single, 2nd prize, Miss H. N. Harrison, Hamilton, $6.

Historical or general Figure subject, 1st prize, W. N. Cresswell, Seaforth, $12; 2nd do., W. Snow, Montreal, $8.

Landscape, Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $12; 2nd do., D. Hancock, Toronto, $8.

Landscape or Marine Painting, not Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $6; 2nd do., J. H. Whale, Burford, $6.

Marine Painting, Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $12; 2nd do., J. C. Forbes, Toronto, $8.

Portrait, 1st prize, J. C. Forbes, Toronto, $10; 2nd do., J. H. Whale, Burford. $7.

Still Life, 1st prize, Robert Whale, Burford, $10; 2nd do., J. H. Whale, do., $6.

Amateur List—Oil (Originals).

Landscape or Marine View, Canadian subject, 1st prize, M. Fisher, Montreal, $8.

Portrait, 1st prize, Miss Jenny Huffman, Fredericksburg, $8.

Amateur List—Oil (Copies).

Landscape, 1st prize, Miss S. G. Drake, Grafton, $7; 2nd do., Miss A. M. Machar, Kingston, $4.

Marine view, 2nd prize, Miss Breden, Kingston, $4.

Professional or Amateur—Figure Subjects. (Originals)

Carving in Wood, 1st prize, W. Herald, Kington, $12.

Photography.

Ambrotypes, collection of, 2nd prize, E. Spencer, Ottawa, $4.

Photograph Portraits, collection of, plain, D. C. Butchart, Toronto, $8; 2nd do., Sheldon & Davis, Kingston, $5.

Photographic Landscapes and Views, collection of, 1st prize, A. L. Russell, Toronto, $8; 2nd do., D. C. Butchart, Toronto, $5; E. Spencer, special 2nd prize, $5.

Photograph Portrait, finished in oil, 1st prize, D. C. Butchart, Toronto, $8; 2nd do., Miss H. N. Harrison, Hamilton, $5.

Photograph Portraits, finished in water colors, 1st prize, Sheldon & Davis, Kingston, $6.

CLASS XL.—Fine Arts.

Professional List (Originals), Water Colors.

Judges—Judge Logie, Hamilton; James Spooner, Toronto.

Any subject, 1st prize, W. N. Cresswell, Seaforth, $10; 2nd do., D. Fowler, Amherst Island, $8.

Animals from Life, 1st prize, W. N. Cresswell, Seaforth, $8; 2nd do., D. Fowler, Amherst Island, $6.

Flowers, grouped or single, 1st prize, D. Fowler, Amherst Island, $7; 2nd do., Mrs. Fitzgibbon, Toronto, $5.

Historical or general figure subject, 1st prize, W. N. Cresswell, Seaforth, $8; 2nd do., D. Fowler, Amherst Island, $6.

Landscape, Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $8; 2nd do., D. Fowler, Amherst Island, $6.

Landscape or Marine View, not Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $8; 2nd do., D. Fowler, Amherst Island, $6.

Marine View, Canadian subject, 1st prize, W. N. Cresswell, Seaforth, $8; 2nd do., D. Fowler, Amherst Island, $6.

Portrait, 2nd prize, D. Fowler, Amherst Island, $5.

Still Life, 1st prize, D. Fowler, Amherst Island, $7.

Pencil, Crayon, &c.

Crayon, colored, 1st prize, D. Fowler, Amherst Island, $6; 2nd do., R. H. Light, Kingston, $4.

Crayon, plain, 1st prize, D. Fowler, Amherst Island, $6; R. H. Light, Kingston, commended.

Crayon or Pencil Portrait, 1st Prize, D. Fowler, Amherst Island, $6; 2nd do., Miss H. N. Harrison, Hamilton, $4.

Pen and Ink Sketch, 1st prize, D. Fowler, Amherst Island, $6.

Pencil Drawing, 1st prize, D. Fowler, Amherst Island, $6.

Sepia Drawing, 1st prize, D. Fowler, Amherst Island, $6; 2nd do., Mrs. Fitzgibbon, Toronto, $4.

Amateur List (Originals), Water Colors.

Animals from Life, 2nd prize, Miss A. M. Machar, Kingston, $5.

Flowers, grouped or single, 1st prize, Miss M. M. Palmer, Guelph, $6.

Landscape or Marine View, Canadian subject, 1st prize, Miss A. M. Machar, Kingston, $7; 2nd do., Miss G. C. Ford, Belleville, $5.

Pencil, Crayon, &c.

Crayon, colored, 1st prize, Miss Thompson, Kingston, $5; 2nd do., Miss G. C. Ford, Belleville, $3.

Crayon, plain, 1st prize, Miss McCrae, Kingston, $5; 2nd do., Miss Thompson, Kingston, $3.

Pencil Drawing, 1st prize, G. M. Wilkinson, Kingston, $5.

Pen and Ink Sketch, 1st prize, R. Pigeon, Napanee, $5.

Sepia, 2nd prize, W. G. Craig, Kingston, $3.

Amateur List (Copies), Water Colors.

Animals, grouped or single, 1st prize, Miss M. M. Palmer, Guelph, $5.

Flowers, grouped or single, 1st prize, Mrs. T. K. Ross, Odessa, $5.

Landscape, 1st prize, Miss M. M. Palmer, Guelph, $5; 2nd do., Miss Thompson, Kingston, $3.

Marine View, 2nd prize, Miss G. C. Ford, Belleville, $3.

Still Life, 1st prize, Miss Machar, Kingston, $5.

Pencil, Crayon, &c.

Crayon, colored, 1st prize, T. Wilson, Kingston, $4; 2nd do., Mrs. Jennie Huffman, Fredericksburg, $2.

Crayon, plain, 1st prize, Rev. A. Dawson, Kingston, $4; 2nd do., Miss A. M. Machar, Kingston, $2.

Pen and Ink Sketch, 1st prize, R. V. Rogers, jun., Kingston, $4; 2nd do., J. Faint, Columbus, $2.

Pencil Drawing, 1st prize, Miss M. M. Palmer, Guelph, $4; 2nd do., R. Pigeon, Napanee, $2.

Sepia, 1st prize, Miss G. C. Ford, Belleville, $4.

Extra Prizes.

Mrs. Fitzgibbon, group of Canadian Wild Flowers; Miss S. G. Drake, Grafton, Indian Ink drawing, recommended.

CLASS XLI.—Groceries and Provisions.

Judges—T. Beeman, Napanee; Chas. James, Napanee; and E. A. McNaughton, Cobourg.

Barley, 25 lbs. of Pearl, 1st prize, D. Hooper, Newburg, $3.

Barley, 25 lbs. of Pot, 1st prize, D. Hooper, Newburg, $3.

Bottled Fruits, manufactured for sale, assortment, 1st prize, W. W. Kitchen, Grimsby, $6; 2nd do., D. Davis, St. Catharines, $4.

Bottled Pickles, manufactured for sale, assortment, 1st prize, J. Harker, Kingston Township, $6; 2nd do. Mrs. R. Pigeon, Napanee, $4.

Buckwheat Flour, 25 lbs., 1st prize, J. A. Close, Lennox, $3; 2nd do., D. Hooper, Newburg, $2.

Indian Cornmeal, 25 lbs., 1st prize, J. A. Close, Lennox, $3; 2nd do., A. Bond, Storrington, $2.

Oatmeal, 25 lbs., 1st prize, D. Hooper, Newburgh, $3.

Soap, box of common, 1st prize, C. Watts, Brantford, $4.

Soaps, assorted fancy, 1st prize, C. Watts, Brantford, $6.

Sugar, loaf of refined, 1st prize, Wm. Bugg, Kingston, $5.

Wheat Flour, 50 lbs., 1st prize, W. S. Guess, Loboro', $7; 2nd do., L. F. Fralick, Ernestown, $5.

Extra Prizes.

J. Fisher, Portsmouth, one dozen each Ale and Porter; J. A. Karch, Kingston, assortment of roasted and ground Coffee, Flour, ground Rice, and assortment of Spices; Livingston & Scoble, Cape Vincent, N. Y., one dozen Ale and Porter; C. Watts, Brantford, box Tallow Candles; G. W Creighton, Kingston, one dozen Porter; Birely & Co., Hamilton, White Wine, Malt, and Pickling Vinegar; J. A. Karch, assortment of Black Pepper, Cinnamon, Cloves, and Allspice, commended; W. W. Kitchen, Grimsby, hermetically sealed Vegetables and Grain, a diploma.

CLASS XLII.—Ladies' Work.

Braiding, Embroidery, Needle-work, &c.

Judges—Mrs. R. L. Denison, Toronto; Mrs. Lathrop, Massachusetts; and Miss C. Stephens, Cobourg.

Bead-work, 1st prize, Mrs. Macdonald, Kingston, $3; 2nd do., Mrs. H. Dumble, do., $2; 3rd do., Mrs. Wilson, do., $1.

Braiding, 1st prize, Misses Henley and Ottan, Kingston, $3; 2nd do., Miss Ramsey, do., $2; 3rd do., Miss A. Schroder, Portsmouth, $1.

Crochet-work, 1st prize, Miss Ramsey, Kingston, $3; 2nd do., Misses Henley and Ottan, do., $2; 3rd do., Mrs. T. F. Fitzpatrick, do., $1.

Embroidery in Muslin, 1st prize, Miss Ramsey, Kingston, $3; 2nd do., Miss Breden, do., $2; 3rd do., Mrs. Templeton, do., $1.

Embroidery in Cotton, 1st prize, Mrs. Templeton, Kingston, $3; 2nd do., Mrs. H. Dumble, do., $2; 3rd do., Miss Breden, do., $1.

Embroidery in Silk, 1st prize, Mrs. H. Hough, Cobourg, $3; 2nd do., Mrs. H. Dumble, Kingston, $2; 3rd do., Mrs. Wilson, do., $1.

Embroidery in Worsted, 1st prize, Miss Ramsey, Kingston, $3; 2nd do., Elizabeth Carberry, do., $2; 3rd do., Miss F. Newson, do., $1.

Guipure-work, 1st prize, Miss H. Bidwell, Cramahe, $3.

Knitting, 1st prize, Miss Ramsey, Kingston, $3; 2nd do., Mrs. W. C. Evans, do., $2; 3rd do., Miss A. Gibson, Portsmouth, $1.

Lace-work, 1st prize, Miss H. Bidwell, Cramahe, $3; 2nd do., Misses Henley and Ottan, Kingston, $2.

Best Family Machine Sewing, Mrs. H. Ferguson, Kingston, $3.

Needle-work, ornamental, 1st prize, Miss Ramsey, Kingston, $3; 2nd do., Mrs. C. E. Briggs, do., $2; 3rd do., Mrs. H. Dumble, do., $1.

Netting, fancy, 1st prize, Mrs. E. Miller, Kingston, $3; 2nd do., Mrs. Allen, do., $2.

Plait for Bonnets or Hats, of Canadian straw, 1st prize, Mrs. A. Schroder, Portsmouth, $3; 2nd do., Mrs. Hopkins, Ernestown, $2; 3rd do., Mrs. H. Dumble, Kingston, $1.

Best Silk Quilt, Mrs. J. Harker, Kingston Township, $3; 2nd do., Mrs. W. Boyce, Loboro', $2; 3rd do., Mrs. Alex. McDonald, Kingston, $1.

Best Patch Work Quilt, Mrs. James Ellis, Kingston, $3; 2nd do., Miss Breden, Kingston, $2; 3rd do., Miss E. Lawrence, Loboro', $1.

Best Shirt, gentleman's, 1st prize, Miss C. McEvers, Hamilton Township, $3; 2nd do., Mrs. A. Storms, Odessa, $2; 3rd do., Miss S. A. Bibby, Kingston, $1.

Tatting, 1st prize, Mrs. R. T. Burns, Kingston, $3; 2nd do., Miss Ramsey, do., $2; 3rd do., Miss H. Bidwell, Cramahe, $1.

Indian Bead Work—34 small prizes given to Caughnawaga Indians.

Extra Prizes.

Mary Riddell, Hamilton Township, Bonnet and Hat of Canadian Straw; Mrs. Hopkins, Ernestown, three Straw Hats; Mrs. Wilson, Kingston, knitted Drawers and Shirt. Mrs. H. Huffman, Fredericksburg, quilted White Quilt: Miss Ramsay, Kingston, Knitted Shirt; Miss S. Vanslyck, Ernestown, Crochet in Wool; Mrs.

M. Colligan, Kingston, Patch-work Table Cover; Miss Denison, Toronto, Child's Ornamented Dress; Mrs. W. Boulton, Toronto, Child's Ornamented Dress; Mrs. T. F. S. Kirkpatrick, Kingston, Child's Fancy Dress; Mrs. C. Dollar, Fredericksburg, two fancy Quilts of Spread Needle Work.

CLASS XLIII.—LADIES' WORK.

Flower, Hair, Moss, Wax and Worsted Work, &c

Judges—Mrs. R. L. Denison, Toronto; Mrs. Lathrop, Massachusetts; Miss C. Stephens, Cobourg.

Cone Work, 1st prize, Mrs. A. Storms, Odessa, $3; 2nd do., Miss E. F. Storms, Ernestown, $2; 3rd do., Miss A. Gibson, Portsmouth, $1.

Flowers, silver wire, 1st prize, Mrs. H. Hough, Cobourg, $2; 2nd do., Miss E. F. Storms, Ernestown, $1; 3rd do., Miss A. Schroder, Portsmouth, 50 cts.

Flowers, feather, 1st prize, Miss E. F. Storms, Ernestown, $2; 2nd do., Miss A. A. Daly, Ernestown, $1; 3rd do., Miss A. Schroder, Portsmouth, 50 cts.

Gloves, three pairs, 1st prize, Mrs. E. Jackson, Kingston Township, $2; 2nd do., Miss Jane Swinton, Smith, $1.

Hair Work, 1st prize, Miss E. F. Storms, Ernestown, $3; 2nd do., Mrs. A. Storms, Odessa, $2; 3rd do., Miss A. E. Gardiner, Elizabethtown, $1.

Mittens, two pairs woollen, 1st prize, J. N. Arney, Camden, $2.

