THE JOURNAL
OF THE
Board of Arts and Manufactures
FOR UPPER CANADA.

AUGUST, 1865.

PROVINCIAL EXHIBITION.

In a little less than two months the exhibition of the Agricultural Association of Upper Canada will be held, in the city of London, commencing on Monday the 18th of September. It is to be hoped that manufacturers and artists who are intending to exhibit their productions—and we trust a very large number will do so—will not be behind time in their preparations.

The "Prize List," and "Rules and Regulations," and printed forms for entries, are published, and may be had of secretaries of Agricultural Societies and Mechanics' Institutes, free of charge.

Entries for all live animals must be made on or before Saturday the 12th of August; Grain, and other Farm Products, Agricultural Implements, Machinery and Manufactures generally, by Saturday August 26th; Horticultural Products, Ladies' Work, and the Fine Arts, by Saturday September 9th.

We would impress on exhibitors the necessity of having their entries made by the dates above specified; and particularly would we urge upon them the desirableness of having all articles in the *Arts* and *Manufactures* department on the grounds, as far as possible, on the Saturday previous to the show, but certainly not later than the noon of Monday the 18th of September, as the officers in charge require as much time as possible in arranging the goods so as to properly classify them, and have them ready for the judges on the Tuesday morning. Exhibitors frequently complain of their articles being placed in improper positions; but this is unavoidable when goods are brought in only just before or during the time the judges are proceeding to their duties. An improvement in this respect, on former years, is highly desirable.

Heretofore the judges in the Arts and Manufactures, and Ladies' Department, have had the greatest difficulty possible in gaining access to the goods in such a manner as to be able to arrive at satisfactory conclusions, especially in cases of close competition, owing to the main building being crowded with visitors at the time of the performance of their duties. We are happy to notice that this will not be the case at the coming show, as the Council of the Association have *wisely* determined that the main building shall be closed to all but the judges and necessary attendants, during the whole of Tuesday the 19th.

The issuing of members' tickets, or badges, good for the whole show, has heretofore been sadly abused; one ticket being often made to serve for the introduction of a number of persons to the grounds, by methods well known but not easily prevented. It has therefore been determined to issue no more of such tickets, but instead:

"Each member, on paying his subscription, will be furnished with four small admission tickets, each of which will admit the holder once, and must be given up at the gate on passing into the grounds. By economy in the use of these tickets, they can be made to last during the Show; but if a member shall have used them all, and still desires admission, he will have to purchase a single admission ticket in the same manner as a non-member. Life members will be furnished, as heretofore, with tickets admitting them during the Show. Delegates from Societies, and members of the Press, will also be furnished with complimentary admission badges or tickets, as heretofore.

"The entry tickets upon animals or articles will admit the person bringing them to the Show grounds for exhibition, along with such animals or articles, without the use of any other ticket. Afterwards such parties must be provided with proper admission tickets.

"Necessary attendants upon stock and articles belonging to exhibitors will be furnished with admission tickets with their names written upon them, which ticket will be good at the *Exhibitors' Gate only*, during the Show."

The Association will make the most favourable arrangements possible with the steamboat and railway proprietors, for carrying articles and passengers at reduced rates, which will be duly announced to the public.

Very few changes have been made in the prize list, from last year. Some few articles heretofore shown as extras have been placed in regular sections, and a few new ones also added. We refer all interested to the printed list, and also ask particular attention to the following

Programme for the Week.

1. MONDAY, Sept. 18th, will be devoted to the final receiving of articles for exhibition, and their proper arrangement. None but officers and members of the Association, judges, exhibitors, and necessary attendants will be admitted.

2. TUESDAY, 19th.—The judges will meet in the

Committee Room at 9 A.M.,* and will commence their duties forthwith. On receiving their class books, they will also be furnished with the blank prize tickets, which they shall fill up and affix in each section so soon as they shall have finally determined their awards. The First Prize Tickets will be Red; the second Blue; the third Yellow; the fourth White; Extras, Green. On completing the class the judges will report to the Secretary of the proper department. The main Exhibition Building will be closed all this day for the purpose of affording the judges an opportunity for discharging their duties properly. Non-members admitted to the grounds this day on payment of 25 cents each time. The ploughing match will take place this day within as covenient a distance of the exhibition grounds as possible.

3. WEDNESDAY, 20th.—The judges of the various classes will complete their awards as early in the day as possible. All the buildings and grounds will be open to visitors. Admission this day the same as yesterday. A public meeting will be held this evening in the Mechanics' Hall at 7 P.M., at which farmers generally and others interested in the progress of the Association are invited to attend.

4. THURSDAY, 21st.—Admission this day the same as yesterday. In the evening a meeting of Delegates will be held in the Mechanics' Hall at 7 P.M., preliminary to the Annual Meeting, for the discussion of subjects relating to the management of the Association, and for the nomination of Candidates for the offices of the Association.

5. FRIDAY, 22d.—The regular Annual Meeting of the Directors of the Association, for the purpose of electing officers, deciding upon the place of holding the next Exhibition, and other business, will take place at 10 A.M., in the Committee Room. The President will deliver the Annual Address at 2 P.M., after which the Exhibition will be considered officially closed, and exhibitors may commence to take away their property. Admission to-day the same as yesterday.

6. SATURDAY, 23d.—The Treasurer will commence paying the premiums at 9 A.M., Exhibitors will remove all their property from the grounds and building. The gates will be kept closed as long as necessary, and none will be admitted except those who can show that they have business to attend to.

* The Judges in the Arts and Manufactures Department will meet in the Secretary's Office, in the main building, at 11 a.m.

How can the less the greater comprehend?
Or finite reason reach infinity?
For what could fathom God were more than he.
—*Dryden.*

WASTE SUBSTANCES.

"Waste not! want not," is a homely saying, and a true one, which we have been accustomed to hear from our childhood. It is true of individuals, and no less true of nations. In Canada we have not yet learned to utilize the numerous waste substances that are to be found in civilized communities, to anything like the extent that it is done in older and more densely peopled countries; in some of which companies are formed who employ large numbers of those who would otherwise be destitute, in collecting Rags, Bones, Horn, Hair, Paper, Glass, Metals, Old Rope, and many other kinds of refuse.

In 1863 Canada imported cottons to the value of $4,264,025; Linen, $446,676; Cordage, $123,112; or, a total value of $4,833,813; and besides these there were imported ready-made clothing and other goods of fibrous material to an immense amount; and the same occurs annually. How much of each year's stuff of this kind, waste material, so far as human wear is concerned, finds its way to the paper mills of this or any other country? We fear but a very small proportion. House-keepers too often look upon the saving and selling of Old Rags as something that has an exceedingly penurious aspect. Did they but conceive the wealth there is stored up in these for paper material, they would be more provident of them. It is not merely their value as old rags that has to be estimated, but also the cost of all labour and machinery expended thereon, and the manufacturer's profit added thereto, which is all saved to the country.

As with Rags so with Bones. Like the inhabitants of all cold climates we, in Canada, are great meat-eaters, and consequently among our waste substances are great quantities of bones. These, when burnt in kilns and broken or ground, or manufactured into Phosphate or Super-Phosphate, constitute a fertilizer for land superior, probably, to any other known; and yet how few there are amongst us that store up bones for this purpose. Were they but preserved from pure philanthropic motives, we should have our reward in the number of poor and infirm people employed in collecting and disposing of them, and in being the means of furnishing the material for a cheap and superior fertilizer, enriching the land and the cultivator of it, and adding to the wealth of the Province. England imports annually from 70,000 to 80,000 tons of bones, representing a value of somewhere about $2,000,000; so that if we should not require for use all the bones collected, they might, in a manufactured state, become an article of export.

How much of Old Lead, Copper, Brass and Iron goes to waste from sheer negligence in not collecting it, while our founders in these various Metals have to import either the raw material or manufactured article from other countries.

What an amount of Oil, of the very best kind for dressing new and preserving Old Leather, or for use on the stone for edge-tools, and various other purposes, could be made from the feet of neat cattle; various fancy articles from their horns; Glue from the paring of the hide, and the tendons; and curled hair for the upholsterer from the tail.

What becomes of the carcases of our dead Horses? Mr. Mayhew of London, tells us that

"The following estimate has been made of the carcass of a dead horse, the average weight of which is from 12 to 13 cwt.:—

"Hair of mane and tail, 1½ lbs., used for hair-cloth, stuffing mattresses, and for making bags for crushing seed in oil-mills and other purposes. Fat, 20 lbs., used for lamps after distilling, and other purposes. Intestines, 80 lbs., for gut strings. Heart and tongue a mystery. Bones, 160 lbs., for knife-handles, phosphorus, super-phosphate of lime. Hoofs, gelatine, prussiate, for fancy snuff-boxes, Shoes, 5 lbs., used for shoes again, sold for old iron."

We fear that the poor Horse, in too many cases, so soon as dead is considered of no more value, and is put out of sight as speedily as possible.

In our manufactories and workshops how much waste and destruction of material takes place, from the want of system and order in the managers, or skill and care on the part of the workmen.

Economy and perseverance, and the utilization of every substance and thing that can be rendered of any practical value, are the principles upon which we must act, if we essay to be a prosperous people, a great nation. We have in our Canada broad Lands, rich Mines, magnificent Lakes and Rivers, a vigorous climate, a superior system of Government, and Civil and Religious Liberty; and if we only use these blessings that Providence has so bountifully bestowed upon us, wisely and well, we cannot but become a happy and contented people.

FLAX AND FLAX-COTTON.

In February 1863 the Congress of the United States appropriated the sum of $20,000 towards investigating and testing the practicability of preparing flax, so as to answer in certain cases as a substitute for cotton.

The commissioners entrusted with the investigation have presented their report, in a pamphlet of nearly one hundred pages. They have arrived at the conclusion that an unlimited amount of flax straw may be cheaply produced, and "adapted to the use of the manufacturers of coarse linens, and may also be prepared for combination with wool in a large class of fabrics, in the preparation of which it had already been introduced." It is gratifying to know that this is already being realized, to a limited extent, in Canada.

Very excellent specimens of coarse linens, bleached and unbleached, are now produced by Messrs. Perrine Brothers, of the County of Waterloo; and it is understood that Messrs. Gooderham and Worts of Toronto, in connection with the Messrs. Perrine's, are about to establish a large linen mill in the village of Streetsville. These parties are already extensively engaged in the cultivation and scutching of flax, and certain flax manufactures, and will no doubt be successful in their proposed new branch of operations. We believe, also, that linen yarns produced by Messrs. Perrine's, have largely taken the place of the cotton yarns heretofore used by our woollen manufacturers, in the articles of mixed cloths.

That linen is well adapted for this purpose we believe there is no doubt. It takes the colours in dyeing much more readily than cotton, and in strength it is far superior to the cotton warp. A Mr. McNally of the stark mills, Manchester, N. H., who had thoroughly tested the two in the manufacture of bagging, says: "From tests of strength I have made of the yarn, I find that the flax warp stood the strain of 20lbs. weight to three threads stretched 57 inches; while cotton warp broke at 5lbs." The United States Commissioners are of the opinion that fabrics made from flax and cotton, must not only be stronger when new, but more reliable for service.

Flax has been to a limited extent cottonized in Canada, a very nice specimen of which was sent home to the Dublin Exhibition. The Commissioners already referred to says in their report:

"The preparation of flax-cotton is not yet sufficiently developed to enable us to predict decidedly its ultimate success. If more time be given this commission or a new one for further investigation, greater progress will undoubtedly be made in the present year than has been accomplished during the entire period that has been given to the subject."

"A leading object of the appropriation having been to test the practicability of substituting the fibres of flax for cotton, on cotton machinery, and also of mixing them instead of cotton with wool, we have directed our attention particularly to such modes of assimilatining these fibres to cotton as

would, in our judgment, be likely to accomplish the desired results, and to such modifications of cotton machinery (wool machinery not requiring any change) as would best adapt it to the production of yarn from such assimilated fibres. There are very few mills of this kind in the United States, and most of them are using long-line for coarse fabrics, obtained to a considerable extent in the Canadas, whence it is imported free of duty under the Reciprocity Treaty."

One great object with experimenters in flax, has been to disintegrate it without having to pass it through the usual process of water rotting, which, if not carefully attended to by experienced hands, often injures the quality of the fibre, even to the extent of 50 per cent. of its value; and is at all times an offensive process, both to the operator and to the immediate neighborhood of the rotting pits. Experimenters have not heretofore been successful, but it is recently claimed by a French inventor that he has produced a machine which completely effects the desired object—this has yet to be proved. The American Commissioners say that, after an extensive observation, "it is wholly impracticable to disintegrate flax into its ultimate fibre or cells, without the intervention of a solvent for the intercellose or gluten." The Commissioners also say that,

"The encouraging reports from those who have used machine broken and disintegrated flax cotton as a substitute for an admixture of cotton in coarse woollen goods, relieve the commission from the necessity of elaborating this branch of the subject. As an admixture in fine woollen goods, in the form of chemically disintegrated fibre, there are at present no satisfactory results. The failure to obtain such results in this direction is probably owing more to the want of a supply of good material and to the general unwillingness of manufacturers of fine woollens to mix even cotton with wool, than to any intrinsic want of adaptability of flax cotton for admixture. On the contrary, the peculiar affinity of flax for colour (it being equal to wool in this respect), and its indisposition to excessive fulling, would seem to make it a much more desirable admixture for fine coloured woollen goods than cotton. And it is not unreasonable to expect that when there is a sufficiency of supply of well disintegrated and separated refined flax cotton, that it will be extensively sold for this purpose."