Moss Picture, 1st prize, Miss H. N. Harrison, Hamilton, $3.

Moss Work, 1st prize, Miss Julia B. Daveney, Cobourg, $2; 2nd do., Mrs. A. Storms, Odessa, $1; 3rd do., Miss E. F. Storms Ernestown, 50 cts.

Shell Work, 1st prize, Mrs. A. Storms, Odessa, $2.

Socks, three pairs woollen, 1st prize, Mrs. Bennett, Cobourg, $2; 2nd do., Mrs. E. Jackson, Kingston Township, $1; 3rd do., Mrs. C. Dollar, Fredericksburg, 50 cts.

Stockings, three pairs woollen, 1st prize, Mrs. E. Jackson, Kingston Township, $2; 2nd do., J. N. Arney, Camden, $1.

Wax Flowers, 1st prize, Mrs. A. Livingston, Kingston, $5; 2nd do., Mrs. Bajus, do., $3; 3rd do., Miss Ramsay, do., $1 50.

Wax Fruit, 1st prize, Mrs. H. Hough, Cobourg, $5; 2nd do., Mrs. Bajus, Kingston, $3; 3rd do., Mrs. Bruce, do., $1 50.

Worsted Work, 1st prize, Miss Ramsay, Kingston, $3; 2nd do., Miss Jane Herkmer, do., $2; 3rd do., Mrs. L. Lenea, do., $1.

Worsted-work, fancy, for framing, Miss B. Wolf, Kingston, $3; 2nd do., Mrs. Bruce, do., $2; 3rd do. Miss E. Ramsay, do., $1.

Worsted-work, raised, 1st prize, Miss E. Ramsay, Kingston, $3; 2nd do., Miss Ramsay, do., $2; 3rd do., Miss Kate Bermingham, do., $1.

Wreath of Flowers, 1st prize, Miss A. A. Daly, Ernestown, $2; 2nd do., Miss Ramsay, Kingston, $2.

Wreath, seed, 1st prize, Mrs. H. Hough, Cobourg, $2; 2nd do., Mary E. Hitchens, Amherst Island, $1; 3rd do., Miss C. McEvers, Hamilton Township, 50 cts.

Extra Prizes.

Mrs. J. H. Delamere, Port Hope, Banner Screen; Miss A. Brown, Kingston, Skeleton Leaves; Margaret Hougan, do., Shawl or Table Cover; Mrs. J. Craig, do., Chinese Cover-lids; Mrs. Bajus, do., Wax Vase and Wax Wreath; Mrs. Crowe, do., Vase of Shells with Sea Weed; Eliz. McGeein, Portsmouth, one Feather Wreath; Miss Dewson, Bond Head, 2 Cloth Rugs.

CLASS XLIV.—MACHINERY, CASTINGS AND TOOLS.

Judges—H. Beyer, Smith's Falls; W. Hamilton, jr., Toronto; John Moss, Toronto.

Cordwood Sawing Machine, horse-power, 1st prize, H. P. Barber, Fredonia, New York, U. S., $10; 2nd do., Hon. E. Leonard, London, $6.

Hand-power Weaving Loom, 1st prize, S Worthen & Co., Coaticook, $6.

Pump, in metal, 1st prize, C. L. Merrill, London, $5; 2nd do., John Brokenshire, Kingston, $3.

Refrigerator, 1st prize, McKelvey & Birch, Kingston, $5.

Sash and Moulding Machine, 1st prize, McKechnie & Bertram, Dundas, $12.

Shingle Splitting Machine, 1st prize, F. W. Glen, Oshawa, $6.

Turning Lathe, 1st prize, McKechnie & Bertram, Dundas, $8.

Extra Prizes.

F. W. Glen, Oshawa, four Printing Presses, $10 and diploma; do., Power Loom; do., Leather Splitting Machines; J. Brokenshire, Kingston, Wooden Ship Pump, lot of Blocks for Shipping, and Deadeyes; John Forsyth, Dundas, assortment Card Clothing; Jones & Co., Markham, Steel Amalgam Bells; Eyre Thuresson, Ancaster, Card Clothing Setting Machine, two extra prizes for English and American machines; do., Card Clothing; Jas. Brown, jr., Toronto, model of Grain Dryer, a diploma; C. H. Waterous & Co., Brantford, Lath Cutting Machine; do., a Machine for Lath Bolts from Slabs; P. J. Ayres, Peterboro', Tire and Axle Upsetting Machine, and an Auger Handle; Robert Gardner, Montreal, Cracker and Biscuit Machine, $10 and diploma; John Lazier, Belleville, improved domestic Spinner; Samuel Lambert, Kingston, Fish Plate Rail Joint Fastenings; A. M. Forster, Hamilton, Patent Boiler Purger; W. Rowland, Toronto, Fire Extinguisher, highly commended; John Watson, Guelph, Model of Brick Making Machine; W. E. Wright, Rome, Oneida, N. Y., Model of Turbine Water Wheel, recommended; W. S. Beebe, Markham, Set of Pump Tools; M. C. Doolittle, Malahide, one Spinning Machine; J. H. Rowe, King, Self-returning Spindle and Spinning Wheel.

Judges' Report.

The Judges report that they spent several hours in the examination and testing of the several sewing machines on exhibition, and have awarded the following prizes:

Family Sewing Machine, for ordinary purposes, without change of needle. Makers, A. W. Abbott &

Co., St. Catharines; Grout & Co., Toronto, agents; 1st class prize and diploma.

Button-hole Machine (Singer's), Norris Black, Toronto, agent; 1st class prize and diploma.

Sewing Machine, for manufacturing and heavy work (Singer's), Norris Black, Toronto, agent; 1st class prize.

Combined Sewing Machine, for heavy and light work, by change of needles; makers, C. Irwin & Co. Belleville; 1st class prize.

The Judges recommend that regular sections be introduced for sewing machines next year, and that the programme of modes of testing the machines, hereto annexed, be adopted by the association for that occasion:

Programme.

The Judges to allow each Machine twenty minutes for examination, as follows:

1st. Stitching and hemming a sample of fine jaconet muslin, say two yards of each.

2nd. Change needle and stitch sample of heavy cloth, with thread.

3rd. Change needle and stitch samples of light and heavy leather, with leather needle and silk thread.

4th. The operator to take his machine off the stand, and show its movements and principle of construction.

5th. The Judges to accept no samples of work but what are done in their presence; and any time occupied over and above the twenty minutes, by any machine, in completing the required samples, to be charged against such machines.

CLASS XLV.—Metal Work (Miscellaneous) including Stoves.

Judges—John Neil, Toronto; John Power, Kingston; George Cormack, Whitby.

Miscellaneous.

Coppersmith's Work, assortment of, 1st prize, Chown & Cunningham, Kingston, $8.

Engineers' Brass Work, assortment, 1st prize, J. Morrison, Toronto, $8.

Goldsmith's Work, 1st prize, E. Spangerberg, Kingston, $6; 2nd do., O. Meeves, do., $4.

Gold and Silver Leaf, 1st prize, C. H. Hubbard, Toronto, $4.

Iron Fencing and Gate, ornamental, Chown & Cunningham, Kingston, $8.

Iron Work, Ornamental Cast, 1st prize, Chown & Cunningham, Kingston, $7.

Locksmith's Work, assortment, 1st prize, Provincial Hardware Manufacturing Company, Kingston, $8.

Malleable Hardware Manufactures, an assortment, 1st prize, Provincial Hardware Manufacturing Company, Kingston, $8.

Screws, an assortment, 1st prize, Canada Screw Company, Dundas, $6.

Silversmiths' Work, 1st prize, E. Spangerberg, Kingston, $6; 2nd do., O. Meeves, Kingston, $4.

Tinsmith's Work, an assortment, 1st prize, Chown & Cunningham, Kingston, $6.

Tinsmiths' Lacquered Work, an assortment, 1st prize, Chown & Cunningham, Kingston, $6.

Stoves.

Cooking Stove for Wood, 1st prize, Chown & Cunningham, Kingston, $6.

Furniture for Cooking Stove, one set, 1st prize, Chown & Cunningham, Kingston, $5.

Hall Stove for Wood, 1st prize, Chown & Cunningham, Kingston, $5.

Hall Stove for Coal, 1st prize, Beecher & Parker, Brockville, $5.

Parlor Stove for Wood, 1st prize, Chown & Cunningham, Kingston, $5.

Extra Prizes.

Thos. Russell & Son, London, Chronometers and Watches; Provincial Hardware Manufacturing Co., assortment Cast Butt Hinges: do., assortment of Door Knobs, recommended; Livingston & Howe, Gananoque, six Bit Braces; J. Morrison, Toronto, Brass Castors for Furniture; R. Campbell & Co., Hamilton, Cast Iron Enamelled Ware, Diploma; H. T. Smith, Toronto, Soda Water Machine; do., Syrup Pump for Soda Bottles; do., Soda Water Fountain; do., Coal Oil Chandelier; N. L. Piper & Sons, Toronto, Smoke Conductor and Malt-house Ventilator; Beecher & Parker, Brockville, Hot Air Furnace for coal; do., for wood, a diploma; Wills & Mooney, Montreal, assortment of Horse-shoe Nails, a Diploma; C. H. Hubbard, Toronto, Dentists' Gold and Silver Foil; W. Sweet, Montreal, patent Atmospheric Bell Pull; J. Morrison, Toronto, assortment of Steam Guages; do., Beer Pump; Anderson & Sons, London, patent Perforated Ventilator and Pocket Damper Combined, commended.

CLASS XLVI.—Musical Instruments.

Judges—W. Burrows, Kingston; J. D. Humphreys, Toronto; W. Reynolds, Toronto.

Harmonium, 1st prize, R. S. Williams, Toronto, $12; 2nd do., Coleman & Son, Toronto, $8; highly commended—Bell, Wood & Co., Guelph.

Melodeon, 1st prize, R. S. Williams, Toronto, $6; 2nd do., Bell, Wood & Co., Guelph, $4; highly commended—R. H. Dalton, Toronto.

Church Organ, 1st prize, S. R. Warren & Co., Montreal, $30.

Piano, square, J. C. Fox, Kingston, and Heintzman & Co, Toronto, each 1st class prizes of $15.

Piano of any kind, 1st prize, J. F. Rainer & Co., Whitby, $15.

Extra Prizes.

S. R. Warren & Co., Montreal, Miniature Organ; A. Newell, Toronto, Reeds for Melodeons; J. F. Rainer & Co., Whitby, one Elliptic Piano.

Judges' Report.

The Judges recommend that in future melodeons be divided into two sections, single and double reed; and in regard to square pianos, those of Mr. Murray, of Kingston, are recommended as good instruments, but ruled out, not being entered in the name of the manufacturer.

The Judges reported, "after a most careful and extended trial of pianos, Nos. 1 and 2, of J. C. Fox & Co. and Heintzman & Co., they experience a difficulty in deciding on their merits, as to which is entitled to the first prize. They therefore recommend that a first prize be given to each—to No. 1, J. C. Fox, of Kingston, for "power of tone;" and to No. 2, Heintzman & Co., Toronto, for "fullness and equality of tone."

The judges also have great satisfaction in reporting the steady progress in the manufacture of musical instruments in this province, as evidenced by the number of very superior pianos, harmoniums, and melodeons shown on the present occasion; and also the church and chamber organs by Warren, of Montreal. They would also highly recommend the Elliptic pianos of J. F. Rainer & Co., of Whitby, and the melodian Reeds by A. Newell, of Toronto; the latter as a new branch of manufacture deserving encouragement.

CLASS XLVII.—Natural History.

Judges—Dr. S. P. May, Toronto; Dr. Beatty, Cobourg; Joseph Danson, F. C. S., Kingston.

Collection of Native Stuffed Birds, classified, 2nd prize, T. Shelborne, Kingston, $6.

Collection of Native Preserved Fishes, 2nd prize, T. Shelborne, $6.

Collection of Native Insects, classified, 1st prize, R. V. Rogers, Kingston, $8; 2nd do., O. Meeves, Kingston, $4.

Collection of Native Plants, arranged in their natural families, and named, 1st prize, J. Macoun, Belleville, $8 and a Diploma.

Collection of Stuffed Birds and Animals of any country, 1st prize, O. Meeves, Kingston, $7; 2nd do., Mrs. Bajus, do., $6.

Extra Prizes.

J. O. Sullivan, Kingston, Anatomical Preparation, Diploma; F. Hallendel, Ottawa, Model of 68 Pounder made from Rock of Gibraltar; Mrs. J. Craig, Kingston, Stuffed Beaver; E. Leonard, Kingston Tp., collection of Canadian Woods; W. M. Stewart, Watertown, N. Y., Abestus, a non-combustible or cotton stone, found in Province of Quebec.

CLASS XLVIII.—Paper, Printing, Penmanship, Bookbinding and Type.

Judges—H. C. Grant, Kingston; Thomas White, Hamilton.

Letter-press Printing, plain, Robertson & Cook, Toronto, 2nd prize, $3.

Letter-press Printing, ornamental, 2nd prize, Robertson & Cook, Toronto, $3.

Letter-press printing—Posters, plain and ornamental, 2nd prize, Dr. Barker, Kingston, $3.

Paper Hangings (Canadian Paper), one dozen rolls, assorted, 1st prize, Moses Staunton, Toronto, $6 and Diploma.

Penmanship, business hand, without flourishes, 1st prize, Musgrove & Wright, Toronto, $4.

Extra Prizes.

Musgrove & Wright, System of Penmanship; H. V. Brown, Kingston, Prepared Fibre of Cedar Bark for making Paper; Dr. Barker, Kingston, Copper-plate Printing—Recommended.

CLASS XLIX.—Saddle, Engine Hose, Trunkmakers' Work, Leather, &c.

Saddlery, &c.

Judges—Robert Irwin, Montreal; Wm. Inkson, Hamilton; Wm. Edwards, Toronto.

Collars, an assortment, 1st prize, R. Nicolls, Toronto, $5; 2nd do., R. Malcom, Toronto, $3.

Engine Hose and Joints, 2¾ inches diameter, 50 feet of copper rivetted, 1st prize, L. J. Campbell, Montreal, $8.

Harness, set of Double Carriage, 1st prize, R. Malcom, Toronto, $8; 2nd do., P. O. Crandell, Trenton, $5.

Harness, set of Single Carriage, 1st prize, R. Malcom, Toronto, $7; 2nd do., R. Nicolls, Toronto, $4.

Harness, set of Team, 1st prize, R. Malcom, Toronto, $5.

Harness, set of Express, 1st prize, R. Nicolls, Toronto, $6; 2nd do., R. Malcom, Toronto, $4.

Leather Machine Belting, an assortment, 1st prize, Wm. Ford, jr., Kingston, $8.

Saddle, Ladies' Full Quilted, 1st prize, R. Malcom, Toronto, $8.

Saddle, Ladies' Quilted Safe, 1st prize, R. Malcom, Toronto, $6.

Saddle, Gentleman's Full Quilted, 1st prize, R. Malcom, Toronto.

Saddle, Gentleman's Plain Shaftoe, 1st prize, R. Malcom, Toronto, $6.

Trunks, an assortment, 1st prize, R. Malcom, Toronto, $8.

Valises and Travelling Bags, an assortment, 1st prize, R. Malcom, Toronto, $5.

Saddle and Harness Stock.

Check for Horse Collars, one piece, 1st prize, W. Leonard, Westbrook, $6; 2nd do., H. Smith, Kingston, $4.

Belt Leather, 30 lbs., 1st prize, L. J. Campbell & Co., Montreal, $4; 2nd do., Wm. Ford, jr., Kingston, $3.

Brown Strap and Bridle, one side of each, 1st prize, Wm. Ford, jr., Kingston, $3; 2nd do., R. Lingwood, Fergus, $3.

Carriage Cover, two skins (whole), Wm. Ford, Kingston, $4.

Deer Skins, three dressed, 1st prize, R. Lingwood, Fergus, $3.

Harness Leather, two sides, 1st prize, R. Lingwood, Fergus, $4; 2nd do., Wm. Ford, jr., Kingston, $3.

Horse Blankets, two pairs, 1st prize, R. Dennison, Richmond, $5; 2nd do., F. M. Campbell, Storrington, $3.

Skirting for Saddles, two sides, 1st prize, R. Lingwood, Fergus, $4.

Extra Prizes.

R. Lingwood, Fergus, Card Leather; L. J. Campbell & Co., Montreal, three hides Oak Tanned Belt Leather; L. J. Campbell & Co., Montreal, Oak Belting and Belt Leather, Diploma: E. Snider, Elizabethtown, a piece of Saddle Serge; L. F. Fralick, Ernestown, made up Horse Clothing; R. Malcom, Toronto, best General Display, Diploma.

Judges' Report.

The Judges' have great satisfaction in reporting a very fair competition, both in quantity and quality, and recommend a diploma to Mr. Malcolm,* for the largest display of saddles, harness, and trunks on exhibition. The saddles—gentlemen's and ladies'—the single and double carriage harness, and express harness, shown by Mr. Bach, of Toronto, although entered in time did not reach the exhibition until after the awards were made in the regular sections. They would, however, under the circumstances recommend a liberal prize to Mr. Bach for good workmanship and proportions, in all his goods.

CLASS L.—Shoe & Bootmakers' Work, Leather, &c.

Judges—Wm. Deering, Cobourg; Wm. Burns, Whitby.

Boots, Ladies', an assortment, 1st prize, A. Sutherland, Kingston, $7; 2nd do., Wm. Allan, Kingston, $4.

Boots, Gentlemen's, sewed, an assortment, 1st prize, A. Sutherland, Kingston, $7; 2nd do., Wm. Allan, Kingston, $4.

Boots, pegged, an assortment, 1st prize, W. Allan, Kingston, $5; 2nd do., A. Sutherland, Kingston, $3.

Boot and Shoemakers' Lasts and Trees, 1st prize, M. Selway, Toronto, $8.

Calf Skins, two, 1st prize, Wm. Ford, Kingston, $3; 2nd do., R. Lingwood, Fergus, $2.

Calf Skins, two grained, 1st prize, R. Lingwood, Fergus, $3; 2nd do., Wm. Ford, Kingston, $2.

Cordovan, two skins, 1st prize, R. Lingwood, Fergus, $3.

Dog Skins, two dressed, 1st prize, Wm. Ford, jr., Kingston, $3; 2nd do, R. Lingwood, Fergus, $2.

Kip Skins, two sides, 1st prize, Wm. Ford, jr., Kingston, $3; 2nd do., R. Lingwood, Fergus, $2.

Kip Skins, two grained, 1st prize, Wm. Ford, jr., Kingston, $3; 2nd do., R. Lingwood, Fergus, $2.

Linings, six skins, 1st prize, W. Ford, jr., Kingston, $3.

Sole Leather, two sides, 1st prize, R. Lingwood, Fergus, $3; 2nd do., Wm. Ford, jr., Kingston, $2.

Upper Leather, two sides, 1st prize, R. Lingwood, Fergus, $3; 2nd do., Wm. Ford, jr., Kingston, $2.

Upper Leather, grained, two sides, 1st prize, R. Lingwood, Fergus, $3; 2nd do., Wm. Ford, jr., Kingston, $2.

Extra Prizes.

R. Lingwood, Fergus, Satin Calf, Pebbled Cow, Buffed Cow, Buffed Deer, and Splits; A. Sutherland, Kingston, a pair of Highland Shoes; Wm. Ford, jr., Kingston, Buff Leather.

CLASS LI.—Woollen, Flax and Cotton Goods, Furs and Wearing Apparel.

Judges—Hugh Frazer, Whitby; Glover Bennett, Cobourg; Wm. Cottingham, Omemee.

Blankets, Woollen, one pair, 1st prize, E. Snider, Elizabethtown, $6; 2nd do., S. Wartman, Kingston Township, $4.

Caps, Cloth, an assortment, 1st prize, Wm. Grow, Kingston, $5.

Carpet, piece Woollen, 1st prize, E. Snider, Elizabethtown, $8; 2nd do., A. Bond, Storrington, $5.

Carpet, piece Woollen Stair, 1st prize, E. Snider, Elizabethtown, $7.

Carpet, piece Rag, 1st prize, N. Dollar, Fredericksburg, $5; 2nd do., R. Pigeon, Napanee, $2.

Fulled Cloth, piece, 2nd prize, M. File, Fredericksburg, $4.

Counterpanes, two, 1st prize, Miss J. Waldron, Storrington, $5; 2nd do., W. E. Hazzard, Richmond, $3.

Cordage and Twines from Canadian Flax or Hemp, assortment, 1st prize, E. Law, Kingston, $10; 2nd do., N. Couper, Kingston, $6.

Drawers, six pair Woollen factory made, Armstrong, McCrae & Co., Guelph, $5.

Flannel, not factory made, piece, 1st prize, R. Spooner, Kingston Township, $5; 2nd do., J. Donnelly, Portland, $3.

Fur Cap and Gloves, 1st prize, C. Wright, Kingston, $5; 2nd do., W. Grow, do., $3; G. H. Haymes, Belleville, recommended.

Fur Sleigh Robes, including Buffalo, Wolf and Racoon, 1st prize, Wm. Grow, Kingston, $15; 2nd do., C. Wright, do., $8; G. H. Haymes, Belleville, recommended.

Gloves and Mits of any leather, an assortment, 1st prize, Hall & Childs, Brockville, $5; 2nd do., Wm. Grow, Kingston, $3; J. Cook, Toronto, commended.

Linen Goods, unbleached, one piece, 1st prize, Robert Hutton, Kitley, $5.

Linen Sheeting, bleached, 1st prize, R. Hutton, Kitly, $3.

Overcoat, of Canadian cloth, 1st prize, Miss J. Waldron, Storrington, $5.

Shawls, home-made, 1st prize, H. Huffman, Fredericksburgh, $4; 2nd do., John Jackson, Newburgh, $2; C. Dollar, Fredericksburgh, recommended.

Sheepskin Mats, dressed and colored, an assortment, 1st prize, J. Cook, Toronto, $6.

Shirts, factory made, three of each, woollen and Angola, 1st prize, Armstrong, McCrea & Co., Guelph, $5.

Silk and Felt Hats, 1st prize, C. Wright, Kingston, $5; 2nd do., Wm. Grow, Kingston, $3.

Stockings and Socks, factory-made, woollen, three pairs of each, 1st prize, Armstrong, McCrae & Co., Guelph, $4.

* A protest by Mr. Bach, against the awards made to Mr. Malcom's saddles, on the ground of their being imported articles, now awaits the decision of the association.

Stockings and Socks, factory-made, mixed woollen and cotton, three pairs of each, 1st prize, Armstrong, McCrae & Co., Guelph, $4.

Winsey, checked, one piece, 1st prize, J. Richardson, Pelham, $5.

Woollen Shawls, Stockings, Drawers, Shirts and Mits, an assortment, 1st prize, Armstrong, McCrea & Co., Guelph, $10; 2nd do., Mrs. E. Jackson, Kingston Township, $6.

Yarn, white and dyed, 1 lb. of each, 1st prize, James Gibson, Kingston Township, $3; 2nd do., J. Richardson, Pelham, $2.

Yarn, fleecy woollen, for knitting, 1 lb., 1st prize, T. Wilson, Kingston, $3.

Yarn, linen, two pounds, 1st prize, James Gibson, Kingston Township, $3, 2nd do., Robert Hutton, Kitley, $2.

Extra Prizes.

E. Law, Kingston, assortment of Cordage from Russian flax; C. Sibbald, Brockville, four fleeces Negretti Merino Wool; J. Donnelly, Portland, a piece of Shepherd Plaid, recommended; Charles Doebler, Port Hope, assortment of Ladies' Furs; Robert Hutton, Kitley, Linen Diaper Towels, Table Linen, and Linen Coverlit; S. Wartman, Kingston Township, home-made Mats and fancy Flannels; W. Grow, Kingston, assortment of Ladies' Furs; C. M. Star, patient in Penetentiary Lunatic Asylum, for Gloves and Mits, Stockings, and Fly Catcher; N. Couper, Kingston, assortment of Cordage and Twines from Russian and Manilla Hemp; C. Wright, Kingston, assortment of Ladies' Furs and dressed Fur Skins; J. G. Sherlock, Kingston, Military Undress Coat; J. Cooke, Toronto, Hearth Rug; C. Winicke, Cloth Patch Work Quilt; Staff Surgeon Corbett, Kingston, 6 Leopard and 1 Fox Skin, shot in the Himalayas; Empire Hat Co., Watertown, N. Y., Ladies' Patent Waterproof Paper Hats; Black River Paper and Manufacturing Co., Watertown, N. Y., Patent Satchell and Double Bottom Paper Flour Sacks; Hall & Childs, Brockville, assortment of dressed Kid Leather.

Board of Arts and Manufactures
FOR ONTARIO.

MEETING OF COMMITTEE.

The Executive Committee of the Board will meet at the Board Rooms, Mechanics' Institute, Toronto, on Tuesday Nov. 12th, at 10 o'clock, A.M. Important business will be submitted.

W. EDWARDS, *Secretary.*

TRADE MARKS.

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

(*Continued from page 259.*)

J. N. Harris, et. al., New London, U. S. Trade Mark:—"Allen's Lung Balsam." Recorded in Vol. A., folio 195 (No. 685). September 21, 1867.

Horace C. Bliss, Ottawa, Ontario. Trade Mark:—"Balsamic Troches." Recorded in Vol. A., folio 196 (No. 743). September 25, 1867.

J. C. Bright, Chatham, Ontario. Trade Mark:—"Oil of Gladness." Recorded in Vol. A., folio 197 (No. 750). September 28, 1867.

John Shannon, Toronto, Ontario. Trade Mark:—"Beaver Soda Water Works," partially surrounding a design of a Beaver. Recorded in Vol. A., folio 198. (No. 764). October, 3, 1867.

C. P. Reid, Toronto, Ontario. Trade Mark:—"C. P. R & Co., T. Good Templar Whiskey." Recorded in Vol. A, folio 199 (No. 762). October 9, 1867.

John Lerch, Canaan, Penn. U. S. Trade Mark:—"The British Universal Salve." Recorded in Vol. A., folio 200 (No. 795). October 11, 1867.

Correspondence.

TECHNICAL EDUCATION—THE FOREIGNER AND THE BRITON.

SIR,—Your article in last number, fully and fairly represents the authorities and arguments in support of the allegation that, owing to the advantages which technical schools afford, the foreign worker is surpassing the Briton in the march of improvement, and a brief examination of them will exhaust the subject. Of the eighteen witnesses whose testimony is cited, at least a dozen are directly or indirectly committed to a support of the science and art department, and are not likely to gainsay the opinion of one of its chief organisers, Dr. Playfair. One gives his opinion—not from recent facts, but *long ago* formed, that Britain must *one day* find herself outstripped; another his *previously* entertained *conviction*; a third a *prediction* that unless we do so-and-so we shall soon be behind; a fourth states his belief as to the *wants* of England; a fifth thinks *the* want is a rousing of the public mind to the ignorance prevalent on a certain subject; a sixth asserts that technical education is more advanced on the continent than with us, and so on, not one of them giving any fact warranting the conclusion come to—and it is a legitimate inference that if there had been specific instances to produce in which the British worker is being surpassed by the foreigner, the point would not be maintained by such astute advocates merely by the less effective means of sheer assertion. True, Mr. Huth says he found the foreigner more scientifically educated than the Briton, but Mr. Bell, who from many years of extensive intercourse is familiar with both, declared at the meeting of the British Association that it was not true that foreign workmen were better educated than those of Britain, that neither

can be held as superior scientifically to the other. This latter finding, though seemingly impossible, seeing that the Prussian people are subjected to seven years' compulsory schooling, is confirmed by the opinion of Mr. Laing, and entirely in accordance with the experience of the two nations; and when Mr. Smith says that nobody can deny that German officers of works are better educated than British, the answer is that success is the best test of true ability, and of what education best fits a man for doing his work well; and most persons will require more than Mr. Smith's *ipse dixit* to make them believe an averment so irreconcileable with practical experience. Of course, a Briton acquainted with mechanics and chemistry, other things being equal, will make a more efficient workman than one who is not, whether his work be burglary or boiler-making, but that does not warrant the conclusion that therefore technical schools ought to be established.