The flax interests are important to Canada, and we have here again referred to them, even at the risk of wearying our readers; having recently published several lengthy communicated articles on the subject in the Journal.

SPIRITS OF TURPENTINE.

Writing on the high price of this article, and the substitution of Benzole, the *Trade Review* remarks:—

"A new substitute made in the North and in Canada has appeared in the market: it is called Spirits of Turpentine, but is very different from the Wilmington; it is not equal in any respect, and is more properly a Spirit of Tar Wood or Naphtha. This is sold at $1.20 in this market, and meets with ready sale. For the ordinary uses of Turpentine this Spirit, which is distilled from the wood and roots of the pine, will no doubt be useful; but for the manufacture of varnishes and paints it will never come into general use, as its want of uniformity of strength and of specific gravity will render its employment inconvenient, and frequently will occasion serious loss. The Wilmington Turpentine has peculiar properties as a solvent and drier, which will render it always the best to use."

The *Review* is wrong in stating that *all* the turpentine made in Canada is distilled from the wood and roots of the pine. Mr. Irish, of Brighton, taps the living tree for the gum, the same as in Carolina, and from it obtains the spirit and the resin; Messrs. Connell & Cotter, of Hastings, obtain it in the same way. Each of these is a good article, having the proper smell; the boiling point of one is 154° C., specific gravity 0·865, of the other we have not the analysis. The article made by Mr. Luke, of Angus, is distilled from the wood, but it appears to be a good article, nevertheless. The February number of the Journal contains a certificate from C. F. Donovan, carriage painter for Messrs. Cooper, of Hamilton, that he had experimented with it in a variety of ways, and that it operated to his satisfaction in every respect.

MECHANICS' INSTITUTE CLASSES.

(Communicated.)

"Man is more likely to miss his way in darkness than in twilight; in twilight than in full sun."

The promoters and managers of Mechanics' Institutions wield, if they did but realize it, a power for good which can hardly be over-estimated. Their very existence is but evidence of the greatness of the modern appetite—or rather craving—for knowledge, demanding to be satisfied. And one of the most pleasing features connected with them is the fact that they are the result of that earnest demand for knowledge by the industrial portion of society. The modern Mechanics' Institutions embody in their constitution the means of educating and civilizing the communities in which they exist, and possess facilities for the distribution of knowledge which before their time was unknown. There is no community of five hundred

souls but ought to have one in its midst, and if it does not at present exist it is the bounden duty of every intelligent man to immediately take steps for the formation of one. The work of doing so will be found to be of the most agreeable and pleasing character, and will entitle those who initiate it to the lasting gratitude of the community. Once started, there need be no bounds to their prosperity. Begun in good spirit, conducted in a popular and intelligent manner, nothing, apart from christianity itself, is so well calculated to improve the morals and habits of the community.

The manner of conducting them, or the necessary steps for commencing them, may at any time be learned by communicating with experienced officers of old established Institutes, or through the medium of the Board of Arts and Manufactures; but one of their principal means of usefulness, and the one to which special attention is now directed, is that of evening classes. It is not only one of the principal means of usefulness but the most desirable, because directly educational, and the most useful field of educational enterprise. Useful because it is the rule rather than the exception that boys employed in industrial pursuits, after leaving school, loose nearly the whole of the learning they ever had. If, therefore, after leaving school they are subject to no systematic mental training, they grow up in ignorance, and very often into vice and all kinds of immorality, a disgrace to themselves and a source of continuous grief to their fond and indulgent parents. We therefore submit it as a rule that, after entering upon active employment, when commencing his experience as an embryo man, his intelligence being awakened and his curiosity excited, he will learn faster and retain better in his memory that which he does learn; it is, therefore, the duty of his parents to see that his leisure hours are, *in moderation*, devoted to the improvement of his mind. Unless this is done, the mind will become enervated as the body becomes strong; in the same way, and in accordance with the same law, as the body would become enervated if he used his mind only. Hence we have in the illiterate and uneducated masses of the world strong, vigorous, and enduring bodies, but minds uninformed and unintelligent—wedded to notions and prejudices which were held by their fathers before them, and incapable of giving a rational opinion on any subject beyond their immediate daily routine, and barely on that.

Now we have in the case of Mechanics' Institute evening classes admirable facilities for the educa- of all such. Conducted at moderate cost, with all modern facilities, and at hours suited to such as are employed during the day; they offer every advantage to the persevering and industrious of acquiring a practical and liberal education. They may embrace any or all of the following subjects: English Grammar and Composition, Arithmetic, Penmanship, Book-keeping, Architectural and Mechanical Drawing, Ornamental Drawing, Mathematics, French, Grammar, History, Music, &c. &c. As a general rule, they can be conducted successfully only during the fall and winter months—say from October or November to the end of March. There should be but one session, and the fees payable in advance.

Suppose preparations were made during the month of October, the village, town, or city well canvassed or advertised, and on the first Monday of November a public meeting were called of all who were willing to enroll their names, and to pay their fees. Begin with enthusiasm, but begin right. The session may continue twenty weeks—November to March, inclusive—giving to each class two lessons per week, or forty as the course. Suppose two dollars were charged each pupil for the session, this would be but five cents per lesson, and within the reach of every industrious citizen of Canada. Who shall say what might not be effected in a single season, what capabilities developed out of the growing and expanding mind, or to what extent it might exercise an influence on the future destiny of those who thus employ their evening hours? There is no royal road to learning, nor would we convey any such an enthusiastic idea, but there is a road by which it may be reached, and we know of none more capable of attaining it than the hardworking, industrious sons of toil; nor, let us say, of ornamenting it better when reached. The road to learning is by hard, diligent, intelligent work—no man can aspire to it who is not willing to employ these means, or worthy of it if he could; but, all things considered, the hardworked body with a well employed mind is capable of accomplishing more in the shape of practical available talent than those whose brains are enervated by idleness, and uninspired by honourable and manly ambition. But we must start right. Any man who would understand literature, art, or science, must by educational training be prepared for it. Men not so prepared cannot be taken from the common—or in fact any other—walks of life, and be taught science. The theory that he can is utopian and fallacious; but the lesson had to be learned by experience. Many learned lectures had to be deliverd, costing money, time, and careful preparation ere it was exploded. But now, by the light of that experience, we urge as strongly as we possibly can the absolute neces-

sity of beginning at the beginning and not at the end.

The child must walk before it can run, and the man who aspires to an acquaintance with science must of necessity have a good English education. We begin with Reading, this gives an impetus to the intellectual faculties, when Penmanship and Arithmetic may follow; and so on until Grammar, Geography, History are reached, then Mathematics and Mental Philosophy, when Natural Philosophy and the elements of other sciences may follow, and so on to prepare the individual for that sphere in life for which he is intended.

All this being admitted, we have before us a guide for the opening and conducting of Mechanics' Institute classes. A candidate for the Book-keeping class should be able to write a good hand, and good English, and if he cannot he should be sent either to the English class or the Penmanship. And so with French and all other classes. This may appear a little arbitrary, but if looked into will be seen to be sound sense. And again, a less fee should be charged to those who enter a second season than for the first, and less for the third than the second, and those who distinguish themselves should be rewarded with honours in some shape.

The certificates awarded by the Board of Arts and Manufactures, of first, second, and third grades, and in special cases, silver medals, offer inducements to some, and might do to all; but local Boards can do more by offering prizes in money or books to the most successful, and then sending forward to the Board such as have passed the preliminary examination in a creditable manner. Thus *all* who are deserving of reward may rely upon winning it. The latter examination not being competitive, the awards being based upon merit purely, every pupil in a class—instead of one or two only—may obtain a certificate of one grade or another. In the conducting of classes, the first pre-requisite is to appoint good teachers, and then to see that order is preserved. These two are necessary to success, and the latter equal in importance with the former, inasmuch as the efforts of the best teachers in the province may be frustrated unless he can preserve order, and conduct all the proceedings by rules clearly understood by his pupils at the commencement of the session. Moreover, the Committee of Management will find that their object will be attained better if they make their plans known to the students before the session is begun. In this connection we submit a series of rules suggested by our own experience in conducting a series of classes for a number of years. They may be varied to suit peculiar circumstances, but as a rule they will apply in the majority of cases.

1st. The class fees for the current session are, to members of the Institute, $2; non-members, $3, for each class, payable invariably in advance.

2nd. The classes will open during the first week of November, and continue until the last week in March. Each class, meeting twice a week, shall receive forty lessons.

3rd. Each class shall meet and the studies commence punctually at 8 o'clock, and close not later than 10.

4th. It shall be the duty of the Teachers to keep a correct roll of the pupils in their respective classes, and also of the attendance of each; the roll to be called at 8 o'clock.

5th. Prompt and regular attendance is required of all, and those not so attending will not be permitted to compete for the prizes hereinafter mentioned.

6th. Conversation and other irregular and improper conduct must meet with instant reproof from the Teacher; and if he is not obeyed, it may be reported to the Committee, who hereby hold to themselves the right of dealing with the offenders as they shall see fit.

7th. All the materials required in the respective classes may be obtained from the Secretary, at wholesale prices.

8th. The Committee of Management will offer for competition, at the close of the session, a first and second prize in books, to each class, of the respective values of $5 and $3. Teachers will report on the 1st March the names of the pupils intending to stand for examination.

9th. Any pupil is competent to enter the lists; but no one engaged in or studying for any of the learned professions, no student of any university or college, and no professional teacher, will be allowed to take a prize.

10th. Those who have taken first prizes in any previous year will not be eligible for the same in any subsequent year.

11th. In addition to the prizes thus offered, pupils passing a creditable examination may, if they desire it, enter for the Board of Arts and Manufactures' subsequent examination, where certificates of merit of three grades will be awarded. This examination is not competitive, each candidate being rewarded according to merit.

In ancient times the Scotch made raids across the "Border" into England for the purpose of obtaining a store of iron. Now Scotland exports to England and other countries upwards of 500,000 tons of iron per year.

Board of Arts and Manufactures
FOR UPPER CANADA.

SUBSCRIPTIONS TO THE "JOURNAL."

The annual subscription to the *Journal* is invariably 75 cents per annum, except to members of Mechanics' Institutes and Agricultural and Literary Societies, and remitted through the Secretaries and other officers of these institutions.

TRADE MARKS.

Trade Marks registered in the Department of the Bureau of Agriculture and Statistics, Quebec, to July 1st, 1865; copies whereof have been forwarded to the Board of Arts and Manufactures, Toronto, and are now open to the inspection of the public, in accordance with 24 Vic. cap. 21, sec. 25.

Folio 61, vol. A, No. 84:—James Blakely, Napanee, "Indian Root Pills."

Folio 62, vol. A, No. 104:—Wm. Hy. Comstock, Brockville, "Dead Shot for Worms."

Folio 64, vol. A, No. 239:—P. & J. Dunn, Cote St. Paul, per. A. C. Hutchison, Montreal, "Cut Nails."

Folio 68, vol. A, No. 239:—P. & J. Dunn, Cote St. Paul, per. A. C. Hutchison, Montreal, "Cut Nails."

Folio 66, vol. A, No. 239:—P. & J. Dunn, Cote St. Paul, per. A. C. Hutchison, Montreal, "Horse Shoe Nails."

MEETING OF SUB-COMMITTEE.

The Executive Committee met in the Board-Rooms, Thursday, June 29th, present: the President (J. Beatty, M. D.), the Vice-President (Rev. Professor Hincks), and Messrs. W. H. Sheppard, B. Walton, H. E. Clarke, T. Sheldrick, Professor Buckland, F. W. Coate and E. A. McNaughton.

Minutes of previous meeting were read and approved of.

Fifty copies of a pamphlet on CANADA, "a Geographical, Agricultural and Mineralogical sketch," by Mr. T. Sterry Hunt; and thirty copies of a "catalogue of the Canadian contributions to the Dublin Exhibition, for 1865," by the Department of Agriculture and Statistics, presented by the Minister of Agriculture, were submitted as having been received and acknowledged by the Secretary.

Treasurer's *rough* balance sheet was submitted in accordance with the by-laws, for the six months ending at date, shewing balance in favour of the Board of $44 50, irrespective of assets due on the Journal of the Board.

Several accounts were submitted, and ordered for payment, when the following report was presented:

The Committee appointed to purchase goods for the Dublin Exhibition, beg to report—

That, considering the short time allotted them to complete their duties, they succeeded in collecting together a very interesting assortment of the most useful of our manufactures, to, and even beyond, the extent of the funds placed at their disposal, $500.

Finding that they could not, out of that sum, apportion any for apparatus manufactured for the Educational department of Upper Canada, they reported to the assistant minister of Agriculture the desirableness of making an appropriation for that purpose, and received in answer a check for the further sum of $25. Adding $3 thereto, they purchased an assortment from the department to the value of fifty-six dollars, at 50 per cent discount.