As to the rebutting evidence, Mr. Bell, after a careful comparison of the exhibition of iron at Paris, declares Britain had not fallen behind other nations, and from many years familiarity with the subject at home and abroad, states confidently that there has been no change in the relative position of our own and other nations in regard to iron manufactures. Mr. Ferdinand Kohn, at the British Association, commenting on the exhibition of iron and steel in Paris, said that a vague notion of the superiority and predominance of British iron manufactures having ceased to exist, or was threatened to be overthrown by continental competition, was without foundation, judging from that exhibition. Mr. Fornie, referring to the same facts, declares, so far as France is concerned England has not been excelled in the manufacture of iron. An able critic in the *Saturday Review*, while conceding that the French furniture is beautifully executed and generally light and elegant, maintains that the English shows equal skill and more originality of thought. Mr. Kitson, referring to the choicest productions of France in the exhibition, declares that Britain produces articles superior in quality and most certainly superior in design, though design is *the* point in which France is alleged greatly to excel and Britain to be greatly deficient. In all branches of trade connected with mechanical science, Mr. Kitson, fortified by the opinions of men of great experience confirming his own finding, declares that Britain stands without superior. Our marine engines are gems of mechanical finish superior in design to anything the continent can show; our locomotive engines are unequalled in beauty of form and simplicity and appropriateness of construction; our machinery for working iron and other metals has no equal; our iron is of unequalled quality; our tools have no compeers; our war materials are incontestibly superior to all others, and in advance of those of any other nation. In the fine arts our execution is such as to give the alarm to France that we are about to excel her in this her favourite subject. The armourers of Liege have a name in history, but in their work we are now ahead of both Belgium and France, our last achievements, only chronicled a few days ago, far surpassing anything of the kind ever before attempted. The success of Flanders in cotton cannot compare with that of Britain, though obtained by the aid of British machinery, and for the most part by British supervision. In France, when great undertakings are to be executed, they are not unfrequently committed, as in the late matter of locomotives mentioned at the British Association, to British controul, and executed according to British design, which would not in any instance be the case if, as alleged, the French had superior men for the work. In printing machinery, and printing in newspapers and popular publications, as well as in more substantial reading, and bookbinding, what has the continent to show compared with Britain. In agriculture Britain is *facile princeps*. In agricultural machinery, if Britain is surpassed at all it is by the United States and Canada, and most certainly not by any European nation. In shipbuilding, where is there anything to compare to the erections on the Clyde and the Tyne. With all the advantages of recent arrangements so much heralded, is Lowell superseding Glasgow in the markets of Japan and China? Who is threatening to give remotest India cotton goods which must diminish the British supply, or to give the world broadcloth to the exclusion of Yorkshire manufacture? Whose cutlery is surpassing or supplanting that of Sheffield, or in what other department is Britain falling behind, and in what special instances are foreigners occupying the places they used to fill? In none! Stripped of its generality and reduced to specific instances of actual fact, the allegation is a mere assertion without a particle of fact to support it.

Let me say as to the point at issue, that it is not simply the superiority of the foreigner, but their superiority now in departments where formerly they were inferior to the Briton, and mainly that that superiority is owing to their technical education, as it is only in such cases that their superiority can be cited in support of the cry for technical schools here. Belgium may supply iron, Flanders cloth and France steam-engines, to those who

heretofore got their articles from Britain, but if they do so simply because they can sell them cheaper, and not because they are of superior workmanship or more excellent make, the fact has no more bearing on the point in controversy than has the fact that Austria now, as of yore, has furniture more elegant, and China carved work more curious or elaborate than Britain. Technical education may be desirable or it may not, but what is here maintained is that the alleged superiority of foreign workers is unwarranted, and that even if it were true, there is no good reason for attributing it to the effects of technical schools. The thorough education of the worker, using the term in its evident sense, is among the prime necessities of our time; but just in proportion to its importance is the necessity of guarding against wasting the energies and funds of the nation on schemes for securing it, which, in the very nature of things can never be successful.

S. R.

ELEMENTARY AND TECHNICAL EDUCATION.

To the Editor of the Journal of Arts.

Sir,—The subject for inquiry and discussion, introduced by you, in the July number of the Journal, and regarding which much light has been given in subsequent numbers, is one of considerable importance. The attention of men in England was directed to Technical Education, by a letter from Professor Playfair to Lord Taunton, in May of the present year, in which the writer stated, that the British workman was behind his fellows on the Continent of Europe, in the matter of education, and that this defect acted prejudicially on his work. The matter being of such importance, it was made the subject of a special report, from the School Inquiring Commission, and this report has confirmed what Dr. Playfair alleged. The Commission ascertained the opinion of 19 jurors of the Paris Exposition; (extracts were given from several of those opinions in the last month's number of the Journal,) and all of those concurred in the statement, that the working men of Britain, are incomparably worse educated than the same class on the Continent, and that this was one reason, if not the main, why continental workmen have become such formidable rivals during the last few years; furthermore, unless this serious defect were remedied, British supremacy in arts and manufactures would become a thing of the past. Now, this is a state of matter disgraceful at least, if not alarming; since Great Britain depends to such a large extent on the part of her population engaged in mechanical trades. So much for the fact and how established. But when a juror goes more minutely into the matter, then we come to what chiefly concerns us. One of the most striking testimonies is borne by H. J. Mundella; and though you have given part of his judgment to the Commissioners already, perhaps you will be kind enough to repeat the following extract:

"The branch of industry with which I have been connected for thirty years past is the manufacture of hoisery. I am the managing partner of a firm employing five thousand (5000) workpeople, with establishments in Nottingham, Derby, and Loughborough, employing more than fourth fifths of the number, and with branches at Chemnitz and Pansa in Saxony, employing about seven hundred persons.

In addition to the opportunities and experience which the superintendence of these establishments afforded me, I have for many years past formed friendships with manufacturers in France and Germany. I have had free access to their warehouses and workshops, and I am as well accquainted with the progress of my own branch of industry in those countries as in England.

As the result of my observation I have for four or five years past been increasingly alarmed for our industrial supremacy, and my experience of the Paris Exhibition has only confirmed and strengthened my fears. In my own branch we still maintain the lead in the majority of articles, but the progress made by France and Germany, since 1862 is truly astonishing, and it has been much greater than our own.

In Nottingham, where the best machinery in the world is required and used in the production of hoisery and lace, there is no such thing as industrial education, and, greatly as it is to be desired, I am accquainted with many good mechanics and superior workmen to whom it would be of no service, inasmuch as they can neither read or write.

The contrast betwixt the workpeople of England and Saxony, engaged in the same industry, is most humiliating. I have had statistics taken of various workshops and rooms in factories in this district, and the frightful ignorance they reveal is disheartening and appalling. I was born and educated amongst the working classes, and all my life have been in close association with them, but I never realized the condition of the *lower masses* of our workpeople till I took the pains to examine them personally in the manner I have indicated.

In Saxony our manager, an Englishman of superior intelligence, and greatly interested in education, during a residence of seven years, has never yet met with a workman who cannot read or write. And not in the limited and imperfect manner in which the majority of English artizans are said to read and write, but with a freedom and familiarity that enables them to enjoy reading and to conduct their correspondence in a creditable and often superior style. Some of the sons of our poorest workmen in Saxony are receiving a technical education at the Polytechnic schools, such as the sons of our manufacturers cannot hope to obtain.

Whilst, therefore, I believe that the English workman is possessed of greater natural capacity than any of his foreign competitors, I am of opinion

that he is gradually losing the race through the superior intelligence which foreign governments are carefully developing in their artizans."

You will note from the above extract, that what is chiefly recommended, is a much better and more generally spread elementary education, and upon that good solid elementary education rear a special training for some trade, or what is commonly called "Technical Education." Happily in Canada (I take it in its widest extent), we have the means of giving this sound elementary education; the machinery has been in working order for some years past, and if every son and daughter of our happy and highly favoured land, is not receiving or in possession of it, the country is not to blame. Those who have the oversight of our schools, or those who actually conduct them, may be directing the attention and energy of their pupils, from the proper subjects: instead of teaching them to read fluently and intelligently; to perform the simpler, but most important operations in arithmetic; to write easily and compose correctly, may perhaps be urging them to devote their time and talents to the acquisition of such branches, as History, Physiology, Chemistry, Natural Philosophy, Mensuration, Algebra, Geometry, etc., etc. Are not those last mentioned subjects important? Assuredly they are: but they should not be taught in our common schools, or to a very limited extent indeed, and least of all they should never be allowed to take the place of the first mentioned three which are absolutely necessary for every one to know. And that not in a kind of way, but to be thorough masters of them.

I have said this much on the elementary part of the subject, the very foundation of the whole matter; because of its importance and because so many at this time seem to overlook the fact that we have public schools, whose proper function it is to provide this part of the education of the people, rush or send their children to institutions whose professed aim is to give a very special training indeed.

A WORKER.

(*To be continued.*)

Transactions of Societies.

THE TORONTO MECHANIC'S INSTITUTE CLASSES.

This Institution has again organised the usual series of winter evening classes. These comprise Architectural and Mechanical Drawing; Ornamental and Landscape Drawing; Mathematics, embracing Arithmetic, &c.; English Grammar and Composition; Book-keeping; Penmanship; French; Chemistry and Natural Philosophy. The charge for the course of instruction for each class, with the exception of French, is $2 for members of the Institute, and $3 for non-members. The charge for the French Class is $1 additional. Each class meets two nights per week, two hours each night, for twenty weeks. First class professional teachers have been secured for each class. As pupils are still joining, we defer giving the numbers until next month; in the meantime, let all youths who desire to improve themselves in the studies embraced in the series at once take advantage of the favourable opportunity. We recently heard an excellent discourse from the pulpit on "opportunities neglected," in relation to man's higher duties. The thought is just as striking, although less important in its consequences, when applied to the subject of education. How many youths there are, who, when arrived at years of maturity, will regret the "neglected opportunities" of their earlier days.

BERLIN MECHANICS' INSTITUTE.

The Annual Meeting of this Institute was recently held. The report of the committee showed its affairs to be in a prosperous condition. During the year 118 vols. had been added to the library, besides 30 vols. presented by the Swedenborg Society of London, England. The library now numbers 300 vols. The number of vols. taken out during the year 1865-6 was 352; for the year just closed 752. The following gentlemen were duly elected office-bearers for the ensuing year:—

President, John Fennell; *Vice-President*, Wm. Gaul; *Treasurer*, W. H. G. Knowles; *Secretary*, F. Macpherson; *Librarian*, Geo. S. Howard; and Messrs. T. Pearce, W. H. Bowman, Allan Huber. Alex. Millar, and Henry Gauntly, *Committee*.

A vote of thanks was voted to this Board, and to the publishers of some ten other journals, for free copies of their respective publications sent to the Reading Room during the past year.

AGRICULTURAL ASSOCIATION OF ONTARIO.

The Annual Meeting of the Association was held on the grounds, at 10 a.m. on Friday morning. of the week of the Exhibition, at Kingston. A large number of Delegates were present.

Hamilton, by an unanimous vote, was selected as the place for the Exhibition of 1868.

The following office-bearers for the ensuing year were then elected:—

President.—Thos. Stock, East Flamboro'.

1st *Vice-President.*—James Nimmo, Camden.
2nd " —John Walton, Peterboro.
Treasurer.—R. L. Denison, Toronto.

Votes of thanks were passed to all the Officers of the past year, the Manager's of Railways, and the Municipalities of Kingston, and County of Frontenac.

A resolution was adopted recommending that hereafter the annual meeting be held on the Thursday, instead of the Friday.

A letter was read from the President of the Quebec Agricultural Association, suggesting the propriety of holding an inter-colonial exhibition. The proposition was favourably received, but laid over for the present, in view of the want of proper facilities of communication and travel with the Maritime Provinces.

A motion was adopted for a Convention, consisting of one delegate from each of the Agricultural and Horticultural Societies and Mechanics' Institutes, to be held in Toronto, in November, to take into consideration a new Bill for the promotion of these several interests.

A motion to withhold, in future, the names of exhibitors from goods until after the judges shall have reported, was, after considersble discussion, lost.

The meeting adjourned.

Selected Articles.

THE INVENTION OF THE REAPING MACHINE.

A paper was recently read at the annual meeting of the British Association on the history of the reaping machine, by the Rev. Patrick Bell of Carmyllie, Scotland, who claims to be the first inventor of a practical mechanical reaper. At the conclusion of this paper, Mr. Bell gave a very interesting account of the history of his own invention, which we give in full as follows:—

"From my earliest years I had a liking and turn for the study and practice of mechanics. I am the son of a farmer, and was accustomed from my early youth to witness all the operations of the farm performed, and in most of them I engaged with my own hands. I was not a Presbyterian minister during the time in which I invented the reaping machine, as is currently stated, but an alumnus of one of our national universities—the University of St. Andrews. A farmer's son in my day, at least, although an academic, would not have been allowed to study undisturbed in his *sanctum*, and was liable especially in the harvest season, to be summoned to wield the fork or some other implement of toil. At a very early period of my life I was most painfully struck with the very severe nature of the toil to which the harvest-workers were subjected—a toil made doubly oppressive sometimes by the heat of the weather, and always by the very awkward position in which they were obliged to stoop when engaged in their work. It may sound as an empty sentimentalism, but it is nevertheless true that a desire to mitigate such excessive toil led me to inquire whether there might not be a possibility of transferring part of it at least to beams of wood and bars of iron, supplemented by the bones and sinews of the horse. Sure I am that I had no intention of taking the people's bread from them; and had I been so taunted, I believe that even then I could have demonstrated that the multiplication and employment of machinery in agricultural work immediately promotes the increase of the people's bread, and does not ultimately tend to diminish the means of the people to obtain that bread. For years I had thought of the matter and had diligently searched for some principle; and, taking up one after another, I duly weighed the possibilities of their application to the object in view, and abandoned them all as worthless.

One evening after tea, while walking in my father's garden, my eyes caught a pair of gardener's shears sticking in the hedge. I seized them by the handles, which protruded, and I proceeded to snap at the twigs of the thorns. My mind was full of mechanics at the time, and many hours were spent in my workshop; and, contemplating the shears attentively, I insensibly said to myself, here is a principle, and is there any reason why it should not be applied to the cutting down of the corn? Not altogether satisfied with my performance on the hedge, I brushed through it with the shears in my hand to a field of young oats adjoining, and commenced cutting them right and left. It was well that no neighbouring gossip saw me at the unwonted employment, else the rumor might have been readily circulated that the poor student had gone crazed. For weeks and for months, by night and day, those shears were uppermost in my thoughts, and I searched anxiously and indefatigably for the mode in which they should be employed. Plan after plan presented itself to me and was put upon paper. The merits of each, and the likelihood of its success, were carefully scrutinized and pondered, and eventually I fixed upon the plan now successfully in operation. This took place in the summer of 1827.

The next step was to construct a model, and to ascertain how thoughts would look when transformed to steel and iron. This was done, and it was during the process of making the little wooden frame and my puny cutters that the idea of a sloping canvas for conveying the cut corn to the side occurred to me. My first idea was to place the canvas level with the ground, and it was merely because that it was more conveniently situated in the model. and pleased the eye better, that the angular position was adopted, so that in reality the position and the angle of tne canvas were more matters of accident than the result of consideration. Were the truth always known, I believe that much more important improvements in mechanical science would be found to have a similar origin. Having finished my model, and speculated as accurately and deeply as I was able upon the possibilities and probabilities of the actual results, I determined to have a machine constructed upon the

large scale. For this purpose I had to pass out of my character of inventor into that of engineer and workman. The plan I took was this. After making my calculations as to size, etc., I joined a quantity of rough sticks together and called them a frame. Then I made cutters of wood of every part that required to be made of iron and steel. I sent these piece by piece as I required them to the blacksmith, with the instructions to make a thing of iron as like the wooden ones sent as possible. When I got a few of the pieces from the smith, I finished them with the file, and secured each to its proper place. I remember the cutters gave me a world of trouble and vexation. When they came into my hands they were in a very rude state, and required much filing, grinding, and fitting. By dint of patient application I got the whole into a sufficiently perfect state, as I thought, for trial.

It may amuse you, perhaps, if I give you some account of the first field I cut. That you may understand this, imagine an empty outhouse, rather long and narrow, having in one end a wright's bench, and in the other a rude-looking piece of mechanism—an embryo reaping machine. For my subsequent operations I chose a quiet day, that is, a day when there were few people about the place. On that day an eavesdropper might have seen me busily but stealthily engaged in conveying earth in a common wheelbarrow into the workshop. When the place between the bench and the rude but ambitious candidate for the honors of the harvest field was covered to the depth of some six inches, I proceeded to compress the loose mold with my feet. I next went on to an old stack that happened to be in the barnyard, and drawing a sheaf of oats out of it, and carrying it to the workshop, I planted it stalk by stalk at about the same thickness which I knew it would have grown in the field. This done, I shut and barred the door, and then going behind the machine I pushed it forward with all my might through the planted oats. As soon as I recovered my breath, I anxiously examined how the work had been done. I found that it had been all very well cut, but it was lying higgledy-piggledy, in such a mess as would have utterly disgraced me in the harvest field. Upon the whole, however, I was not discouraged but rather encouraged by the first experiment. The cutting was perfect, and that was the great point I aimed at. Although by the experiment I had proved my new invention to be a cutting machine, it certainly little deserved to be dignified with the name of a reaping machine, and yet it was a reaping machine I had set my heart upon constructing. Had I at this stage been content to summon a man with a rake to do the work of wheels and pinions, my machine was complete; and had I been contented with a combination, I would have saved myself a host of trouble, and what to me at the time was no small expenditure of money.

My workshop was again speedily cleared of earth and loam and made ready for the jack-plane and files. I proceeded forthwith to put the canvas in order. One might naturally suppose that this would be an easy matter, but I did not find it so. After the rollers were put into position, the wheels for driving them adjusted and the canvas stretched and fixed upon the rollers the proper tightness, I conceived in my simplicity that the work was done and my object secured. The result was otherwise; for on pushing the machine forward only the length of the house I found that it twisted, and would have been torn in pieces if it had proceeded many yards forward. I proceeded now to make grooves at the ends of the rollers, in which I placed a small rope. To these ropes, one at the top and the other at the bottom of the rollers, I sewed the canvas, expecting that the ropes and canvas would move together in uniformity and that my object would thus be obtained; but, upon trial, I was a second time disappointed. The ropes from inequality in the grooves, moved irregularly, and the canvas became twisted as before. For a time I was nonplussed and dispirited, but plucking up courage and ruminating over mechanical appliances, I thought of pitched chains. Having made some six inches of such a chain out of a piece of old hoop-iron, I sent the same as a pattern to the blacksmith, with an order to make for me so many feet of chain like the model sent. Having received the chains and put them into their places, the canvas was speedily attached, and a third trial was prepared for to meet the third trial of its construction which had now been made. The wheelbarrow was again in requisition, and another visit made to the old stack in the barnyard, and the process of dibbling another sheaf gone through. The door was again shut, and, palpitating with expectation, I pushed the machine forward. To my unspeakable satisfaction the oats were not only nicely cut, but were lying almost uniformly by the side of the machine in one continuous row, as I had confidently expected. You may smile, but I now complimented myself sensibly, I think, on my success, being convinced that I had converted the implement from a cutting to a reaping machine. All this took place in 1828.

Until the crops were ripe nothing more could be done. I was in high excitement and hope, and I waited impatiently for the ripening of the grain. In the meantime I revolved in my mind, with anxious and provident hope, everything that was likely to happen when the actual trial in the open field should come to be made. I was fearful that there should happen to me what had happened to many an experimenter before, who performs his experiments to a wish in the laboratory or workshop, but who utterly fails when he actually adjourns to the actual domain of nature or of art. I had observed in my experiment upon the pigmy and artificial field in the workshop that while the oats upon the whole came to the canvas, and were regularly removed to its side, nevertheless some seeds straggled away capriciously in different and adverse directions. And yet I could not forget that in the workshop all was calm, and that I had the elements greatly under my own control, but that in the open field the blowing wind might multiply the capricious stragglers and fan the flame of disunion and damage the success of the operation. It was an anticipation of this kind that induced me to think of the reel or collector. Having plenty of time before harvest, I constructed this part of the implement and laid it past to be used or not, as the emergencies of the field might require.

The period now approached that was to decide the merits of the machine. That night I will nev-

er forget. Before the corn was perfectly ripe (I had not patience to wait for that) a younger brother of mine and I resolved to have a quiet and unobserved start by ourselves. That could not be got while the sun was in the heavens nor for a considerable time after he was set; and, accordingly, about eleven o'clock at night, in a dark autumn evening, when every man, woman, and child were in their beds, the machine was quietly taken from its quarters and the good horse Jock was yoked to it, and we trio wended our way through a field of lea to one of standing wheat beyond it—my brother and I the meanwhile speaking to one another in whispers. We reached our destination and the machine was put in position right in the end of a ridge. My duty was to look ahead, and my brother's to guide the horse. I gave the word of command to go on, and on the implement went; but it had not proceeded above five or six yards when I called upon my brother to stop. Upon examining the work we found it far from satisfactory. The wheat was well enough cut, but it was lying in a bundle before the machine. For a moment we were both downcast; but, recollecting myself, I had yet great hope and said so, the whole of the machine not being used, the reel or collector having been left behind. I ran across the field and brought the reel and everything connected with it upon my shoulders, and adjusted it as well as the darkness of the night would permit, and we were soon ready for a second start. Taking our positions respectively as before, the machine moved forward, and now all was right. The wheat was lying by the side of the machine as prettily as any that has ever been cut by it since. After this we merely took it back again to the end of the ridge and made a cut with the open edge to ascertain how the swathes would lie upon the stubble, with which being well pleased, we, after some pardonable congratulations, moved the machine back to its old quarters as quickly and as quietly as possible."

WHAT OLD BONES AND LEATHER ARE GOOD FOR.

Under the heading "Science familiarly illustrated," the *Scientific American* weekly publishes in its columns some very interesting short articles, some of which also afford valuable information. The following is of that character :—

Articles are not to be despised because worn out, for wearing out means, almost always, only a change of use; when an article becomes useless for one purpose its being fitted for others. This fact is well exemplified in the value of old leather and bones. Let us consider the latter first because of its variety of uses. The fresh bones from the butcher's stall, as those of beef, which have been entirely stripped of the flesh, are excellent basis for soup. Indeed, bones alone make a far better soup than meat alone; and even after being cooked, unless boiled, bones are superior materials for this purpose. Even the rib bones of a piece of roasting beef, after having been placed once on the table, although marrowless, are good soup bones, and the skeleton of the turkey, gosling, or chicken, which as a roast has done its duty, will make a nourishing broth. Gelatin and not fat is the true foundation for soup, and this is largely contained in bones. So much for the domestic uses of bones; now let us look at their other uses.

First, then, the bone boiler deprives them of their fat ,which is used for a hundred purposes, from the basis of fancy soaps and pomatums to the "slush" of ships' masts. The gelatin becomes the "isinglass" put up in fancy colored papers and sold at the groceries for making jellies, soups, and blanc mange; or it enters into the composition of jujube paste and gum drops. Old bones are the foundation of the much valued fertilizer known as superphospate of lime. Ground and mixed with sulphuric acid they restore to the soil what it had given us in our wheat.

But they are almost invaluable in the arts. Very much of our "ivory handled" cutlery, probably nearly all of our ivory handled umbrellas, parasols, and whips, many similarly ornamented canes, etc., are handled with bone and not true ivory; In fact, some of the bones in our domestic animals approach very nearly in texture to genuine ivory.

We have seen a complete set of dental instruments handled with horse bones, which made as fine an appearance as the real ivory. Bone buttons are so commonly used that only an illusion to them is necessary. Almost all, if not quite all the phosphorus employed in the arts and sciences is produced from old bones. It is probably the most valuable extract which bones yield.

But it may be questioned whether any other use for old bones can equal in value that to which they are put in the manufactures of iron and steel; and here comes in the value of old leather. The carbon contained in bones and leather is a necessary element in case-hardening iron, and also in some instances of hardening steel. For the first purpose prussiate of potash, or ferro-cyanide of potassium is largely used, but it is a general belief among mechanics that its effects are not so thorough as those from the employment of ground bones and leather scraps. The article to be carbonized or case-hardened is packed in an iron box with the ground bones and leather and exposed to a red heat for several hours—more or less, as the depth of the cementation desired—then removed and plunged into water. Its surface becomes hardened steel.

For some parts of gun work and of machinery this is a very necessary process.

Then there are occasions when an extra hardness to steel is desirable; such as hardening the dies for raising "the steel mills" used in engraving calico-printing rollers. These are treated in precisely the same manner as articles of iron to be case-hardened. They are prepared for being engraved—which is done by hand—by being deprived of a portion of their carbon by a process of annealing, when they become nearly if not quite as soft as silver. To harden them this carbon must be restored, and for this purpose it is doubtful if anything is better than the old bones and leather scraps which we so thoughtlessly cast aside as valueless. Fortunes were made during our late war by gathering and sending to market the bones of horses, mules, and the edible animals which accompanied our armies, together with the cast-off scraps of leather, in the form of equipments. The above

are only a part of the uses of these despised articles, but our object was mainly to draw attention to the value of what are too often considered used up and worn out materials.

TREATMENT OF ANIMAL REFUSE IN EUROPE.

[Translated from the "Erganzungsblätter" for the Scientific American.

Working up Dead Horses.

Two manufactories for the utilization of dead horses have been established in Germany, one in Leipsic, Saxony, and another in Linden Prussia. The blood is manufactured into blood albumen, dried blood or blood manure; the hides are sold to tanners; the hair is separated into tail hair, carded hair for stuffing, and very short hair for manufacturing carpets; and the hoofs are used for manufacturing common buttons, manure or blood alkali.

The skinned animal is quartered and put into large cylindrical boilers, which are hermetically closed and kept under a steam pressure of two atmospheres. The condensed water softens the meat off and is then run off through a cock. When this water begins to run quite clear the cock is shut, and the steam is allowed to operate for eight hours. It melts the grease out, converts the skinny and stringy parts to glue, and even softens thin bones. Each cylinder contains three or four carcasses lying on a seive bottom, under which an impure deposit of glue is formed, with a layer of pure grease above the glue. The melted grease flows off through a cock. It is liquid when kept at medium temperature, is especially good for oiling machinery and wool, and makes a soap which is well adapted for the cloth manufacture. The glue, which of course contains also extracts of meat, is so changed by the heat that it can be used only for manufacturing bonesize, an article used in cloth manufactories, which remains permanently liquid and will not spoil by keeping. The next process is to crush the meat and bones to a yellowish powder (worth $3½ to $4 per cwt.) which, according to Mr. Wicke's analysis, contains ·0568 per cent. of moisture, ·5687 of organic substances, ·0653 of nitrogen, and ·3745 of ash. The ·3745 per cent. of ash is divided into ·2989 per cent. of phosphoric salts (·1391 per cent. of phosphoric acid), ·0033 of potash, ·0034 of soda, ·0441 of lime, ·0041 of magnesia, ·0104 of sulphuric acid, and ·0043 of chlorine.

Fish Guano.

Artificial manure is manufactured of fish offal, and spoiled fish, in the following manner, on the Lofoden Islands (Norway and Sweden),—They dry and grind the back bone and head, cut the other remains into small pieces and pile them with layers of fresh burnt lime, in pits stoned up and bottomed with clay upon which is placed a layer of turf ashes five inches thick. The mass is mixed together after six or eight months and packed in bags.

Fish Meal.