Notwithstanding all the care taken by your committee to keep their liabilites within the amount of the appropriation, in the hurry incident to receiving and despatching the goods, and on account of the extra cost of sending 22 cases by express—two clear through to Dublin—instead of by Grand Trunk Railway as at first intended, but which they were prevented from doing through insufficiency of time; and also on account of the extra expense of some of the goods received, over what was anticipated, your committee exceeded their resources by, as then estimated, $70 55. A full statement of the account was sent to the assistant minister of agriculture, with an application for funds to meet this deficiency; in reply Mr. Tache promptly promised to furnish the amount should he be able to realize, as he then anticipated, a saving from some other source. A check for the $70 55 was received on the 21st intstant, making the whole receipts $595 55; the total expenditure, as per Treasurer's Ledger account here submitted, amounts to $596 55; leaving a deficit chargeable to the Board of but one dollar, after paying all incidental expenses.

Copies of all the invoices were sent down to the Bureau of Agriculture, and a set also shipped with the goods.

A complete list of the articles sent to Dublin was published in the May number of the Journal —those presented free being so credited.

Some manufacturers declined to furnish goods, from mere indifference to the object; others refused to do so from fear of raising up rivalries in their manufactures, being, apparently, desirous of having their productions as little known as possible; while others cheerfully contributed when applied

to, many of them furnishing their goods either free or at a considerable reduction on the usual price.

The Government department published a catalogue of the goods sent from Canada, apparently got up in haste, and which, your Committee regret to observe, contains many errors, both as to the names of contributors and the articles contributed, so far as relates to Upper Canada.

All which is respectfully submitted

(Signed) BENJ. WALTON.
W. H. SHEPPARD.
H. LANGLEY.
W. EDWARDS, *Secretary.*

The Secretary brought under the notice of the committee the possibility of the Models, and British Patent office publications, being removed from the Board-rooms to Ottawa, on the removal of the seat of government to that city.

On motion of Mr. McNaughton, seconded by Mr. Sheldrick, it was

Resolved—"That the Secretary be instructed to communicate with the assistant Minister of Agriculture, on the subject of the British patent office publications, the property of the Canadian patent department, and now in charge of this Board; with a view to their remaining, with their continuations, in charge of this Board, for public reference."

A conversational discussion ensued on a suggested amalgamation with another library in this city, so far as refers to works of general reference and joint occupation of rooms, which was ordered to lie over for future consideration.

The meeting then adjourned.

W. EDWARDS,
Secretary.

ANNUAL EXAMINATIONS, 1865.

The Annual Examination of candidates, members of Mechanics' Institutes, was held during the first week of June, according to programme previously published in the Journal.

The subjects proposed for examination were the same as last year. Nine candidates only have been examined, and five subjects taken up. Five candidates were examined in but one subject each, two in two subjects each, one in three subjects, and one in four subjects.

In 1863 seven candidates were examined and five subjects taken up; in 1864 seventeen candidates were examined and twelve subjects taken up; and for 1865 nine candidates in five subjects. The following are the subjects, with the names of the gentlemen who kindly gave their services as examiners:

Arithmetic—M. Barrett, M.A., M.D., U. C. Col.
English Grammar and Analysis—C. W. Connon, LL.D., U. C. Col.
Algebra—James Brown, Esq., M.A., U. C. Col.
Geometry—T. Thurman, Esq., Toronto.
History—C. W. Connon, LL.D., U. C. Col.
**Mensuration*—A. McMurchy, Esq., M.A., Toronto Grammar School.
Committee on Examinations — Rev. Professor Hincks and Professor Buckland, University College, and Henry Langley, Esq., Toronto.

The awards made are for actual merit, and not in competition. The 1st class certificate indicates "Excellence;" the 2nd class, "Proficiency;" and the 3rd class, "Commendableness."

Certificates awarded to Candidates.†

No. 1.—Miss Maggie Fraser aged 15, English Grammar and Analysis, 2nd class certificate.

No. 3.—W. A. Chapman, aged 19, Arithmetic, 2nd class certificate.

No. 4.—Miss Bessie Clarke, aged 16, English Grammar and Analysis, 3rd class certificate.

No. 5.—Allan Mason, aged 15, History, 2nd class certificate.

No. 6.—Wm. H. Ballard,‡ aged 19, English Grammar and Analysis, 1st class certificate; History, 1st class certificate; Algebra, 1st class certificate; Geometry, 2nd class certificate.

No. 7.—Alex. J. Wells, aged 18, Arithmetic, 3rd class certificate.

No. 8.—David Nicol, aged 16, Geometry, 2nd class certificate; Algebra, 3rd class certificate; arithmetic, 3rd class certificate.

No. 9.—Francis Michell, aged 16, Geometry, 2nd class certificate; English Grammar and Analysis, 3rd class certificate.

No. 10.—Geo. Bengough, aged 18, Geometry, 1st class certificate; Arithmetic, 3rd class certificate.

The examiner in *History*, in his report, says, "Paper number six (Wm. H. Ballard) is excellent in the highest degree.

The examiner in *Algebra*, in his report, says, "The author of paper number eight (David Nicol) shows considerable skill and accuracy, but he has not attempted to answer more than half the questions set. I cannot award to him a higher grade than that of 'Commendableness.' The papers of number six (Wm. H. Ballard) are of a high order

* Two candidates reported but no papers returned.

† All members of the Whitby Mechanics' Institute.

‡ In 1864 Mr. Ballard took 1st class certificate in Arithmetic; 2nd class in English Grammar; 2nd class in Algebra; and 3rd class in Geometry.

of merit. With the exception of two or three errors arising from inadvertence, he has carefully answered all but one of the questions set, and that, too, in a style remarkable for neatness, and exhibiting a familiar acquaintance with the best methods of performing algebraic operations. In short, I think that the answers of number six are in every respect deserving of the title of 'Excellence.'"

The examiner in *Geometry*, in his report, says, "Numbers six and eight show an excellent knowledge of Euclid, but the papers have been worked in a hurried and careless manner. I should have been better pleased to see fewer propositions attempted, but accompanied by greater neatness in working them: this is a very important point. Number nine is carefully worked, and accurate, extending over 1st and 2nd books only. Number 10 (Geo. Bengough) is deserving of the highest grade (First Class)."

Our readers will observe that but three hours are allowed for working the papers in any one subject—that the questions to be worked are not seen until the candidate takes his place in the class room, in the presence of at least two members of the committee, to commence work—that no assistance is allowed from books, papers, or from each other—and that as soon as the three hours are expired, the papers are folded up and sealed, by the committee, and forwarded to this Board for examination; numbers only being written on the separate papers to designate to whom they belong.

A portion of the examination papers were published in last month's Journal, the remainder will be found below. No papers were sent up for examination in *Mensuration;* nevertheless, we publish the questions set in this subject, as well as the others, for the benefit of any of our young readers who may desire to exercise themselves in working them out.

Examination Papers.

ALGEBRA.

(Three hours allowed.)

1. State and illustrate the principles upon which the algebraic rules of addition and subtraction are founded.

Simplify $\{5a^2-(3ab+4b^2)\} - [3a^2-\{6ab-(7b^2-4a^2)\}+2b^2]$

Find the value of the above when $a+b=6$, $a-b=2$.

2. Multiply (1) $(3x^2-2xy+5y^2)(4x^2+5xy-7y^2)$
(2) $x^n-1)(x^n+1)(x^{2n}+1)$.

3. Divide (1) x^5-4x^3+5x-6 by x^2+2x-3
(2) $x^{3n}-1$ by x^n-1.

4. Find the G. C. M. and L. C. M. of
$21x^3-32x^2+40x-24$ & $14x^3+9x^2-46x+24$.

5. Simplify (1) $\frac{2}{x^2+2x-3}+\frac{3}{x^2+x-6}-\frac{5}{x^2-3x+2}$

(2) $\frac{4x^2-6x+9}{4x^2+12x+9}+\frac{8x^3-27}{4x^2-9}$.

6. Investigate a rule for finding the square root of any quantity.
Shew that if x^2+px+q be a perfect square, $p^2=4q$.

7. Find the square root of
$4a^2+b^2+9c^2-4ab-12ac+6bc$.

8. Find values of x & y which satisfy both of the equations $ax+by=c$, $lx+my=n$.
If the same values of x & y also satisfy the equation $px+qy=r$ what inference is to be drawn?

9. Solve the equations

(1) $\frac{x}{2}-\frac{1}{3}(x-2)=\frac{1}{4}\left\{x-\frac{2}{3}(2\frac{1}{2}-x)\right\}-\frac{1}{3}(x-5)$.

(2) $\frac{3}{x-3}+\frac{4}{x-4}=\frac{5}{x-5}$.

(3) $\frac{x-3}{3}=\frac{y+4}{4}$, $x-\frac{2y+1}{3}=y+\frac{x-5}{2}$.

(4) $2x^2+3xy=26$, $3y^2+2xy=39$.

10. What quantity added to the numerator and denominator of $\frac{3}{8}$ will make it equal to $\frac{1}{2}$.

11. The sum of three fractions whose denominations are 8, 12 and 15, respectively, is $1\frac{3}{120}$; the sum of the numerators is 15, and the difference of the first and second fraction is $\frac{2}{5}$ths of the difference of the second and third. Find the fractions.

12. Find the arithmetic, the geometric and the harmonic means between $5(a+b)$ & $3(a-b)$.

13. Sum (1) $12\frac{1}{8}+10\frac{1}{2}+8\frac{5}{8}+\ldots$ to 12 terms and to n terms.
(2) $108+72+48+\ldots$ to n terms and to infinity.

14. In an A. S. whose first term is 1 and common difference 3, the sum of n terms : the sum of $n+2$ terms as 30 : 41 ; find n.

GEOMETRY.

(Three hours allowed.)

1. Upon the same base, and upon the same side of it, there cannot be two tri-angles that have their sides which are terminated in one extremity of the base equal to one another, and likewise those which are terminated in the other extremity.

2. If two straight lines cut one another, the vertical or opposite angles shall be equal.

3. The greater angle of every triangle is subtended by the greater side, or has the greater side opposite to it.

4. If a straight line fall upon two parallel straight lines, it makes the alternate angles equal to one another; and the exterior angle equal to

interior and opposite upon the same side; and likewise the two interior angles upon the same side together equal to two right angles.

5. Triangles upon the same base, and between the same parallels, are equal to one another.

6. In any right angled triangle, the square which is described upon the side subtending the right angle, is equal to the squares described upon the sides which contain the right angle.

7. If a straight line be divided into any two parts, the square of the whole line is equal to the squares of the two parts, together with twice the rectangle contained by the parts.

8. If a straight line be divided into any two parts the squares of the whole line, and one of the parts, are equal to twice the rectangle contained by the whole and that part together with the square of the other part.

9. In obtuse angled triangles, if a perpendicular be drawn from any acute angles to the opposite side produced, the square of the side subtending the obtuse angle is greater than the squares of the sides containing the obtuse angle, by twice the rectangle contained by the side upon which when produced the perpendicular falls, and the straight line intercepted without the triangle, between the perpendicular and the obtuse angle.

10. If in a circle two straight lines cut one another, which do not both pass through the centre, they do not bisect each other.

11. If two circles touch one another internally, they shall not have the same centre.

12. If two circles touch each other externally, the straight line which joins their centres, shall pass through the point of contract.

13. Upon the same straight line, and upon the same side of it, there cannot be two similar segments of circles, not coinciding with one another.

14. Describe a circle about a given triangle.

15. Inscribe a square in a given circle.

16. Describe a circle about a given equilateral and equiangular pentagon.

MENSURATION.

(*Three hours allowed.*)

Shew how practically to do the following problems: (1.) To raise a perpendicular from the end of a line without producing it; (2.) To bisect a given rectilineal angle; (3.) To bisect a given right line; (4.) Through a given point to draw a right line parallel to a given right line.

2. Find area of a regular polygon of n sides, inscribed in a circle, whose radius is given; also of a circumscribing regular polygon of same number of sides, and educe the area of the circle. Find area of a decagon, length of side being 20. If centre of one circle whose radius is 10, be in circumference of another whose diameter is 45, find areas of the three included spaces.

3. What will be the length of a fence reaching from one of the angular points of a triangular field to the longer side; sides being 25, 35, 40 rods: give length of sections of longer side made by fence; find also area of field. Give proofs for the methods you adopt.

4. The top and bottom of a ditch are parallel, breadth at top 72 feet, at bottom 38$\frac{3}{4}$, and sloping sides 26$\frac{3}{4}$ and 20 feet respectively, find area of a vertical section.

Required, the cost, at 6*s.* per square yard, of the wainscoting of a room; the height, including cornice and mouldings, being 12 feet 6 inches, and the whole compass 83 feet 8 inches; also the three window shutters, being each 7 feet 8 inches, by 3 feet 6 inches, and the door 7 feet by 3 feet 6 inches which being worked on both sides must be reckoned work and half work.

6. Find cost of material for making a balloon, at 5 cents per square inch; and also cost of filling at one cent per cubic inch, diameter being 30 feet.

7. Three men buy a grinding stone three feet in diameter, each paying one-third expense; what part of diameter should each grind for his share.

Canadian Patents.

(*Continued from page 97 of this Journal.*)

Bureau of Agriculture and Statistics, Patent Office, Quebec, 1st July, 1865.—His Excellency the Governor General has been pleased to grant Letters Patent of Invention for a period of *fourteen years*, from the dates hereof, to the persons whose names are included in the following list. Published by command,

J. C. Taché,
Deputy to Min. of Agric.

Jeremiah Daigneau, Yeoman, of Roxton Pond, in the County of Shefford, for "A new and useful Stove Register.—(Dated 15th February, 1865.)

William Augustus Leggo and George Edward Desbarets, Engravers, Lithographers and Electrotypists, of the City of Quebec, carrying on business as such under the name and style of William Leggo & Company, for "A new and useful Art of photo-electrotyping to be called Leggotyping."—(Dated 22nd February, 1865.)

David Reekie, Esquire, of the Township of Georgina, in the County of York, for "A new and useful Lifting-gate."—(Dated 4th March, 1865.)

William Augustus Wiggins, Machinist, of the Town of Belleville, in the County of Hastings, for "A new and useful Trap Hook, called Wiggins' Trap Hook."—(Dated 4th March, 1865.)

JOHN BROWN, Gentleman, of the City of Toronto, in the County of York, for "A new and useful Horse Rake, called John Brown's Horse Cake."—(Dated 16th March, 1865.)

DERRICK JAY HINMAN, Yeoman, of the Township of Haldimand, in the County of Northumberland, for "A new and improved Broom."—(Dated 22nd March, 1865.)

THOMAS NORTHEY, Machinist, of the City of Hamilton, in the County of Wentworth, for "A new and improved Differential Governor for Steam Engines."—(Dated 22nd March, 1865.)

GEORGE BLACK, Telegraph Operator, of the City of Hamilton, in the County of Wentworth, for "A new and useful Air Heating Apparatus."—(Dated 22nd March, 1865.)

JOHN HOPKINS THOMAS, Artist, of the Village of Brooklin, in the County of Ontario, for "A combined Moveable Comb and Double-boarded Bee-Hive."—(Dated 22nd March, 1865.)

ELI SHUPE, Machinist, of the Village of St. George, in the Township of Dumphries, in the County of Brant, for "The Reel and finger board motion, being an improvement on Shupes combined Reaping and Mowing machine and others."—(Dated 22nd March, 1865.)

GIOVANNI BARTOLOMEO EQUI, Merchant, of the City of Toronto, in the County of York, for "A new and improved process for preparing Hemp or Flax, so that either may be spun and wove by the same machinery that is commonly used for spinning and weaving cotton."—(Dated 23rd March, 1865.)

GIOAANNI BARTOLOMEO EQUI, Merchant, of the City of Toronto, in the County of York, for "A process of manufacturing and refining white and brown sugar and syrup out of Indian Corn and other Cereals."—(Dated 23rd March, 1865.)

JAMES HOUGHTON, Machinist, of the Town of Dundas, in the County of Wentworth, for "Certain new and useful improvements in the manufacturing, building and working of the Excelsior combined Reaping and Mowing machine, said machine as improved to be hereafter known as the Improved Excelsior combined Reaping and Mowing Machine."—(Dated 23rd March, 1865.)

ALEXANDER ANDERSON, Machinist, of the City of London, in the County of Middlesex, for "A new and useful Anderson's even balanced vibrating cultivator."—(Dated 23rd March, 1865.)

JAMES CHASE, Mechanic, of the Village of Brooklin, in the County of Ontario, for "A new and useful improved spring Bed-bottom."—(Dated 27th March, 1865.)

WILLIAM ROBERT SHAVER, Yeoman, of Ancaster, in the County of Wentworth, for "A safety cap for covering the points of connecting Rods in threshing and other machines."—(Dated 27th March, 1865.)

JOHN WILLIAMS, Iron Manufacturer, of the City of Montreal, for "an improved Puddling Furnace."—(Dated 11th April, 1865.)

JAMES FINDLAY, Engineer, of the City of Toronto, in the County of York, for "A new spring called Findlay's Spring."—(Dated 17th April, 1865.)

GEORGE HENRY WEALCH, Turner, of the Village of Blenheim, in the County of Kent, for "A new and improved Spinning wheel."—(Dated 17th April, 1865.)

DAVID LEONARD, Millwright, of the Township of Onondaga, in the County of Brant, for "A new and useful wheel for creating a motive power by animal power, called Leonard's Inclined Wheel."—Dated 17th April, 1865."

JAMES WOOD, Gentleman, of the Township of Grimsby, in the County of Lincoln, for "A new and useful slide Door for oil-lamp Burners."—(Dated 17th April, 1865.)

HENRY PETRIMOULX, Carpenter, of the Township of Sandwich, in the County of Essex, for "A new and improved portable Crane."—(Dated 17th April, 1865.)

FREDERICK OAKLEY, Carpenter, of the City of Toronto, in the County of York, for "A new and useful improvement in Lamp Burners."—(Dated 17th April, 1865.)

CHRISTOPHER DONER, Builder, of the Village of Aurora, in the County of York, for "A reversible saturated Wash-board."—(Dated 17th April, 1865.)

WILLIAM HOCKIN, Cooper, of the Town of Guelph, in the County of Wellington, for "A stave chamfering and crozing machine."—(Dated 17th April, 1865.)

JOHN MCGEE, Merchant, of the City of Toronto, Assignee of William Hickin, Mechanic, of the Township of Draper, in the County of Victoria, for "A new and useful die for stamping sheet metal for bottoms of Kettles, Boilers, &c."—(Dated 19th April, 1865.)

JOHN HAMILTON GORDON, Gentleman, and RICHARD TAYLOR, Laborer, assignees of Michael Judge, Diesinker, all of the City of Toronto, in the County of York, for "a new and useful process for the manufacture of Boiler and Kettle Bottoms (known as a collar for Dies used in stamping sheet metal); also a duplicate collar-die, and also a new application of Ball and Socket to the upper or cameo die, and also a process of trimming sheet metal."—(Dated 19th April, 1865.)

WILLIAM WHITNEY KITCHEN, Yeoman, of the Township of Grimsby, in the County of Lincoln, for "A new and useful Knuckle-rubbing Clothes Washer."—(Dated 24th April, 1865.)

JAMES WELCH, Waggon Maker, of the Township of Dunwich, in the County of Elgin, for a self-acting Portable Cheese Press."—(Dated 21st April, 1865.)

STEPHEN POCOCK, Painter, of the Town of Woodstock, in the County of Oxford, for "An improved Window Blind."—(Dated 24 April, 1865.)

JAMES M. COUSIN, Pumpmaker, of the City of London, in the County of Middlesex, for "A self-acting Cattle Pump."—(Dated 25th April, 1865.)

EDWIN BEVIER, Druggist, of the City of Hamilton, in the County of Wentworth, for "A new and useful Churn, called the Ladies' Friend."—(Dated 1st May 1865.)

THOMAS JOHN BIRCH, Tinsmith, of the Town of Stratford, in the County of Perth, for "A new and useful article called Birch's Lock-seam Eave-trough and Former."—(Dated 1st May, 1865.)

CHARLES DION, Photographer, of the City of Montreal, for "A new and improved Alarum, to be called Sonnerie d'Alarme Dion."—(Dated 3rd May, 1865.)

CLARK WATSON, Painter, of Coaticook, in the County of Stanstead, for "A new and useful Washing Machine."—(Dated 3rd May, 1865.)

WILLIAM RIDER, Machinist, of the Township of Stanley, in the County of Huron, for "A new and useful Rider's Horse Power."—(Dated 3rd May, 1865.)

THEOPHILUS KNICKERBOCKER, Cooper, of the Township of North Norwich, in the County of Oxford, for "A new and useful Fruit Picker."—(Dated 3rd May, 1865.)

AARON C. HALL, Tinsmith, of Stanstead, in the District of St. Francis, for "A new and useful Tubular Sap-Boiler."—(Dated 5th May, 1865.)

CORNELIUS RYAN, Tinsmith, of the City of Montreal, for "Improvements in Coal Burning Cooking Stoves."—(Dated 16th May, 1865.)

JOHN BENNETT, of the Town of Belleville, in the County of Hastings, Mechanic, for "A new and useful Double-action Fanning-mill, called Bennett's Double-action Fanning-mill."—(Dated 17th May, 1865.)

JOHN HAGGERT, Iron Founder, of the Village of Brampton, in the County of Peel, for "A new and useful Axle Nut, or mode of securing wheels to their axles."—(Dated 17th May, 1865.)

LEWIS SLEEPER, Gentleman, of the Village of Coaticook, in the County of Stanstead, for "A new and improved Axle for Railway Carriages, to be called Sleeper's Patent Double Curve Axle."—(Dated 19th May, 1865.)

LEWIS SLEEPER, Gentleman, of the Village of Coaticook, in the County of Stanstead, for "A new and useful improved Rail, for Railway purposes, to be called Sleeper's Patent Continuous Rail."—(Dated 22nd May, 1865.)

WILLIAM COE NUNN, Gentleman, of the Town of Whitby, in the County of Ontario, for "A new and improved Railway Signal."—(Dated 30th May, 1865.)

HORACE A. COOMBS, Carpenter, of the Township of Saltfleet, in the County of Wentworth, for "A new and useful Churn-dash, for the old-fashioned or round Churn."—(Dated 12th June, 1865.)

NARCISSE PIGEON, Manufacturer, of the City of Montreal, for "A new and useful art of producing and manufacturing Crystallized Sugar, similar to Cane Sugar and Syrup, from Indian Corn or other cereal grains or roots."—(Dated 14th June, 1865.)

WILLIAM COUCH MACEY, Mason, of the Village of Richmond Hill, in the County of York, for "A new and useful improvement in Doors, the door as improved to be called Macey's Air-tight Door."—(Dated 16th June, 1865.

JOHN JOHNSTON, Joiner, of the Township of Howard, in the County of Kent, for "A new and useful Self-supporting and Portable Farm Fence, to be called Johnston's Self-supporting and Portable Farm Fence."—(Dated 19th June, 1865.)

JOHN W. TERWILLIGER, Blacksmith, of the Township of Ameliasburgh in the County of Prince Edward, for "A new and useful Auger, called the Farmers' Easy Borer."—(Dated 20th June, 1865.)

SAMUEL SMITH, Cooper, of the Town of Guelph, in the County of Wellington, for "A machine for cutting the Locks of Barrel and other Hoops, to be called Smith's Hoop Locking Machine."—(Dated 26th June 1865.)

Useful Receipts.

A Dry Portable Vinegar.

Wash well half a pound of white tartar with warm water, then dry it and pulverize as fine as possible. Soak that powder with good sharp vinegar, and dry it before the fire or in the sun. Resoak it as before with vinegar, and dry as above, repeating this operation a dozen of times. By these means you will have a very good and sharp powder, which turns water instantly into vinegar. It is very convenient to carry in the pocket, especially when travelling.

To Soften Ivory.

In three ounces of spirits of nitre and fifteen of spring water, mixed together, put your ivory a soaking. In three or four days it will be soft so as to obey your fingers.

To dye ivory thus softened dissolve in spirits of wine such colors as you want to dye your ivory with. And when the spirit of wine shall be sufficiently tinged with the color you have put in, plunge your ivory in it, and leave it there till it is sufficiently penetrated with it, and dyed inwardly. Then give that ivory what form you please.

To harden it afterwards, wrap it up in a sheet of white paper, and cover it with decrepitated common salt, crumbled by heat, and the driest you can make it to be; in which situation you shall leave it only twenty-four hours.—*Ancient Work.*

Transfer Paper.

Transfer paper is prepared thus:—Make a mucilage with ½ oz. of gum tragacanth, strain, add 1 oz. of glue, and ½ oz. of gamboge. Mix French chalk, 4 oz., old Paris plaster, ½ oz., starch, 1 oz.; run them through a sieve, grind with the mixed mucilage, add water to reduce to the consistence of oil, and apply it with a brush to thin sized paper. The drawing made on this prepared side of the paper is wetted at the back and placed on the stone, which is warmed to 125° F., the whole is then strongly pressed in the lithographic press, and the stone receives the impression, which may be printed from as usual. When two impressions are required, a red composition is made of wax, 2 parts, soap, 1 part, and vermillion to color, all melted in a saucepan, and ground with water to the consistence of cream. This is spread thinly on the second stone, an impression from the first stone is next applied, and the second drawing is thus made to correspond with the first exactly. If, in printing, the drawing becomes smutty, mix equal parts of water, olive oil, and oil of turpentine, shake till they froth, wet the stone, throw this froth on it, and rub it with a soft sponge. The printing ink will be dissolved, and the drawing will almost disappear, but, on rolling it, it reappears as clear as at first. When the stone is laid by for future use, a preserving ink is applied, to prevent the surface printing ink becoming too hard. Thick varnish of linseed oil, 2 parts, tallow, 4 parts, wax and Venice turpentine, of each 1 part; melt; add by degrees, lamp-black, 4 parts mix thoroughly, and preserve in a tin case. This must be rolled on the stone each time before laying it aside for future use. When the whole of the impressions are completed, and the stones required for other drawings, two of the stones are laid face to face and ground with sand and water until the surfaces are clear. They are, finally, more or less polished with pumice stone, according to the required fineness, and are then prepared to receive other drawings.