This novel description of food was shown at the late exhibition of fishery articles in Bergen (Norway and Sweden), as prepared by the Lofoden Company, the only establishment of its kind. The flesh of the haddock is dried hard and crushed, the bones having been carefully taken out. The meal is then heated and stirred in pans to drive off the rank odour, after which it tastes rather sweet. As food it is said to surpass beef four times and fresh haddock four and a half times. It is sold at fifteen cents a pound.

THE PARIS SAFE TRIAL. A FARCE.

Since our publication of the report of the safe trial between Herring and Chatwood, copied from *Engineering*, we have received several communications evidently intended to show—what is not apparent by the trial—the great superiority of the American safe over its English rival. Perhaps this superiority was established at the trial, or if not, possibly it can be so established, and nobody would rejoice more than we at such a triumph of American mechanical skill; but the various reports do not seem to differ in any essential particular from the facts reported in *Engineering*. On the Chatwood safe were used a heavy sledge, slung by brawny arms, large wedges, and crowbars, and on the Herring safe the hand hammers, serrated wedges, and jointed levers of the burglar. The sledge hammer was used on the Herring safe only in opening his internal box in which was placed the block, the object sought, which in Chatwood's safe was contained in the outer case only.

Yet we cannot see what bearing this trial has, after all, on the relative value of either of these safes as offering resistance to the attempts of burglars. Burglars do not come with sledge hammers, and bang and rap away for two or three hours to reduce a structure of mechanical proportions to a mass of old junk. The whole trial was a farce—nothing less—and it was the hight of folly in the commission under whose auspices the experiments were conducted that they did not define the nature of the implements to be used, only allowing each competitor to furnish as expert an operator as he could find.

A test conducted by scientific burglars with the ingenious implements ordinarily used by them, would have been an interesting exhibition, and the result would have been of practical importance to the business community.

As an advertising dodge, which probably both exhibitors intended, it may answer their purpose, but the practical result deducible from the trial is not apparent.

The nonsense of allowing three men to bang, and chisel, and hammer for hours to open a safe, is too ridiculous to merit serious consideration.—*Scientific American.*

ASPHALT PAVEMENT IN PARIS.

Visitors to Paris are generally surprised at the appearance of the pavement of a great number of streets in the central parts of the town, and still more at the peculiar mode of making and repairing this asphalt pavement if they chance to see those operations carried out. The asphalt pavement was introduced in Paris in 1824, by M. Momberg, chief engineer, and M. Vandrey, engineer of the municipal service of the town of Paris. The first street paved in this manner was the Rue Bergère. The asphalt used for this purpose is a

natural composition of pure carbonate of lime and of bitumen or mineral tar. It is found in abundant quantities at Seyssel (Ain) in France, and at Val-de-Travers, in the canton Neuchâtel, in Switzerland. In the first-named locality the layers of bituminous limestone are from four to seven yards deep, and of very uniform composition, containing about sixty-six per cent of bitumen and thirty-four per cent carbonate of lime. The natural stone is crushed into powder by machinery, and afterward heated to a temperature of about 140° Cent. It then remains in the state of a dry, fine powder, somewhat similar in its consistency to moulders' sand, and in this form it is employed in the streets. The roads to be paved are first covered with a layer of concrete made of gravel and cement, and this layer is carefully dried before the application of the asphalt cover. The asphalt-powder is then reheated and spread over the surface of the concrete in an even layer of about four centimetres, or 1⅔ inches, in thickness throughout.

After this the powder is rammed and compressed by means of heated cast-iron rams worked by hand.

This being done, a heated roller is passed over the surface. The roller weighs about four hundred weight, and is repeatedly traversed over each short length of pavement newly rammed in. Two larger rollers, one of sixteen hundred weight and one of about two tons weight, are afterward employed for flattening down the surface of the whole.

The pavement is finished and ready for use immediately after cooling, say two or three hours after the first roller has completed its work. The asphalt pavement has now had an extensive and complete trial, and its advantages are very numerous. There is neither dust nor mud produced by it, and its surface wears no more than one millimetre, or one twenty-fifth of an inch in thickness per annum in streets having a lively traffic. At the beginning there is a compression caused by the weight of the vehicles rolling over the pavement, but the whole gets soon into a state of uniform density, and the street then remains in a perfect state for a long time, requiring very little repair.

There is no noise whatever from the wheels of carriages in asphalt-paved streets, so that there is a certain danger caused by this to pedestrians from the want of warning of the approaching carriages.

This, however, disappears by degrees, as the public become more and more acquainted with this kind of pavement. The tractive force required by the carriages passing over asphalted streets is very considerably reduced, and still more important is the reduction of the wear and tear of carriage wheels, springs, and axles, a reduction which is due to the absence of all concussion and vibration in the rolling of the carriage wheels over the smooth and uniform surface of the street.—*Engineering.*

The amount of nutriment contained in beer is generally greatly over estimated. Liebig asserts that in 1,460 quarts of the best Bavarian beer, there is exactly the nourishment of an ordinary two and a half pound loaf of bread. This beer is about on a par with our best American beer. Instead of being a condensation of the nutriment contained in the grain, in just so far as the liquid has undergone fermentation, the nourishment has disappeared.

Machinery and Manufactures.

The Uchatius Process of Steel Manufacture.

Many of our readers will still recollect an interesting invention made by M. Uchatius, an officer in the Austrian service, and which was first brought under public notice at the Paris Exhibition of 1855. It is a direct method of steel manufacture by mixing granulated cast iron and iron ore, in proper proportions, in a crucible, and by these means forming the exact combination required for any given quality of steel. In 1856, at the same time when Mr. Bessemer's invention had been pronounced to be a failure, this process was at the hight of its renown, and experiments were made in France and in England on a more or less large scale, although not in anything like commercial practice, to test its value. A company was formed in France, and, we believe, under the auspices of the Government, for the working of M. Uchatius's patents, and everything then believed to be necessary for steel manufacture on a large scale was provided. The causes of failure in this instance are now perfectly intelligible, since the advancement of what may be called the science of steel manufacture has, since that date, enabled us to judge of the importance and value of certain details which were then unknown or overlooked, and the absence of which caused the practical failure of a process which in principle was perfectly correct, and would have in time become of considerable importance, had it not been surpassed by the progress of a still more glorious and revolutionizing invention, viz., the Bessemer process. The Uchatius process, however, has been commercially introduced at one place, and the steel works has continued its operations now for about ten years, and so far as can be judged from the excellent quality of its products, and from the continuance of this mode of manufacture, with perfect success. The steel works referred to is at Wykmanshyttan, in Sweden. In 1862, this concern sent Uchatius steel to London, which was remarkable for its tenacity and uniformity of grain, and now in the Paris Exhibition we find the same works represented by another excellent collection of the Uchatius steel. We understand that the Uchatius steel of Wykmanshyttan is used exclusively by the royal mint at Stockholm for dies of coining presses, polished rolls, and other similar articles requiring steel of great strength and closeness and uniformity of grain. The reason why this process succeeded in Sweden and failed in France and in England is the same which made the Bessemer process first succeed in that country, viz., the purity of the Swedish ores. The ore employed for the Uchatius process at Wykmanshyttan is that of the Bisberg mines, which can be seen in its natural state at the Paris Exhibition, forming part of the large trophy of ironstone and iron erected in the Swedish machinery gallery. It ranks among the purest and richest magnetic ores to be found anywhere. From this ore and from granulated pig iron made of the same ore, probably mixed with iron containing manganese, if the original granulated iron does not contain a sufficient dose of this latter

metal, the Uchatius steel is made. The production is not inconsiderable, and the article finds a market at Gefle, principally in the form of a bar steel of small dimensions, at a price of 30s. to 35s. per cwt. Uchatius' process would have become a practical success in England, had it not been swept away by Mr. Bessemer's invention before it had time to establish itself in practice. The steel manufacturers of this country and the public at large have all reason to be satisfied with the historical coincidence of the two inventions, since there would otherwise, and had Bessemer followed behind Uchatius, have been two revolutions to be passed through instead of the one which has taken place. We should have had to change from the old mode of steel conversion to the Uchatius process, and ultimately again from that to the Bessemer process.—*Engineering.*

Mushet's Process of Cast Steel Manufacture.

In the manufacture of cast-steel by the ordinary process of melting either blister steel or scrap steel, or mixtures of materials which when melted produce cast-steel, it is customary to add to the steel or mixture of steel-producing materials constituting the charge of each melting pot or crucible a few ounces of peroxyd of manganese as a flux. The peroxyd acts as a flux, and likewise improves the tenacity and ductility of the cast-steel produced when heated and forged, and materially increases the capability of the said cast-steel to bear a high degree of heat without cracking when being forged or rolled.

Mr. Robert Mushet's improved process consists in employing as a flux, in place of peroxyd of manganese, chromate of iron, oxyd of chrome, or an artificial mixture of chrome-oxyd and oxyd of iron. But as natural chromate of iron answers perfectly for this process, and is far cheaper than chrome-oxyd or artificial mixtures of chrome-oxyd and oxyd of iron, the inventor prefers to use the natural chromate of iron. Chromate of iron is a mineral found abundantly in nature, and consisting essentially of the oxyds of chrome and iron. The chromate of iron employed is that which is most free from gangue, veinstone, and likewise free from sulphur and phosphorus, which latter are sometimes found associated with chromate of iron. The chromate of iron is prepared for this process by pulverizing or by breaking into small pieces. Or it is used in the granulated state, in which it is frequently found in nature.

To the charge of steel or of steel-producing materials which it is intended to melt into cast steel, and which charge usually amounts to from forty to fifty pounds avoirdupois for each melting pot, more or less, Mr. Mushet adds from three to six ounces of chromate of iron, but he does not confine himself to the specific quantities of chromate of iron. The chromate of iron is introduced into the melting pot along with a charge of steel or of steel-producing materials which it is intended to melt into cast-steel, and for the sake of convenience the chromate is wrapped in a piece of paper and dropped into the melting-pot along with the steel or mixture of steel-producing materials. The chromate of iron may nevertheless be introduced into the melting-pot subsequently to the introduction and melting or partially melting of the steel or steel-producing materials, but it is found to be convenient to introduce the chromate along with the steel. When the steel and chromate of iron are melted into cast-steel the melting-pots are withdrawn from the furnace, and the cast-steel is poured into ingot-molds in the usual manner.

Example No. 1: Take cast scrap-steel ingot tops or steel bar ends 40 pounds, and chromate of iron pulverized 6 ounces. Introduce these materials into a melting-pot, and when the steel is melted withdraw the melting-pot and pour the melted steel into an ingot-mold. *Example No.* 2: Take spring steel-scrap 38 pounds, spiegeleisen 2 pounds or 3 pounds, chromate of iron pulverized 6 ounces, and proceed as in example No. 1. *Example No.* 3: Take hard converted bars 40 pounds, chromate of iron 6 ounces, and proceed as in example No. 1. It is not necessary to employ oxyd of manganese or any other flux in this process, except chromate of iron, these other fluxes not being essential to the success of the process. They may, however, be occasionally used without any injurious effect. This process not only increases the ductility and tenacity of the cast-steel produced by it when the said cast-steel is heated and forged, but it also prevents or materially diminishes the shrinkage, or what is termed the "piping," of the cast-steel ingots, thus saving much waste. The bars of steel also which are forged from ingots of cast-steel produced by this process are (when the cast-steel has been thoroughly melted in a workmanlike manner) free or nearly free from those serious imperfections technically called "rokes" or seams; and, lastly, cast-steel thus prepared is wholly or nearly free from the defect of what is termed "water cracking" when hardened. — *Mechanics' Magazine.*

Malleable Cast Iron.

Malleable cast iron, as has been proved by the careful experiments of M. Tresca, has a coefficient of elasticity and an elastic limit equal to that of good wrought iron. For a repetition of complicated articles difficult and expensive to forge, we cannot imagine a better material; and there can be no doubt that malleable cast iron has not yet had justice done to it by the engineer. Though its manufacture is getting rather widely spread on the continent and in England, it is yet in the hands of comparatively few people, and is in fact, almost a secret. The most noted English malleable cast iron founder is Mr. John Crowley, of the Kelham Works, Sheffield, and of Manchester. A bar of his manufacture, five-sixteenths of an inch in diameter and about a foot long, with a fracture like steel, is now before us. Few would guess that large quantities of such rods are cast to make the common fish-tail gas burners by cutting them up and turning and boring them in the lathe.

The discovery of the process of making cast iron malleable is ascribed to Samuel Lucas, whose specification describes the chief features of the mode still adopted in the manufacture. Dr. Percy has pointed out that Reaumur, as long ago as 1722, published this process. The difference between the positions of Reaumur and the Lucases—Samuel and Thomas—in the matter is, that Reaumur never carried out the discovery on a commercial scale,

and that he left this to be done by the Englishmen. In any case, Reaumur seems to have preferred the use of a mixture of chalk or of calcined bones, and not red ore, for decarbonizing the metal.

The pig iron used in the manufacture of malleable cast iron must be free from phosphorus and sulphur. The best materials are hence Swedish and Styrian pigs, made with charcoal from the purest ores. The last kind is used in the southern parts of Germany, but its price makes it impossible to employ it in England or even in northern Germany. The most usual material is hence pig iron made with coke from the hematite ores of the Cumberland districts. A small proportion of Swedish pig is sometimes, but probably very rarely, added. The pigs with the whitest fractures are preferably employed for larger castings, and those with a grayer fracture for smaller articles. As is usual in these cases, the proportions of the mixtures used are made a mystery by the different makers, but there can be little in this, as different establishments use pigs with different brands and varying mixtures. The principal thing is evidently to have as little phosphorus as possible. Some yeas ago a patent was taken out in France for mixing in the crucible from two per cent to seven per cent of red copper with the cast iron intended to be made malleable, in order to give it more fusibility, and to obtain castings with a better surface. We are not aware, however, whether this plan has been much adopted.