Tracing Paper.

Open a quire of double crown tissue paper, and brush the first sheet with a mixture of mastic var-

nish and oil of turpentine, equal parts; proceed with each sheet similarly, and dry them on lines by hanging them up singly. As the process goes on, the under sheets absorb a portion of the varnish, and require less than if single sheets were brushed seperately. The inventor of this varnish for tracing paper received a medal and premium from the Royal Society. It leaves the paper quite light and transparent, it may readily be written on, and drawings traced with a pen are permanently visible. Used by learners to draw outlines. The paper is placed on the drawing, which is clearly seen, and an outline is made taking care to hold the tracing paper steady. In this way elaborate drawings are easily copied.

Test Papers.

Test papers are prepared by dipping unsized sheets into a solution or infusion of the test. The substances used are Brazil wood, Buckthorn, acetate and diacetate of lead, cherry juice, dahlia leaves, elderberry, litmus, mallow flower, protosulphate of iron, starch, turmeric, indigo, cabbage, iodide of potassium, manganese, rhubarb, etc. They are used to distinguish acids, alkalies, poisons, gases, etc.

Aquaria Cement.

A correspondent furnishes the following to the *Scientific American*, and says he has used it for five or six years:

One part, by measure, of litharge; one part plaster of Paris; one part fine beach sand; one-third part fine powdered rosin; mix all together. This may be kept for years, while dry, in a well-corked bottle; when used, make in a putty with boiled linseed oil; a little patent dryer, may be used; it will stand water at once, either salt or fresh.

A cheap aquarium is made as follows:—

Cut a narrow groove in a board the size you wish; set four pieces of glass on edge in the grooves; put a piece of zinc in the bottom; on the board make a light frame, the size of the top, with grooves; pass a small rod through the frame down the inside of the corners, through the bottom, and screw up tight; put the cement in all the corners, and you will have an aquarium at very trifling cost.

A Preparation for Preserving Leather.

A preparation which is said to insure great durability to leather and to make it very pliable and soft. It consists of four articles, tallow, soap, rosin and water. These ingredients are prepared as follows:—Twenty-one parts of tallow are melted in a vessel, three parts of rosin added, and the two when melted mixed well together. In another vessel seven parts of good washing soap are dissolved in seventy parts of pure rain water. After it is dissolved and the mass heated to the boiling point, we add the part prepared before, let it boil once more gently, and the preparation is ready for use. It is especially adapted to boots, harness leather and belting.—*Shoe and Leather Reporter.*

A Valuable Paint.

For the information of all who are wishing to obtain a cheap and valuable paint for buildings, I would say, take common clay, (the same that our common bricks are made of), dry, pulverize, and run it through a common sieve, and mix with linseed oil. You then have a first-rate fire-proof paint, of a delicate drab color. Put on as thick as practicable. If any one has doubts with regard to the above, just try it on a small scale—paint a shingle and let it dry. Recollect that it must be mixed thicker than common paints. The clay when first dug will soon dry; spread it in the air under a shelter, or, if wanted immediately, it may be dried in a kettle over a fire. When dry it will be in lumps, and can be pulverized by placing an iron kettle a few inches in the ground, containing the clay, and pounding it with the end of a billet of hard wood, three inches in diameter, three feet long, the lower end to be a little rounded. Then sift it. Any clay will make paint, but the colors may differ, which can easily be ascertained by trying them on a small scale as above indicated. By burning the clay slightly you will get a little red, and the greater the heat you subject it to, the brighter or deeper the red.—*Country Gent.*

Preservation of Ice.

A method of preserving ice is going the round of the papers here, which I send you, as it is often required to keep some as long as possible when people are not provided with an ice-safe. Put the ice on a dish and cover it with a napkin, then set the dish upon a feather-bed or pillow, and place another bed or pillow on the top of it. In this way you may keep a few pounds of ice for a week or more.

Spruce Beer.

Water 10 gallons; sugar 10 lbs.; essence of spruce ½ lb.; yeast ½ pint. Dissolve the sugar and essence of spruce in the water, previously warmed; then allow it to cool a little, and add the yeast as in making ginger-beer; bottle immediately in half-pint bottles.

Entomological Specimens.

To preserve Entomological specimens, M. Gerber employes an etherial solution of carbolic acid with ten per cent. of the latter, which he finds to effectually protect the insects even in a place infested with ants. He recommends the solution especially therefore to entomologists making collections in hot countries.

Metallic Coating.

This is effected in a very simple way by Mr. Well, he makes an alkaline solution of this metal which he intends to deposit, and adds to it tartaric acid, glycerine, or some other organic matter. Iron, steel, &c., may with such a fluid be coated with copper, zinc, nickel, &c., and beautiful bright surfaces be obtained. It is usually sufficient to place the object to be coated in the alkaline solution; but, if required, a weak galvanic current may be generated, by bringing it into contact with a piece of zinc.

Gold Test.

A good test for gold or silver is a piece of lunar caustic, fixed with a pointed piece of wood. Slightly wet the metal to be tested, and rub it gently with the caustic. If gold or silver, the mark will be faint; but if an inferior metal, it will be quite black. Jewellers who purchase old gold often use this test.

Paste for Labels.

A good paste for fixing paper labels on tinned sheet iron may be obtained by preparing a paste from water, rye flour, and a small quantity of a solution of glue, to which add as much of Venice Terebinth as to fit it for brushing over the labels, which will adhere closely to the tinned surface and will not be affected by moisture.

To Petrify Wooden Objects.

Take equal quantities of gem-salt, rock-alum, white vinegar, chalk, and pebbles powdered. Mix all these ingredients; there will happen an ebullition. If, after it has ceased, you throw some wooden objects into this liquid, and leave them soaking for four or five days, they will be transformed into petrifactions.

Selected Articles.

SCHOOLS OF ART.

At a large and influential meeting held for the purpose of establishing a School of Science and Art for Salisbury. Mr. Buckmaster spoke to a resolution which was intended to give him an opportunity of developing the whole scheme of the Science and Art Department with reference to instructions in science and art. After giving a sketch of the rise and progress which had attained the formation of evening classes, he said: The true connection between science and art has never been sufficiently recognized. Leonardo da Vinci is only known as a painter, but he was equally great as a scientific man. He was one of the early practical reformers of science, and wrote thirteen volumes on pneumatics and hydraulics, which gave the earliest indication of that system of inductive philosophy with which the name of Bacon is associated. His great contemporary and rival, Michael Angelo, was also thoroughly acquainted with all the then known sciences, especially those of geometry and mechanics. Phidias not only sculptured the statue of Minerva and the frieze which adorns the Parthenon, but he also superintended its building and gave lessons on the sciences involved in its construction. (Hear, hear.) Egypt, Assyria, Judea, Greece, and Rome have left us an unwritten history in their architecture, but the dawn and spread of Christianity was marked by the rise of a new era in art, which embodied the great ideas of sacrifice and hope, the noble expression of a great spiritual revelation, to which heathenism had succumbed, leaving to posterity the records of transcendant intellect in the Gothic churches of Europe and the masterpieces of art preserved in the Kensington Museum. (Applause.) If we go back only a few years we can call to mind one who never saw science without art, or art without science—who considered both as the great power by which the progress of humanity and civilization was to be advanced in this his adopted country. In his public speeches the Prince Consort alluded constantly to this idea. He seized every opportunity of inculcating the necessity of science and art as the two great manifestations of cultivation and social refinement. The accurate representation of any natural object on a plane surface requires the combination of two elements—the one scientific, the other artistic. The scientific consists in the proper disposition of lines geometrically determined, the artistic in that soft gradation of tone which distance furnishes in nature. The connection between science and the art of painting does not begin till about the 15th century, and it was not till 1731 that the mathematics of perspective was demonstrated. From the time perspective was reduced to certain scientific principles and accepted by art they were adopted as a necessary part of art education, and no student in any of our art schools would now produce a work which a few centuries ago would have been regarded with favour. The Assyrians and Egyptians in their pictoral representations are utterly indifferent to everything that relates to distance. The Chinese, so exquisite with reference to the colour of natural objects, cannot put the lines of a building according to the correct laws of perspective, and this was the kind of painting of all nations until the science of geometery developed the art of perspective, and from that time the art of painting was reduced to correct principles. I could show in the same way the relationship of geometery and mechanics to the art of building; and that many of the most beautiful curves and ornaments in Gothic architecture are to be found in Fossil shells. All those natural and passionate emotions which had their outward expression in the altered muscular forms must have been carefully observed by the eye of the Grecian sculptor. He may not have had the opportunity of studying anatomy and physiology as we understand these sciences. His knowledge of internal structure was obtained from what he saw without. The death struggles of the athlete in the amphitheatre was the science school in which he studied. (Applause.) Galen was obliged to infer the anatomy of the human body by the dissection of a monkey. Modern sculptors and painters have opportunities of studying calmly the dissected body or casts taken from it. The higher departments of correct art are no doubt intimately connected with science, but elementary drawing ought to form part of the education given in primary schools; it is easily acquired; it is, in fact, an amusement to children, and contributes to good writing, it quickens the faculty of observation, it educates the eye to judge correctly of the distance and magnitude of bodies, to appreciate the beauty of natural forms; it is an element of cultivated and refined taste; it gives precision and skill to the hand, improves the memory, and enables a person to understand at once drawings of tools, utensils, furniture, machinery, plans, sections, and the power of representing them. All this may be taught without much science in our elementary schools and this kind of

knowledge, apart from its educational value, may in after life greatly aid the workman in his daily toil. The universal success which has attained drawing in continental and American schools, and in our own schools so far as it has been tried, is surely a great recommendation, and it is really a matter of great sorrow to hear the outcry occasionally made against teaching a poor child anything but the three R's. (Hear, hear.) But even with such an education, if it deserves the name, nothing would be lost in making a drawing lesson alternate with a writing lesson. Writing is but the representation of a series of arbitrary signs—it is, in fact, drawing from memory the same as you might teach a child to observe the form of an oak leaf or a laurel leaf, and to represent these forms by drawing; and I doubt very much if it be possible for a person who has never been able to see anything beautiful in nature to produce anything beautiful in art. The instruction given in art schools is not limited to linear drawing, although this must form the foundation of all progress in the higher departments of arts. Painting and modelling are also taught. The true idea of an art school embraces children, as a part of their elementary education, mechanics and working men with a view to their industrial occupations, art students who study art for its moral and refining influence, and those who study ornamental art with a view to design. A training school is established at South Kensington for educating persons to become masters of art schools, and one of the conditions of pecuniary assistance from the department is that he must teach a class of working men or the children of working men, and it is only on these conditions he can obtain any payment. The middle and upper classes receiving instruction in an art school will in most cases pay a fee quite as high as that required by an independent teacher. I believe this art teaching must exercise a useful influence on the character and industry of the country. (Hear, hear.) The pure atmosphere, the glorious sun, the clear streams, and lovely flowers and forms of an agricultural district must be more favourable to the production of correct art with reference to design than the blackening sulphurous atmosphere of a densely-populated manufacturing town, where every green blade of grass has been blasted and withered, and the once pure streams of water now roll perpetual volumes of inky slime. (Applause.) How can men surrounded by such influences create anything beautiful in art? (Hear, hear.) But the mere industrial aspect of this question is, to my mind, the least important. We should all endeavour to cultivate a deep love of art, not for the purpose of ministering to the pride and vanity and wealth of human nature, but as a means of elevating and refining our moral perception, and bringing us into more direct communion with the Great Author of the Universe, who speaks to the souls of his children through their senses; and I trust this school of science and art which we have met this day to inaugurate will become a temple where young men and others shall inquire after truth, whose victories in coming years, more glorious than those of war, shall be celebrated—a temple where some may win a name that nations shall pronounce with reverence and where that law of progress, which is the blessing of God upon humanity, shall receive from time to time a new impulse and new development. (Loud applause and cheers.)

ENGINEERING OPINIONS.

The *London Engineer*, in a recent article on new improvements, says:—

"It is instructive to look upon the number of mechanical and engineering applications now in the thrift of successful practice, but which, but a very few years ago, were unknown, and, still more recently, disbelieved.

"How reasonable it appeared to many, at one time—less than twenty years ago—that plate iron bridges would crumple up like pasteboard or leather. Possibly there may be those, here and there, who remain still unconvinced, just as there are those who still refuse to believe in the strength and staunchness of iron ships. How many engineers there were who could not admit that cylinder foundations could be got in by simple atmospheric pressure; and there were others recently, who doubted that a disc pile could ever reach a strong footing in sand by pumping a stream of water through it and out at the bottom. How confidently, too, do engineers now employ concrete in numberless situations were once only stone and deep piling would have been considered secure."

"The changes which have been brought about, within the past few years, in the manufacture and working of iron and steel, are something almost incredible. It would have been reckoned sheer folly had engineers, even ten years ago, counted upon the general introduction of steel for railway axles and tyres; and steel rails were hardly known even three years ago. Krupp's immense ingots were, perhaps, amongst the greatest wonders of the International Exhibition—at least to minds capable of comprehending them; but it is likely that Bessemer's grand discovery—already brought by untiring energy and ready ingenuity to the rank of a large and rapidly growing manufacture, will work the greatest change in our applications of iron. Opinion has already been turned by it from unbelief into a confidence surer than any admiration however great. Even in iron-making by other processes, including the ordinary course of puddling, re-heating, and rolling, the progress in respect of the magnitude of the pieces wrought has been very great. It would have been seriously doubted, five or six years ago, whether armour plates a foot thick, and weighing each 20 tuns, could ever be made. McHaffie's malleable castings up to two or three tuns weight represent a great step also beyond anything known two or three years ago. This branch of manufacture has been greatly promoted by the improvement in crucibles, those of plumbago now withstanding sometimes a week's work in malleable iron making, and from sixty to ninety rounds in other casting where one or two, or three, was once thought very fair. Another extraordinary stride in metal working is that of drawing steel tubes from ingots in the cold state, by hydraulic pressure. We know more than one engineer who, until he had actually seen this done, refused to believe that it was even

possible. The working of Siemens' regenerative furnaces, although easily understood, is almost as wonderful. It needs no strong prediction to declare that the means which give such a perfect control of temperature, without diluting the flame with uncombined oxygen, and which afford so great an economy of fuel, must come into very general use."

"To go on with inventions in connection with railways:—Who, upon learning the construction of the Injector, would have foreseen that it would work at all? Going a little further back, Eugene Bourdon's discovery, in his workshop, that a coiled still-worm tended to straighten itself under pressure, led to an invention which has conferred great benefits upon locomotive practice, by increasing the security of working and economising fuel. How much complication was removed from locomotive pistons by the introduction of Mr. Ramsbottom's slight and wiry rings, which it was believed by many would scratch the cylinders (and at first they occasionally did), and never remain tight? Messrs. Miller and Wakefield's steam-packed pistons embody an equally neat idea, but this idea—although we believe it was really adopted in practice by Spiller, of Battersea, twenty years ago—was once pronounced absurd by more than one engineer. Then there are Mr. Adams' radial bores which have attained to a thoroughly established success in the face of much and generally expressed doubt. The spring-seated tyres, by the same gentleman, have by far outworn tyres set in the ordinary manner, and it is clear that what saves tyres must save the rails. We do not know that there is any 'if' in the way of the success of the spring tyres, but even if they have not yet wrought a general change in the opinions of practical men, they have certainly attained a measure of success which, at one time, many would not have been willing to admit as possible. Another successful application which, until the success had been proved, many engineers would have rather ridiculed than doubted, is that of Mr. Ramsbottom's water troughs for 'picking up' water into tenders in rapid motion. It is a great deal to have proved that no real difficulty has been found from dust or dirt in the water, and that during the first winter of its trial the trough failed once only from freezing up, and then only in consequence of the water being allowed to stand in it without the disturbance due to a current running through it. Our readers will have observed that, encouraged by so much success, more than one engineer is now considering the practicability of extending the water troughs, so as to give a continuous supply of water for any distance, without a tender, and, if found desirable, as upon trial it might be, to condense not the whole of the steam, for a part is needed for draught, but all remaining below the back pressure line at each stroke."

"The success of underground railways, both in a mechanical and a pecuniary point of view, is more than many could foresee, and our own columns of former years even testify that we then found ourselves compelled to doubt at least the commercial success of such lines—a success which has proved so great that we are glad to acknowledge that we have been disappointed by it. The success of the pneumatic post is already established, and we may now look, with some confidence, to the like success of the Waterloo and Whitehall Pneumatic Railway, the works of which, it is promised, will be finished in a year."

"In marine engineering, it is not many years since there was great unbelief in the economy, and even in the admissibility of the screw propeller. Less than three years ago, some of the cleverest engineers and shipbuilders in the kingdom pronounced twin screws, with independent engines, to be disadvantageous, if not impracticable. *Now* there can hardly be two opinions as to their value. One of the best points in connection with the modern screw engine is the wood bearings now so generally employed. They were designed in their present form by Mr. George D. Kittoe, and were very shortly afterwards adopted by the leading engineer, in the face of much doubt, we need not add. The re-introduction of super-heated steam, and the revival of surface condensation, have greatly qualified engineering opinion also. The use of marine governors, now so general, is in strong contrast with the once-prevailing belief in their utter uselessness. In nearly all these instances our readers will see that we are keeping within a very recent period of time, seldom extending so far back as the memorable week in January, 1856, when THE ENGINEER, fresh from our printers, first met the smile of public approval. We can write with confidence, now, of the ascertained advantages of invention which then were either unknown, or pining in the cold shade of unbelief. Belief was then unprofessional—unbelief, professional."

"How many engineers a few—a very few—years ago believed in steam fire-engines? The late Mr. Braidwood, who, of all men, one would suppose, was the best qualified to judge, refused to countenance them until years after they had taken their place in the established brigades of American cities. Captain Shaw has encouraged them, and the result is that they have been greatly improved, and now even surpass the best American steam fire-engines. They are now thought indispensible to the protection of London, as, indeed, of any city or town of sufficient size to maintain them."

"It was not many years ago when English engineers thought a turbine a toy, and a centrifugal pump an ingenious puzzle in central forces—an hydraulic teetotum for the edification of the disciples of science who throng the Polytechnic. Yet both the turbine and the centrifugal pump are now known to utilise from 70 to 80 per cent. (and sometimes more) of the power applied to them; and this is more than can be said of the old lumbering water-wheels, or of other than the best made pumps."

"What may be said of the now acknowledged value of machine-made bricks, of water-pressure engines, and of the simple and beautiful 'disintegrator,' now used by the artificial manure manufacturers? A few years ago there was nothing like the good old hand moulds for the wretchedest bricks; water-pressure engines, although anybody might have invented them, were not believed in; and the 'disintegrator' was rather a curious example of a Catherine wheel revolving within a scintillating and bristling radiance of superphosphates than a useful and acknowledged invention."

"Nine years ago the late Mr. John Fowler first exhibited his steam plough at the Royal Agricultural Society's show at Chester. For five or six years afterwards it was doubted whether steam ploughs would 'pay.' Now they are made and worked by hundreds. It is a sad recollection that he, who did so much to conquer this success, should have been cut off so early from the enjoyment of his triumpth. Steam locomotion on common roads, although a recognised practicability now, is still hanging fire, but it has gained much over the 'pooh-poohed. Let us hope that coal-cutting machines will gain even as much in commercial confidence. They must, we can't help thinking, yet take the place of those subterranean slaves, the 'putters and sinkers,' and we hope the time is not further off than that when all town sewage will be returned to the land, instead of being cast into the sea."

"The gas engineers have learned much within a few years, and this amounts to a modification of opinion among them. It is now years ago since Mr. Grafton opened the way to the use of clay retorts by employing an exhauster, a thing which no gas company would, if they could, now dispense with. But it was not so long ago when gas engineers were shy of clay retorts, and had a series of objections—many of them imaginary—against them. They could not, they thought, get so much gas from a tun of coal in clay retorts as they could from iron, and then, it was said the clays required more coke. But an iron retort is now becoming as much of a curiosity as was the jaw bone—famous two or three years ago—of Abbeville. See, too, how the gas engineers have taken to iron oxides for purification and to the sulphuric acid treatment for ammonia."

"It impoverished the gas, they said, and they still believe, justly no doubt, that it has entailed upon them the plague of napthaline. We wish one reform in gas works, and in spite of hostile opinion it will, like every other sensible and proper thing, yet prevail. That is, apparatus for charging and drawing the retorts, so as to dispense with the pachydermatous salamanders now employed at that task."

"The introduction of what Dr. Ure very properly termed automatic machinery in the making of guns and of locks, uprooted a world of trade prejudice, and overcame something even of professional misgiving. It is not so long since there were many to doubt 'whether, on the whole, such machinery could be made to compete successfully with hand labor, taking all the requirements of these trades into due account.' But there is no room for doubt under these heads now. It has been somewhat the same with wood-working machinery."

"The cotton manufacture has seen successful changes, also, in the machinery not long ago employed. Self-stripping cards are common now where, ten years ago, both breakers and finishers were always stripped by hand. Messrs. Hetherington's self-acting mule, too, has hardly one-half the parts, if indeed as many, as were originally embodied in Richard Roberts' great invention. Cotton spinners are notoriously jealous of revolutional mechanical devices, yet the old mules are being superseded. A great change, too, has been wrought by the Blackburn 'slasher,' which, within a small space, does almost ten-fold the work of the old dressing frames. Mr. Bullough's and Mr. Taylor's inventions, too, are working their way into the weaving sheds of Lancashire. The beautiful operation of 'gassing' the yarn—an invention of the late Mr. Samuel Hall, of surface condensing notoriety—is almost too old to be instanced in this list, but, palpable as were the advantages, there were prejudices to be overcome."

"The brewers were resolute in their opposition to any invasion of the mysteries of their craft. They knew that many a vat of ale had gone off in a thunderstorm, and they argued that the damage was due to electricity, and galvanism, they thought, must be the twin sister of the subtle fluid. So they would not permit of any conjunction of iron and brass in the fermenting tuns or in the cleansing rounds. Nothing but gun metal pumps and wooden vessels would answer. It is odd that they even permitted iron hoops upon kilderkins and barrels intended to be tapped with brass cocks. It was nothing that more than one chemist had passed currents of electricity through barrels of beer, and, although he might have decomposed a little of the generous liquid, it was none the worse for the experiment. Now the brewers have mashing machines, attemperators, cast iron boiling backs, and even slate fermenting squares—yes, *slate*. And there are centrifugal pumps and india-rubber hose, yeast presses, and one or two enterprising brewers have tried hop digesters, hop separators, and spent hop presses—with what result we will not undertake to say; but it is evident that the brewers, interested, like other people, in making money, are no longer jealous of anything that promises a real improvement. So it is with the sugar refiners, and so also with the millers. But for a few formidable patents in their way, the latter would all be using decorticators, ventilated millstones, and stive rooms, and grinding, perhaps, twelve or fifteen bushels of wheat per pair of stones per hour."

"It is in the success of what was at first believed to be doubtful or impracticable, that engineers gain confidence, and although the fact remains that many so-called inventions are really impracticable, or useless from other reasons, it does not the less follow that many new things which men of narrow views and scanty knowledge may believe to be impracticable, are nevertheless but waiting their time of success."

A CONVENIENT PROCESS FOR PREPARING OXYGEN.

From the latest-received number of the *Annalen der Chemie und Pharmacie*, we translate the following article, which was written by M. Fleitmann:—

"The easy preparation of oxygen for technical purposes is a matter of considerable importance, and I now shortly describe a process which possesses particular scientific interest. I was led to the process by observing that on heating a concentrated solution of chloride of lime with only a trace of freshly prepared moist peroxyd of cobalt, the hypochlorite of lime was completely decomposed into chloride of calcium and oxygen. Repeated

quantitative experiments, the results of which I have lost, convinced me that the whole of the oxygen was evolved, and that only chloride of calcium and no chloric acid was formed.

"The evolution of oxygen commences about 70° or 80°, and continues in a regulur stream, with a slight frothing of the liquid.

The action of the peroxyd of cobalt in this case, it is clear, is exactly like that of nitric oxyd in the manufacture of sulphuric acid. There is no doubt that several peroxyds of cobalt with various proportions of oxygen exist. My own experiments have shown me that the proportion of oxygen in peroxyd of cobalt is variable, and the simplest explanation of this process is that a lower peroxyd abstracts oxygen from the hypochlorite of lime to form a higher oxyd, which is again decomposed into a lower oxyd and oxygen.

"The peroxyd made use of in one experiment may be employed again to decompose a fresh quantity of hypochlorite of lime. From one-tenth to one-half per cent, is sufficient to effect the reaction; and instead of taking the freshly prepared hydrated peroxyd, if will suffice to add to the solution of hypochlorite a few drops of a solution of cobalt salt whereby a corresponding amount of the peroxyd is formed.

"The advantages of this method of procuring oxygen appear to be the following;—

"1. The evolution proceeds with extraordinary regularity, and the gas is collected with the greatest ease, which makes the process specially applicable as a lecture experiment. When the mixture has been heated to 70° or 80° the lamp may in general be removed, as the heat of the fluid is then sufficient to carry on the reaction to the end.

"2. The *whole* of the oxygen is obtained from the material, while only a part is procured by heating peroxyd of manganese; and—

"3. The process has the advantage of greater cheapness than that with chlorate of potash (either with or without manganese).

"It is necessary to employ a clear solution of chloride of lime, as a thick or murky solution will froth over. The best way of making a clear and strong solution is by first extracting the portion of chloride of lime with water, decanting the clear liquor, and then make use of that to exhaust another portion of the chloride. In this way it is easy to get a liquor which will evolve from twenty-five to thirty times its volume of oxygen. On the small scale it is best to employ a capacious flask, which may be about seven-eights filled with the solution. On a large scale for technical purposes a sort of steam boiler might be used, and the oxygen so obtained under pressure, and capable of being employed as a blast."

In a note the author suggests that a very pretty experiment may be made to show the displacement of oxygen by chlorine, by passing the latter gas into a mixture of solution of caustic soda with some peroxyd of cobalt. The chlorine could be passed in on one side, and oxygen collected at the other.—*American Artisan.*

THE LOST ARTS.