The pig is usually melted in crucibles, sometimes of plumbago, and holding about fifty or even sixty pounds—the usual size of steel crucibles—which, in the ordinary method of pouring out by hand, is determined by what an ordinary man can lift. The crucibles are covered up, in order to prevent the access of impurities from the coke, with a consequent waste in skimming the fluid metal. As with the crucibles, the furnaces used are generally those employed in melting pot steel, being from two to three feet square, and holding four crucibles. No blast is used, as the resulting saving in time would be counterbalanced by the increased consumption of coke In this part of the process the principal point is to attain as high a temperature as possible for pouring the metal into the mold. The melter mostly tells this by dipping a red hot iron bar into the crucible, on withdrawing which the fluid iron should spring off in sparks. The crucible is then taken up by a pair of tongs, and, after skimming the surface of its contents, it is emptied as quickly as possible.

The molds are made in green or in dry sand in the usual manner, but great care has been taken with the small and complicated details, the molding of which forms the most economical application of malleable cast iron. These are best cast together and broken off when cold. With heavier and more complicated castings it is very important carefully to determine where to place the feeders for forming, so to speak, reservoirs for holding the extra fluid metal intended to follow up the shrinkage. If this be neglected, small cracks are produced, which are completely visible under the subsequent operation of annealing. Such feeders must not be placed at any sudden changes in shape of the casting, such as at any corners—*e. g.*, at the pins cast on levers, and so on. The castings produced are remarkably brittle, and many wasters are produced in cleaning them. This operation is best done when they are thoroughly cooled down. To delay this till after the annealing process would of course be attended with the obvious difficulty of having to deal with a tough, mealleable material. It is also important to take the castings out of the molds as soon as possible, in order to avoid the production of cracks, as the shrinkage in cooling is considerable. In fact, almost double the usual allowance for shrinkage must be made in the patterns, though this sometimes varies, as might be expected, with the mixtures employed. The molding boxes are either set quite vertical or at a considerable inclination. The first position is always employed with smaller castings. The moulding should be done very neatly, in order to save as much as possible any cleaning after annealing.

The last and the most important, difficult, and expensive process is decarbonizing or annealing the castings. They are placed, together with powdered hematite or red ore, in cast iron cases or muffles, and kept at a high temperature for a long time. These boxes, cast with sides about an inch thick, either have covers or are piled in the furnace one above another, any openings or cracks being luted with clay. Only round muffles were used at one time, but square boxes are now employed. The castings are packed in these boxes with alternate layers of hematite ore, which is placed so as to form both the bottom and the top layer. In packing the boxes with hematite care must be taken that thin and thick castings do not come together. The boxes containing the larger ones must also be set in the furnace nearest to the fire, and those with the smaller articles in the hinder part. If this is not done, in the first case the smaller castings are burnt, and in the second the larger ones get only half decarbonized.

The decarbonizing furnace is simply constructed; the grate is in front, and the fire gases are induced between the boxes placed in the hinder part of the furnace. Or they may consist of square chambers with an inlet at the side from a door for charging and discharging; and with a bottom divided into longitudinal rows, between which are placed two or three narrow gratings extending the whole length of the furnace. The flues open from two places in the roof. A damper at the side serves to watch the firing, which must be done with great care and any access of air to the castings prevented. On lighting the fires the temperature is raised to a bright red at the end of twenty-four hours; this heat is then regularly kept up for three, four, or even five days, according to the size of the castings and the amount of annealing it is wished to give them. At the end of that time the fire is allowed to fall and the temperature to diminish during twenty-four hours; when the furnace can be opened and discharged. The boxes are then unpacked and their contents cleaned. The annealing operation is a very delicate one. With too high a temperature, should the hematite be not mixed with a sufficient proportion of previously used ore, or should the air make its way in, the castings are most likely burnt. An unequal or a too low temperature has for result an imperfect decarboniztaion and brittle castings. The most considerable expense in this manufacture consists in the

renewal of the cast iron cases, which easily crack under the heat, and cannot be used more than once.—*The Engineer.*

Cheap Manufacture of Oxygen.

Few things would have more important results in chemical technology than the cheap manufacture of oxygen gas. We have always kept our readers informed of the various methods proposed for attaining this desirable object; and we mentioned several months ago the process of MM. Tessie du Motay and Marechal. Having seen the operation in progress, we are now able to speak of its actual results. Arrangements are being made at the Hotel de Ville, at Paris, for the supply of oxygen, as a substitute for atmospheric air, to the gas burners used for illumination throughout the building. The generators and gasometers are already placed in the cellars: and it has been ascertained that the employment of oxygen causes the brilliancy of the light to be eight or ten times greater. The oxygen, it will be remembered, is derived from the decomposition of manganate of soda; and the apparatus for effecting this is simple and not expensive. In the first place, there is a boiler in which steam is generated at a moderate pressure. The steam is then passed through an ordinary super-heater, a worm set in a furnace. From this it passes into a retort in which the manganate of soda is kept at a dull red heat. Here the decomposition is effected, and the steam and oxygen pass on to a refrigerator in which the steam is condensed, while the oxygen passes on to a gas-holder. When the evolution of oxygen ceases the steam is shut off, and a current of atmospheric air is passed through the retort by which the manganate of soda is regenerated. Thus the operator starts with a charge of manganate (1 cwt. in the experiments under description) which never wants renewal. The charge of manganate in actual use, after over 80 re-oxydations, yields about 100 gallons of oxygen per hour, the cost of which is mainly the cost of the fuel consumed. A little carbonic acid is disengaged with the oxygen, but it has not been found necessary to separate this. One useful application of oxygen is shown at the same spot in a modification of the Drummond light. A mixture of oxygen and coal-gas is burned, and a flame is made to impinge on a cylinder of magnesia agglomerated by chloride of magnesium by the process of M. Carlevaris. These cylinders are very compact and lasting, and are the very best we have seen produced for similar purposes. The light given, we need hardly say, is very intense, and the method promises to receive extensive applications in Paris.—*Mechanics' Magazine.*

Ammoniacal Gas as a Motive Power.

The idea of using ammoniacal gas as a motive power in place of steam has been entertained by many inventors, but has never before, we believe, been successfully carried out. A few years ago, MM. Tellier and Flandrin proposed to propel omnibuses through the streets of Paris, by its means. They started, or proposed to start, with a vessel of the liquified gas, and supposed that when this was opened, by turning a tap, the gas would be condensed, and a vacuum formed, and the piston driven back by atmospheric pressure. Our readers will thus see that the principle of an ammonia engine is pretty much the same as that of Newcomen's steam engine. The plan, if at all feasible, is obviously better suited for stationary than locomotive machinery, and the most reasonable application of ammonia has been made by M. Fremont, who proposes to work a pump by its agency. His engine differs somewhat from that of M. Tellier, inasmuch as he drives the piston in both directions with the gas.

A recent visit to the Paris Exposition has shown us an engine of his actually at work—or, rather, in action, for it was not usefully employed—and driven by a mixture of steam and ammoniacal gas. Strong liquid ammonia is used in the boiler, and the vapor generated is said to be a mixture of at least 80 parts of ammoniacal gas and 20 parts of steam, so it may be fairly called an ammoniacal engine. The principal recommendations of ammonia when applied as a motive power consist in the small amount of fuel required, and the short time it takes to get up the steam, so to speak. The economy in fuel is very great, being about one fourth of that required to generate steam alone. As regards the boiler, it may be of either of the ordinary forms, the only complete novelty being the apparatus for condensing the steam and ammonia. The gas disengaged (about six atmospheres at 110° cent., with an ordinary solution of ammonia) does its work in the cylinder and then escapes into the tubes of a condenser, where the steam is condensed and the gas is cooled. The gas then meets with water from an injector which dissolves it, and the solution is carried on into a vessel called the "dissolver," from which it is pumped back into the boiler to do its work over again. The water for the injector is taken from the boiler, and is cooled before meeting with the ammoniacal gas by passing through a worm surrounded with cold water. These arrangements are necessarily a little complicated, and could not be fully understood without drawings. It is, however, satisfactory to see that an ammonia engine is a possibility, and thus power is obtainable where fuel and water are both scarce.—*Mechanic's Magazine.*

Birkhols' Metal.

We see it stated in the papers that A. Birkhols, formerly of Colt's factory in Hartford, the inventor of a metalic composition resembling brass, for the manufacture of which a company has been formed in Providence, R. I., with a capital of $300,000, has sold his patent to them for $40,000 of the stock, three cents duty on every pound manufactured, and a salary of $4,000 for superintending the manufacture.

The following is a copy of the patent:—

Be it known that I, Alexander Birkhols, of the city and county of Hartford and state of Connecticut, have invented or discovered certain new and useful improvements in the composition of cast metal, by means of which greater strength is acquired, and I do hereby declare that the same is described in the following specifications.

So as to enable a person skilled to make the same, I will therefore proceed to describe its component parts, the essential ingredient of which is cast iron. To make one hundred pounds of this composition, I first take two pounds of cast iron,

two ounces of charcoal, put into a crucible and heat to a white heat. I then add thereto sixty pounds of copper. Heat till both are melted together, then add four ounces of borax and thirty-eight pounds of zinc.

The mode of proceeding during the melting is much the same as with all other metals melted in crucibles. When melted it may be poured into molds or bars suitable for the forge or rolling mill. Its strength is estimated to be eight thousand pounds greater to the square inch than the best wrought iron, rendering it far more valuable for various purposes.

The proportion of parts may be varied, which will only change proportionably the desired effect, viz., greater amount of strength and solidity; but I believe that the proportions about as described will be best for all practicable purposes. I have described its component parts and the mode of proceeding to produce my improved composition, so as to enable a person skilled to make the same.

What I claim therefore, and desire to secure by letters patent, is the introduction of cast iron into a composition composed of copper and zinc in about the proportion, substantially in the manner as described.—*Scientific American.*

Mysteries of making chewing Gum.

A great many American girls as well as boys have acquired the particularly disagreeable habit of chewing gum. We will tell them how gum is made:—"The greatest gum-manufacturing establishment is at Podunk, Mass.; and the fame of the gum (and the gum itself) is 'in the mouths' of many. One of the employees of that establishment, who has become thoroughly initiated into the mysteries of the manufacture of the gum, was recently discharged from the establishment, and has divulged the mode of making the gum which these young Americans masticate with such velocity and apparent satisfaction. The gum is made of certain parts of gum-arabic, gum-tragacanth, a small quantity of resin and *fat*. The fat used is not lard (that being too expensive), but it is a substance expressed from the bodies of hogs, cats, dogs, and other animals found dead in the streets of cities. After the various ingredients are melted together in a huge kettle, a certain kind of alkali is put in, for the purpose of whitening the gum. This alkali is the same that is used by dyers with indigo to give a deep permanent blue to flannels."—*Exchange.*

Glycerine Soap.

Hitherto, in order to manufacture soaps containing glycerine, and having a more or less transparent character, ordinary soaps had been shredded and dried and then dissolved in alcohol. With these alcoholic solutions comparatively small proportions of glycerine have been mixed or combined, and then the alcohol has been distilled or driven off by heat.

An invention patented by Mr. George Payne, of the Belmont Works, Battersea, London, consists in a mode of manufacturing what are termed "transparent soaps," by which comparatively large proportions of glycerine may be combined with the soaps employed, and at the same time the costly process of dissolving dry soaps in alcohol dispensed with. For these purposes common soaps are shredded and are then introduced into or immersed in glycerine and subjected to heat for several hours, by which the soaps are dissolved. The ingredients are stirred from time to time in order that the mixture or combination may be complete. In carrying out this invention, Mr. Payne uses what are known as "fitted" soaps; they may be taken either in the fluid state as they come hot from the coppers, or the soaps may be shredded after being framed, but other soaps, however made and in whatever condition, may be used in place of fitted soap. He places 5 cwts. by weight of the soap in a copper heated by a steam jacket which surrounds it, and mixes therewith an equal part by weight of distilled glycerine; the ingredients are kept heated and are stirred from time to time until the whole of the soap is dissolved, which usually takes from eight to ten hours. The clear solution is then run off and framed in the usual manner, and it may afterwards be cut up into bars andsquares and stamped to any suitable shapes.—*Mechanics' Magazine*

The Creusot Works (France), and Industrial Education.

Creusot may be said to form a kind of model manufacturing community, all placed under the direction of a single individual or firm, and consisting of 24,000 inhabitants.

The number of workmen employed is 9,950; the steam power is equal to that of 9,750 horses. There are coal mines which produce 250,000 tons annually. There are iron mines, which produce 250,000 tons of minerals per annum; and the annual production of cast iron is 130,000 tons But it is not in the mere production of raw material that this company expends its skill. It converts its cast iron into all the forms of wrought iron employed in the manufacture of machinery, or in the construction of large engineering works. In the course of the year it turns out 100 locomotives, or about two a week. Although situated far inland, with no direct temptation to undertake naval engineering, it exhibits numerous examples of marine steam engines (one of 950 horse power nominal—upward of 5,000 actual) for the iron-clad ships of the French navy.

It seems, that, from their earliest childhood, the children, boys and girls, of the workmen at this immense establishment, are educated and trained in schools organized by M. Schneider. So far from the education which they receive putting the workman above his work, the contrary is the case; it enables him to do it more to the satisfaction of his employer, and to his own honour, and personal advancement.

The system of the instruction given at the Creusot schools is fully detailed in tables hanging on the walls of the Great Exhibition; drawings of the habitations of the workmen, their churches, their hospitals, and their schools, are also exhibited.

Statistical tables illustrate the progress and changes of the population; these are divided into two parts—the one shewing the progress of their material welfare, their accumulation of property, and their consumption of food and luxuries; the other showing the amount of attendance at schools the relative statistics of individual success in these schools, and the subsequent rank attained by each

pupil in the manufactories. From these we gather that the progress of education has always been followed by improved moral character and advanced social being; that the pupils who have most successfully availed themselves of the technical schools are those who have afterward risen to the highest ranks as foremen, clerks, superintendents, overseers and engineers, in the works themselves.

Statistical Information.

THE COAL PRODUCTION OF ENGLAND.

COAL RAISED IN ENGLAND FOR TWELVE YEARS.