Because certain moldy and ill-smelling mummies have been resurrected from the Pyramids of Egypt and found covered with fine linen—because the tombs wherein they have lain for centuries are covered with caricatures of beasts, birds and fishes—because uncouth and ungainly ornaments of gold are found deposited in such tombs—divers persons wander off into extravagant praises of the lost arts, of the subtle and ingenious artizans who lived thousands of years ago, ignoring the wonders of to-day and the skill of their own countrymen.

If the mummies be an evidence of the taste of the ancients, the less said the better. Ugly in their lives, embalmed they are not improved, and the *scarabeus* or beetle with which persons of high rank were ornamented is suggestive of another unpleasant insect quite familiar to housekeepers. Even the pyramids from whence these musty relics of the past are exhumed, might have been built in half the time by modern artificers, with brown stone fronts, if desirable, and slated with alternate rows of purple and green tiles. What a waste of Egyptian time and money they represent!

So also with that Sphinx which glowers at Ethiopia from its seat in the sand, as if suffering from the recollection of some overpowering wrong. If it be a lost art to construct such hideous monstrosities as these, let us congratulate ourselves that the world has grown wiser and better with the lapse of centuries.

Herculaneum and Pompeii, unearthed from the ashes of Vesuvius, show little or no trace of the arts which have been lost. A few bronze lamps of uncouth shapes, some pottery remarkable for its curious decoration, some tiles and frescoes of unquestionable character and tendency—these are some relics of the state of the arts among that people at the time they were overwhelmed.

In Morocco and in Spain, ruins tumbling into decay, courts wherein fountains tinkled through the night atmosphere heavy with the scents of orange groves, tesselated pavements, and columns fretted with intricate designs, are the only signs, the only evidence to build on that the arts ever existed. Arts, not in the sense of gingerbread finery and gilding, but arts by which whole villages earned bread for their families in the sweat of their faces.

In Egypt at this day—land of the pyramids, of the ruined cities, of the crypts wherein musty princes molder into powder—the wretched native cracks his wheat in a stone mortar, or, worse, in a rag bruised between two stones. In Italy and in Imperial Rome—famous, in centuries long since transpired, for all that wealth could procure—the beggars chatter importunately at every step, and the fields are as barren and infertile as they were hundreds of years ago.

It is not on the wide Campagna that the modern reaper or a Yankee mower gets an opportunity to exhibit its qualities. It is not on the slopes at the foot of the Alps that the soil is turned up to the sun by cultivators and corn plows. No! mechanism is tabooed! The arts have no chance, and the way of centuries is the way of to-day.

Though the existence of oil lakes was known to the ancients, no use was made of them. Fish oil

gave forth its feeble glimmer in their lamps for years, and the solar radiance of kerosene was strange to domestic circles. In like manner the want of knowledge of natural products, of the infinite combinations they are capable of, of the use they may be put to, were almost unknown to the ancients—utterly so, compared to the knowledge of the present day.

There was, indeed, no lack of sensuous decoration for palaces, there was no want of stimulants, no absence of anything that appealed to the grosser nature of man in those ancient days, but the artisans were familiar with only the rudest of mechanical contrivances.

No hundred thousand spindles whirred in cotton factories from morning till night, no engines moved swiftly and noiselessly, no railroads clasped the land in their embrace. The earth bore in its bosom then, as now, copper and iron, but for want of artisans, for want of the skill and cunning to work it, little benefit accrued to the possessors thereof. Brass could be put to no better use than making a huge image to straddle the strait at Rhodes.

In the ancient days lived Praxelites, Phidias and Apelles, sculptors of rare talent, who cut from the silent marble statues that seemed instinct with life; but these, however they may have appealed to the taste of men at that time, never helped the poor to a decent living, put no garments on the naked, nor built up towns and cities as does the machinery of to-day.

For all that cultivates society, for all that tends to make mankind refined, intellectual and human, we have the fullest respect and appreciation, but we despise that affectation which accords to barbarians, or nations semi-civilized, more culture, more genius and more mechanical skill than we possess at the present time. The world moves forward, not backward, and the generations of to-day are wiser than those which are not ever were. The arts, in a generic sense, are not those delicate refinements of painting and music, by which white-handed and gifted sons of genius get a living, but they are those stern, hard realities in life which, by the practice of them, turns the intractable iron stone into ductile metal, which level the fores, which turn the wilderness into cities, which open up lands unknown to the pent-up thousands of old countries.

These are the arts and this is the period in which they flourish.—*Scientific American.*

SANITARY PRECAUTIONS.

Mr. Edwin Chadwick, in an address on the "new sanitary and drainage works of the city of Salisbury, says:—

"Your ancient city was, in the former entire ignorance of sanitary science, scourged with such plagues as that which now scourge the filth-encumbered city of St. Petersburgh, and the ordinary death-rate in the old and small-roomed houses was, so far as may be made out, about forty-four in a thousand—a rate such as yet prevails in the lower district of New York, as well as in some of our older cities. By larger and somewhat better houses the death-rate was reduced. On examining the statistics of the nine years before the completion of the new works, it appeared that there was a fluctuation of the death-rate from twenty-two up to thirty-five in a thousand, or an average of about twenty-seven in a thousand exclusive of the cholera year. The fluctuation during the nine years since the completion of the new drainage works, has been from twenty-five to fourteen in a thousand, or an annual average of twenty in a thousand; and to every case of death reduced, there will as a general rule, be twenty cases of sickness reduced. In round numbers the average death-rate may be said to be reduced one-third, that is to say, it is now as if every third year was a jubilee year in which there were no sickness and no deaths. The reduction has been great in the deaths from foul-air diseases, as might be expected, but most marked in those which are intimately connected with moisture as well as foul air, of which the deaths from phthisis have since drainage been reduced to an average of one-half that which prevailed before drainage. Your existing death-rate, I should say, shows that by your present sanitary works you have reduced the exposure of the population to extraordinary epidemics by about one-third.

"My more immediate object is to point out the simple available means by which exposure, both to extraordinary and ordinary epidemics, may be still further diminished.

"Whatsoever may be the causes of extraordinary epidemics, the greatest intensity of the attack upon human beings is almost always found in certain localising conditions.

"The first visitation of cholera in different towns often appeared in the same streets, on the same sides, in the same houses, and sometimes in the same rooms, though the inhabitants had changed. In the course of my inquiries I met with one instance in the city of York, of a small court which, by tradition, was the spot where the great sweating sickness of 1485 appeared, then the great plague of 1664, then others, and the first visitation of cholera: the place was popularly called the 'hagworm's nest.' The hagworm is a species of snake which haunts dung heaps. We looked with interest to see whether the place was true to its traditions, in the second visitation of cholera, and we found it was so. We know the chief localising materials for epidemic explosions. There is, as it were, the charcoal, the nitre, and the sulphur which exist in ordinary times inertly, till there comes some atmospheric conditions, the light which creates the explosion and makes the materials destructive. Some forms of extraordinary epidemics we can create. In two prisons there were extraordinary epidemics of a dysentric form; in both, after a time, it was found that old sewers had burst and leaked into the well from which the prisoners were supplied with water. In one prison there was an extraordinary epidemic of typhus. It was found that the antecedant was the clearance of the adjacent ancient moat, the wind having been slowly and steadily in the direction of that part of the prison where the epidemic first appeared."

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"The chief means of warding off epidemics, to be laboured for everywhere, are these:—clean air in

the streets; air clean from foul emanations beneath the surface, and cesspools (which last you have by your drainage works attained); air clean from foul emanations from unclean streets and yards, and stables; air clean from overcrowding in living and sleeping rooms, in schools and workshops; clean skins, clean body linen, pure water, distributed into every house, and proper channels for the constant removal of all foul and waste water from within the house. With these of course to be combined a sufficiency of nutritious food, and proper clothing. But with the skin kept clean the people may go forth regenerated, and armed as against an extraordinary pestilence, as well as against that which we have always with us."

Machinery and Manufactures.

Wear and Tear of Steam Boilers.

The following is from a letter to the *London Engineer*, by Mr. D. K. Clark, a most competent authority, on the wear and tear of steam boilers:—

"Probably the most important practical inference to be drawn from the tests of the strength of riveted joints, is the explanation they supply of the failure, hitherto unexplained, of boiler plates, not at the joints, but in their neighborhood. We are aware that electrical and galvanic action are freely adduced in explanation. But these words have two meanings; they mean electricity and galvanism, and they mean ignorance and mystery. It is known that boilers fail by corrosive and other agencies eating into the plates on the inside, pitting and furrowing the surface. The pitting of the metal is readily explained by the presence of chemical agents in solution in the water, and the known inequality of substance of iron plates and bars, in consequence of which the metal is gradually but unequally separated and dissolved, and probably a weak galvanic circuit may be established between the iron shell and the brass tubes, accelerating the process of dissolution. But this explanation does not meet the frequent case of a straight, continuous furrow, cut like a groove upon the surface. Furrows are observed to be found parallel to, and close to the riveted joints. Not in any case, that we are aware of, have they been found at any notable distance from a riveted joint, nor otherwise than parallel to one. The inference is inevitable that there is a relationship between them, and our conviction is, that the alternate tension and relaxation of the plates at the joints, as the steam is got up and let down, are attended by an alternate distortion—incipient, it may be—and resumption of the normal form, a bending and unbending of the plates on each side of the joint, in consequence of which the texture of the metal is gradually loosened in lines near to and parallel to joints, and it is thus laid open to corrosive action. On this interpretation the commencement of a groove or furrow, establishing a weak place and concentrating the action there, would suffice to extend and deepen it to the dangerous limits occasionally anounced by explosions.

"The weakness attendant on lap-joints is strikingly exemplified in the lap-welded joint, when subjected to extreme tension; the tensile strength, though the metal at the weld is perfectly solid and fully as strong in itself as the body of the plate, is much below that due to the regular section of the plate. Here there is no elementary weakness in the reduction of metal by rivet-holes; the inferiority of strength arises solely from the bending of the plates on both sides of the lap, and the overstraining of the fire-box, in the endeavor to attain to the position of stability.

"The furrowing of lap-jointed plates reads an important lesson on the real and ultimately practical value of direct connection, and direct action in exerting, transmitting, or resisting forces.

"That the furrowing of the plates at the riveted joints results from the indirectness of the strain of the steam pressure, is rendered still more probable by the analogous furrowing which results from reciprocating strains of another kind. In the more ancient classes of engines, in which the cylinders are fixed to and worked from the smoke-box plates, the alternate forward and backward strains by the steam pressure on the piston have been observed to weaken and to subject to corrosion and leakage the substance of the plate along the edge of the angle iron at the junction with the barrel. In further corroboration of this doctrine, Mr. Colburn states that he is not aware that any accidents from furrowing boiler plates have taken place in the United States; and we believe that their immunity from accidents arising from this source is to be ascribed to the use of very thin boiler plates—one-fourth of an inch to five-sixteenths of an inch in thickness."

Monstrous Cast-iron Anvil.

Some months ago we chronicled the fact that an immense anvil weighing 160 tuns had been cast in Sheffield, England. Quite recently this enormous block has been exceeded in weight by 40 tuns. The Liverpool *Albion* thus speaks of a huge cast iron block weighing 200 tuns;—"The engineering science in its giant progress is constantly needing increased power in its appliances; and the massive forgings now required in ship-building necessitates steam-hammers of corresponding proportions. Many hugh hammers have been made, but none have yet reached the size of the one now in process of erection at the Bolton Iron and Steel Works. This hammer is being made by Messrs. Nasmyth and Company, of Patricroft, and is of gigantic proportions, and will strike a blow equal to 75 tuns. This of course will require an immense anvil block, and the process of casting one for it, weighing 200 tuns, on Wednesday last, was a work of unusual interest. The iron was smelted in two large patent upper tweer cupola furnaces, 24 feet in height and 7 feet in diameter. The molten metal was run into the molding in a constant stream, supplied alternate from each furnace. The process occupied ten hours. The metal was kept in a state of fusion by means of burning charcoal until the whole quantity was poured in. The anvil block measures 12 feet square at the base, and 12 feet 6 in. in depth. The figure is pyramidical, and it is cast base upwards. The metal contains a certain proportion of Bessemer steel. The cast-

ing was performed under the superintendence of Mr. Ireland, of Manchester. Large numbers of visitors were at the works during the day, and were entertained at luncheon. The huge casting is not likely to be perfectly cold three months hence, and it will certainly not be reduced to a sufficiently low temperature to be dealt with under two months. When cool enough, it will be turned over, as already explained. The bed for the reception of the block will be enclosed in a large circular wrought iron cylinder, measuring 20 feet in depth and 18 feet diameter. This will be sunk in the ground and filled with concrete, and when finally deposited in its bed the anvil will appear about 2 feet 6 inches above the ground."

A New Blow Pipe.

A novel blow pipe is thus described in a foreign journal:—

Hendy's blow pipe is an instrument which combines simplicity and efficiency in a great degree; it consists of an ordinary blow pipe nozzle, supplied from an India rubber reservoir. The main portion of the blow pipe is made with a joint, at which a valve is placed, which is opened when the operator blows, and closed immediately when he ceases. By this arrangement the little bag or bladder is readily filled at a single breath, and with very little exertion. When so filled a continuous current of air is forced from the nozzle of the pipe by the mere contractive force of the gutta percha The force is uniform until the air is nearly exhausted. The current may be easily varied or entirely cut off by gently pressing the fingers upon the neck of the bladder above the nipple to which it is attached. Mr. Hendy has recently made a further improvement by attaching a rubber hose between the mouth piece and the pipe, enabling the blower to change his position without disturbing the direction of the current on the object upon which it is turned.