Years.	*Tons.*	*Years.*	*Tons.*	*Years.*	*Tons.*
1855..	64,453,079	1859..	71,979,765	1863...	83,292,515
1856..	66,645,450	1860..	84,042,698	1864...	92,787,873
1857..	65,394,707	1861..	83,635,214	1865...	98,150,587
1858..	65,008,649	1862..	81,638,338	1866..	101,630,543

COAL EXPORTED DURING THE SAME PERIOD.

1855	4,976,902	1861	7,855,115
1856	5,879,779	1862	8,301,852
1857	6,737,718	1863	8,275,212
1858	6,529,483	1864	8,809,908
1859	7,006,949	1865	9,189,021
1860	7,321,832	1866	9,916,244

Consequently, the coal used in England during this time, was

1855	59,476,177	1861	75,780,079
1856	60,765,671	1862	73,336,486
1857	58,656,889	1863	80,017,303
1858	58,479,166	1864	83,977,965
1859	64,972,816	1865	88,961,566
1860	76,720,866	1866	91,714,299

The above tables show increase in home consumption, during the last twelve years, 54 per cent.; ratio of increase since the great discussion in Parliament on this subject, 14 per cent.

Sewing Machine Facts.

The following interesting statistics we gather from the quarterly returns, made, we believe, under oath, by the several manufacturers of sewing machines throughout the United States. The figures which we present, and which we have been at some pains to collect, show at a glance the wonderful growth and great importance of this branch of American manufactures. It will be observed that one company alone has produced and sold within the year over *forty-three thousand sewing machines.* It is somewhat remarkable that, during the recent stagnation in trade, this business has been but slightly, if at all, affected. But below are the figures in detail:

Sewing machines manufactured and sold, as per quarterly returns, for the year ending June 10, 1867.

Double-Thread Machines:

The Singer Manufacturing Co.	43,053
The Wheeler & Wilson Mf. Co.	38,055
The Grover & Baker S. M. Co.	32,999
The Howe Machine Co.	11,053
The Florence S. M. Co.	10,534
The Weed S. M. Co.	3,638
The Elliptic S. M. Co.	3,185
The Ætna S. M. Co	2,958
The Finkle & Lyon S. M. Co.	2,488
The Empire S. M. Co.	2,121
The Leavitt S. M. Co	1,051
Total double-thread machines	151,135

Single-Thread Machines;

The Wilcox & Gibbs S. M. Co.	14,152
The Shaw & Clark S. M. Co.	2,692
The Goodspeed & Wyman S. M. Co.	2,126
Total single-thread machines	18,970
Total of both kinds	170,105

—*Financial Chronicle.*

The Central American States.

The Hartford *Courant*, U. S. says:—

The large profits of the Panama Railroad revive every now and then certain old projects for the construction of another railroad or the canalization of Central America. There can be no doubt that had the people of the region which lies between Mexico and South America been possessed of ordinary commercial activity, two or three well traveled routes would ere this have been opened from ocean to ocean. But like the inhabitants of other portions of Spanish America, they have been too busy with revolutions and political squabbles to find any time or energy to devote to industry or trade. The five Central American republics all achieved their independence about 1821, and in 1823 formed themselves into a confederation, which lasted until 1839, when it fell to pieces and all the members set themselves up as independent powers. The largest one is Nicaragua, which is about the same size as Georgia; its capital is Managua, with ten thousand inhabitants; its total population is about four hundred thousand, of whom thirty thousand are whites, ten thousand negroes, and the remainder Indians and half-breeds. The next in size is Honduras, having about the same area as Mississippi; its capital, Comayagua, has eighteen thousand inhabitants; its total population is about three hundred and fifty thousand souls. Guatemala is the third of the Central American republics, being a little larger than Ohio; the name of its capital is also Guatemala, with forty thousand inhabitants; the total population is estimated at one million and one hundred thousand, or greater than that of all the isthmian powers together. Costa Rica is the next in size, its area being somewhat more extended than that of West Virginia; its capital San Jose, contains thirty thousand souls; its total population is one hundred and twenty thousand. The smallest of these powers is San Salvador, which does not cover quite as much ground as Massachusetts; its capital is also styled San Salvador and its inhabitants number perhaps fifteen thousand; the whole population is believed to reach six hundred thousand. The existing constitution of Nicaragua was adopted in 1858, of Honduras in 1865, and of Guatemala in 1847. The presidents of all the republics serve four years—unless they are overthrown by a revolution—except the executive of Costa Rica, whose term of service is three years. The term Central America is generally considered to include beside the five republics, the state of Yucatan, in Mexico, and the state of Panama in Columbia.

Tobacco produced in the United States

It is estimated that in the year 1866 the enormous amount of 330,561,500 lbs. of tobacco was grown and manufactured in the United States. At present, Virginia produces a larger quantity than any other State, the amount of last year's crop being estimated at 70,000,000 lbs., or more than one-fifth part of the whole. Next in order follows Kentucky with 69,000,000 lbs.; Maryland with 35,300,000.; North Carolina with 35,000,000.; Tenessee with 29,500,000.; and Ohio with 26,000,000. The total amount above given shows a falling off from the amount raised in 1860 of about 104,000,000 lbs., nearly the whole of this difference ocurring in Virginia and Kentucky. This deficit was of course caused by the late war. The total amount divided amongst a population of 35,000,000, gives rather more than 9 lbs. to each person.

Miscellaneous.

Kerosene Lamp Explosion.

Recently, as Mr. Nathan Todd and wife, of Rowley, Mass., were retiring, the latter attempted to blow out the light, which immediately communicated with the kerosene, causing an explosion. Mrs. T. was in her night dress, which took fire, burning her severely. Mr. T. at length smothered the flames and extinguished the fire, but not until he as well as his wife was badly injured. The accident arose from blowing the flame down into the lamp.—*Newburyport Herald.*

Blowing down the chimney is a very poor way of extinguishing a lamp. It requires a good deal of dexterity and a considerable amount of breath. It should never be resorted to except the object be to blow up the lamp. The easiest way of extinguishing a lamp happens to be the safest; turn the wick down pretty low and give a slight puff at the bottom of the chimney.—*Scientific American.*

Death in the Bottle.

A singular explosion case is reported by the engineers of the Manchester Boiler Association. An earthenware bottle of about a quart capacity was used, when full of hot water, as a bed warmer. After filling it on a previous occasion, the cork was tied down with a waxed end. When the bottle was next brought into requisition, instead of being emptied of its cold water and refilled with hot, it was put all tightly corked, into the oven of a kitchen range, to be heated up entire. In a short time a violent explosion took place, the bottle was burst, and pieces of the oven door were thrown into the room with such violence as to instantly kill one person, and seriously injure two others.

New Nomenclature of Diseases.

The result of labors extending through several years, of committees appointed by the London College of Physicians appears in a new nomenclature and classification of diseases. This work has been prepared voluntarily and gratuitously, and will henceforth be used by the medical departments of the English Army and navy. Each title is translated into the Latin, French, German, and Italian languages, so as to come into general use abroad as well as at home. In the new nomenclature the utmost precision of language consistent with intelligible simplicity has been aimed at and attained, The first necessity of sanitary records, is that for statistical and scientific purposes the same thing shall be always signified by the same title. The above mentioned work furnishes the means by which this end may be attained, and coming from so high an authority, its acceptance as a universal standard, seems certain.

The Way to Health.

The only true way to health is that which common sense dictates to man. Live within the bounds of reason. Eat moderately, drink temperately, sleep regularly, avoid excess in anything, and preserve a conscience "void of offence." Some men eat themselves to death, some drink themselves to death, some wear out their lives by indolence, and some by over exertion, others are killed by the doctors, while not a few sink into the grave under the effects of vicious and beastly practices. All the medicines in creation are not worth a farthing to a man who is constantly and habitually violating the laws of his own nature. All the medical science in the world cannot save him from a premature grave. With a suicidal course of conduct, he is planting the seeds of decay in his own constitution, and accelerating the destruction of his own life.—*Scientific American.*

The Diet of Moles.

A champion for these indefatigable excavators has been found in a Mr. Weber, one of the *savans* of Zurich, Switzerland. This gentleman examined the stomachs of a number of moles caught in different localities, but failed to discover therein the slightest vestige of plants or roots; whereas they were filled by the remains of earthworms. He shut up several of these animals in a box containing earth and sod with growing grass and a smaller case of grub or earth worms. In nine days, two moles devoured 341 white worms, 193 earth worms, 25 caterpillars, and a dead mouse. Fed with a mixed diet of raw meat and vegetables, the moles ate the meat and left the plants; and when vegetables exclusively were dealt out to them, in twenty-four hours both died of starvation.

Causes of Acute Bronchitis.

In our climate, both forms of the disease are very common. The essential feature of the disease consists in an inflammation of the bronchial tubes, and is commonly produced by cold and moisture, applied generally or locally, as by means of damp clothing, or exposure to a cold, moist, variable atmosphere, especially, after the body has been overheated by exercise or crowded rooms, or the inhalation of metallic dust or gases. Dr. Charles T. Jackson, the distinguished chemist of Boston, nearly lost his life on one occasion by an attack of acute bronchitis, caused by the sudden inhalation of chlorine gas. Ipecac, in powder, when inhaled by some individuals, will cause bronchitis. The dust of newly cut hay, and the

pollen of the rag weed, in some persons will produce the same effect; also the flowering of roses, and the inhalation of dust, exhaled from the foliage of growing plants and trees. Hooping cough is no doubt a certain form of bronchitis, induced by a specific morbid poison directly on the bronchial mucous membrane.

A very severe form of bronchitis often accompanies some of the eruptive fevers, measles, scarlatina, and small-pox, constituting a most dangerous and sometimes fatal complication. In measles, the recession of eruption is frequently followed by a great increase in the bronchial disorder, which is announced by the great increase of cough, and sudden oppressive dyspnœa. From the suddenness of the production and disappearance of the latter symptoms, which is occasionally observed in the cases, it has been suggested, that it is possible they may be rather congestive, than inflammatory, although if the congestion continue, bronchitis is the final result.

There are also many chronic diseases which may be said to favor the developement of acute bronchitis, these are Bright's disease of the kidneys, and diseases of the heart and lungs. It often occurs during the progress of pulmonary tuberculosis, and sometimes proves very fatal to the patient.—*Med. & Surg. Rep.*

First Discovery of the use of Coal.

The Belgians claim to have been the first to discover the use of coal, and this discovery, they say, was made by one Hullos, a blacksmith, of the village of Pienevaux, near Liege, in the year 1049, from whose name they derive the word "houille." Coal was first used as fuel in London in the latter part of the thirteenth century; but the smoke was considered so injurious to the public health that Parliament petitioned King Edward I. to prohibit its burning as an intolerable nuisance. He complied, and issued his proclamation against it. The most severe measures were then employed to abolish its use—fines, imprisonment, and the destruction of furnaces and workshops where it was used.

Animal Grafts.

Plastic surgery recognizes life in a part and grafts one part of the body on another, or replaces a portion of a nose or a finger when lopped off, and witnesses its continued growth. In lower animals this principle is more astonishingly developed. Cut a polyp into a dozen pieces and each fragment will develope itself into an independent and perfect type of the species. A French naturalist, M. Vulpain, cut off the tails of tadpoles, and saw them not only live but grow for ten days, indifferent to all theories of nervous centers, digestive apparatus, or circulatory systems. But the member that seems to have the strongest dose of the "vital principle," is the tail of a rat. This is the very ideal of life, and here, if anywhere, we ought to locate the seat of vitality. The following experiment was made by Mr. Bert. He dried a rat's tail under the bell of an air pump, and in immediate proximity to concentrated sulphuric acid, so as gradually to deprive it of all moisture. Then he placed it in a hermetically sealed glass tube for five days. At the end of this time he subjected it for a number of hours to a temperature of 98° Cent. in a stove, and subsequently sealed it a second time in his tube. Four days more having elapsed, he united this tail by its cut extremity, to the freshly cut stump of a living healthy rat, and quietly awaited the result. His success was as complete as it was marvellous. It commenced to expand and perform the natural duties of a tail, and three months afterward he demonstrated by a second amputation, and a careful injection, that it was furnished with proper vessels and was a living part of the second rat!

What rich lessons practical surgery may learn from such experiments, can be imagined. A careful anatomist has transplanted a fragment of bone from the skull of one rabbit to the skull of another, and found it form adhesions and replace the lost portion perfectly. A piece of periosteum taken from a rabbit twenty-four hours after death, grew and produced bone when grafted neatly on a living animal of the same species. Nerves also have been removed from one body to another with success, and some very singular results noticed where a portion of a motor was excised and supplied by a fragment of a sensory filament. The diseases to which grafted members are subject, after they have been exposed to certain re-agents, are also full of hints for the pathologist and the physician. —*Medical and Surgical Reporter.*

Artificial Digestion.

A London physician, Dr. Marcet, has announced a process by which natural digestion is simulated by artificial means, and solid food may thereby be prepared for invalids. Dr. Marcet takes fifty-eight grains of muriatic acid having a specific gravity of 1·1496; fifteen grains of pepsine—the organic principle procured from the stomach of a pig or other animal. Diluted in a pint of water and added to a pound of raw meat, the whole is allowed to simmer over a water bath, at about the temperature of the body, 98° F. When the meat is by this means sufficiently broken up, it is strained and the acid neutralized by eighty-one grains of bicarbonate of soda. The product is of a most agreeable character, easily digested and vastly more nutritious than beef ea. Where pepsine cannot be obtained, the doctor has found strips of calves' stomachs answer very well.

Time required for seeing the Exposition.

To view the Paris Exhibition (according to an English writer's calculation), it is necessary to devote on an average five minutes to the glass case of each exhibitor. These number, it is stated, 45-000; it would, therefore, take 225,000 minutes, making 3,750 hours, or 156 days 6 hours; that is, 5 months, 6 days and 6 hours, reckoning 24 hours for each day. But as the interior of the place can only be visited from 10 o'clock in the morning till 6 in the evening, there at only 8 hours at the visitor's disposal instead of 24. One would therefore be occupied in the inspection 15 months, 18 days, 18 hours, supposing that he entered the building every day at 10 o'clock and did not leave it until 6. From this calculation it will be obvious that it is by no means possible to examine the whole of the exhibition during the period of its duration.