Petroleum Blacking.

There can be made from the so-called waste products of petroleum a beautiful polish blacking using much less molasses than is now used in blacking, and giving a better article. A waterproof blacking, possessing all the advantages of other oil blacking, and costing one-fourth the present process, can be made from petroleum products. Some enterprising maker will soon bring this article in market, no doubt, as it is well known that a tanner's oil beneficial to leather can be made from petroleum ; indeed, the pure tanner's oil of commerce is three fourths paraffine.—*London Grocer.*

Practical Memoranda.

Water on Coach Varnish.

A cotemporary says: The more vehicle varnish is exposed to the air, and sponged with cold water after completion and before delivery, the harder will the varnish become, and thus the more durable will be its brilliancy. It is also very desirable for new carriages to be carefully sponged with plenty of cold water immediately after being used, taking care that the surfaces are wiped nicely with a chamois leather to prevent spotting. Vehicles quickly become shabby when this caution is neglected, for the varnish remaining tender for some time is the more susceptible to injury from dirt and dust.

Temperature of Steam at High Pressures.

Pressure in atmospheres of 30 inch mercury.	Temp. Deg. F.	Rise in temp. for each additional atmosphere—Deg.
1	212·0	37·5
2	249·5	23·8
3	273·3	17 9
4	291·2	14·8
5	306·0	12·2
6	318·2	11·4
7	329·6	9·9
8	339·5	8·9
9	348·4	8·2
10	356·6	7·6
11	364·2	6·9
12	371·1	6·7
13	377·8	6·2
14	384·0	6·0
15	390·0	5·4
16	395·4	5·4
17	400 8	5·1
18	405 9	4·9
19	410·8	4·6
20	415·4	—

These results differ but little from those obtained under the direction of Dulong and Arago, by a commission appointed for the purpose many years ago by the French Government. They found the temperature of steam of 20 atmospheres to be 418°·4, and calculated that if the elasticity rose to 50 atmospheres the temperature would amount to 510° 4.

It will be observed that the increase of elasticity, by equal additions of heat, is more rapid at high than at low temperatures, and this circumstance (in addition to the greater simplicity of construction of the machinery in high-pressure engines) is one of the principal reasons for the increased economy of power obtained in employing high-pressure steam as a motive power, when compared with that furnished by the use of low-pressure engines. But it is only when in contact with a body of water from which fresh steam is constantly rising, that the elasticity augments in this manner, and thus produces a force sufficient to rend asunder the strongest vessels. If dry steam alone be heated, it follows the law which regulates the expansion and elasticity of gaseous bodies in general.

High-pressure steam while confined is always of the temperature of the water from which it is produced; it is, therefore, often used in the arts to supply a steady temperature above that of 212°. It is found that the solvent powers of water are much increased by the elevation of temperature caused by preventing the free escape of the steam. Papin's digester is an apparatus designed to effect this object; it is simply a strong iron vessel, furnished with a safety valve for regulating the pressure at which the steam is allowed to blow off. The water may thus be kept steadily at any

required temperature above 212° as long as is requisite. The gelatin of bones may by this means be easily extracted from the earthy matter, although the bones may be boiled for hours in water at 212° without undergoing any such change. —*Prof. Miller.*

Traction of Horses at various rates of Travelling.

It is a well known fact that the traction or force which a horse can exert decreases with the increase of speed.

Rate in miles per hour,	2	3	3½	4	4½	5
Force exerted by the horse,	166 lbs.	125,	104,	83,	62½,	41⅔

To Punch a Hole in Glass.

This is done by scratching a cross (×) upon the given spot by means of the point of a file, and then turning the plate round, in order to form a similar and opposite cross. The glass, at the spot thus marked, is, thereupon, so to speak, gently punched out by means of two centre punches, one of which is fixed in the vise, while the other is in the hand of the operator—an assistant holding the plate of glass in the meanwhile. The glass plate is occasionally turned round until the hole appears right through, which is then gradually enlarged with the pane of the hammer.

The principles on which the hole is formed are, that though glass breaks with a conchoidal fracture in every direction, the vibrations caused by the blows, and otherwise producing fracture, "are checked by the support of the fixed center punch in close contiguity with the part to be broken off." —*Babbage.*

Soap on Arkansas Stones.

The employment of sweet oil for the purpose of keeping Arkansas and other stones in proper condition for sharpening instrumeuts is so general as to be used almost, if not entirely, to the exclusion of every other substance. The tendency, however, to become gummy and clog the surface of the stone after it has been on a short time, along with the liability of soiling the fingers and imparting an unpleasant odor to them, makes the use of oil in the office objectionable on the part of the dentist. All this can be readily obviated, however, by useing soap in place of oil, as follows:—Rub a piece of toilet soap and a little water over the surface of the stone until a thick lather is formed, and then allow this to dry. When occasion arises for putting an edge on an excavator, a few drops of water will moisten the soap, and place the stone in proper condition for use at once. This plan is one we have employed for years, and would recommend a trial of it, on the part of others, in place of the substance generally used.—*Dental Cosmos.*

Statistical Information.

Lake Superior Copper Mines.

The Lake Superior mines have been known for some years back, but few have any idea of the extent of the business done, or of the amount of copper sent to market. In 1830 the total production of the copper mines of the world was 25,000 tons; of this the United States and Canada contributed 50 tons, which in 1853,—twenty-three years later,—had risen to 2,000 tons. From Lake Superior the quantity has increased pretty rapidly. There were in 1845 shipments to the amount of 1,300 pounds.

Year.	Tons.	Year.	Tons.
1846.....	29	1855.....	3,196
1847.....	239	1856.....	5,726
1848.....	516	1857.....	5,759
1849.....	753	1858.....	5,896
1850.....	640	1859.....	6,041
1851.....	872	1860.....	8,614
1852.....	887	1861.....	9,337
1853.....1,452		1862.....	10,000

the value of the last year being $5,000,000.—*Trade Review.*

U. S. Petroleum Exports.

The quantity of Petroleum exported from the United States from the 1st of January to the 19th of May, of the present year, was:

New York.....	2,899,421	galls.
Boston.....	356,483	"
Philadelphia.....	386,953	"
Baltimore.....	201,458	"
Portland.....	5,907	"
Total.....	3,850,222	"
Same time 1864.....	7,658,536	"
Same time 1863.....	14,917,183	"

The total exports from the United States for

1864 was.....	31,643,196	galls.
1863 "	28,162,191	"
1862 "	10,887,701	"
1863 "	1,194,682	"

The principal portion of these exports consist of refined oil, very little crude being shipped abroad.

Canadian Emigration.

RETURN of the number of arrivals at the port of Quebec from the opening of navigation to the 1st of July, 1865:—

	Cabin.	Steerage.	Total.
From England.....	331	2821	3162
Ireland.....	34	2020	2084
Scotland.....	28	1400	1428
Germany.....	...	1112	1112
Norway and Sweden	4	2156	2160
Total.....	397	9539	9936
To cor. period, 1864.....	332	10313	10645
Decrease this year.....			709

Nationalities—1609 English, 3005 Irish, 998 Scotch, 1476 Germans and Prussians, 2278 Norwegians, 190 Swedes, 71 Danes, 18 French and 291 from other countries. Total—9936.

A. C. BUCHANAN,
Chief Agent.

Government Emigration Office,
Quebec, 1st July, 1865.

Geographical Health Statistics.

Some interesting statistics as to geographical distribution of health and disease have been published. According to these the chances of longevity are in great favour of the more northerly latitudes. Near the top of the scale are Norway, Sweden and parts of England. Of cities, Vienna stands the lowest, and the highest is London. A cool or cold climate near the sea is the most favourable for longevity. While formerly one out of every thirty of the population of England, France, and Germany died in one year, now the average is one in forty-five. The chances of life in England have nearly doubled within eight years.—*Journal of Education for Upper Canada.*

SUMMARY.

The *Trade Review* gives the average decrease of imports in Cottons, Woollens, Silks, Sugars, Teas, Coffee, Hardware and Iron, from the 1st January, to 10th June, of the present year as compared with the same period last year, for the Port of Montreal, at 44½ per cent.——The total imports of gold and silver into India, for 1863, exceeded the exports of bullion by £10,398,315; and in 1864 the excess of imports over exports of bullion was £21,629,751.—It was not till 1863 that the first railway line was opened in India, and that was only for twenty-two miles, which were built at a cost of $3,353,200. There are now three thousand miles in operation; these roads cost from $55,000 to $100,000 per mile.——There are upwards of two hundred steam ploughs, at work in Egypt, and a larger number of steam pumps, engaged in the cultivation of cotton; and the cotton gins are countless. The Viceroy has 150,000 acres of land under cotton cultivation, and his uncle has 50,000 acres. Some of the irrigated lands have produced 600 lbs. of clean cotton per acre in one year. The machinery is obtained from England, and the cotton supplied is by far the best to be now obtained from any available sources.——Dr. Granville's statistics gives the number of registered deaths of children in England, in the 26 years 1838-63, who were born alive but did not live for a single year, as 2,374,379. At the present time 100,000 infants of less than a year old die every year in England.

Miscellaneous.

Duration of Life.

The average duration of life of man in civilised society, is about thirty-three and a third years. This is called a generation, making three in a century. But there are certain localities and communities of people where this average is considerably extended. The mountaineer lives longer than the lowlander; the farmer than the artisan; the traveller than the sedentary; the temperate than the self-indulgent; the just than the dishonest. "The wicked shall not live one half his days," is the announcement of Divinity. The philosophy of this is found in fact, that the moral character has a strong power much more controlling than is generally imagined.—The true man conducts himself in the light of Bible precepts, "is temperate in all things;" is "slow to anger;" and on his grave is written; "he went about doing good." In these three things are the great elements of human health: the restraint of the appetites; the control of the passions; and that highest type of physical exercise, "going about doing good." It is said of the eminent Quaker philantrophist, Joseph J. Gurney, that the labor and the pains he took to go and see personally the objects of his contemplated charities, so that none of them should be unworthily bestowed, was of itself almost the labor of one man, and he attended to his immense banking business besides; in fact he did too much, and died at sixty. The average length of human life of all countries, at this age of the world, is about twenty-eight years. One quarter of all who die, do not reach the age of seven; one-half die before reaching seventeen; and yet the average of life of "Friends," in Great Britain and Ireland, in 1850, was nearly fifty-six years, just double the average life of other people. Surely this is a strong inducement for all to practice for themselves and to inculcate it upon their children, day by day, that simplicity of habit, that quietness of demeanor, that restraint of temper, that control of the appetites and propensities, and that orderly, systematic, and even mode of life, which "Friend's" discipline inculcates, and which are demonstrably the means of so largely increasing the average of human existence.

Reasoning from the analogy of the animal creation, mankind should live nearly an hundred years; that law seeming to be, that life should be five times the length of the period of growth; at least the general observation is, that the longer persons are growing the longer they live; other things being equal. Naturalists say:

A dog grows for	2	years,	and lives	.....			8
An ox	"	"	4	"	"	"	16
A horse	"	"	5	"	"	"	25
A camel	"	"	8	"	"	"	40
Man	"	"	20	"	"	should live..	100

But the sad fact is, that only one man for every thousand reaches one hundred years. Still it is encouraging to know, that the science of life, as revealed by the investigations of the physiologist and the teachings of medical men, is steadily extending the period of human existence.

The distinguished historian Macaulay states that, in 1685, one person in twenty died each year; Dupin says that from 1776 to 1833, the duration of life in France increased fifty-two days annually, for in 1731 the mortality was one in twenty-nine; in 1843, one in forty. The rich men in France live forty-two years on an average, the poor, only thirty. Those who are "well-to-do in the world," live about eleven years longer than those who have to work from day to day for a living. Remunerative labor and the diffusion of the knowledge of the laws of life among the masses, with temperance and thrift, are the great means of adding to human health and life; but the more important ingredient, happiness, is only to be found in daily loving, obeying and serving Him "who giveth us all things richly to enjoy."—*Hall's Journal of Health.*

Education and Labour.

The *London Engineer* in an article noticing the emigration to America of artizans and puddlers, the result of the great "Lock-out" in the English iron works, says:—

"The nation has entered upon the work of education, and it is a happy circumstance that it has done so; but it has scarcely more than entered upon it. Science and mechanism must follow in the wake of material and intellectual capital. Thus will both descriptions of wealth find an increasingly profitable employment. As, therefore, the people are educated intellectually, they must be proportionately relieved from the slavery of brute labor. 'If the shuttle and chisel could move of themselves', says Aristotle, 'there would be no need of slavery.' In proportion as the shuttle and chisel are moved of themselves, labor-slavery decreases; and in proportion as the people become wealthy in intelligence will they demand the freedom which follows in the train of science and machinery. 'At every step of scientific improvement there is a demand for labor of a higher character than existed without the science,' is the remark of a careful thinker on this subject. And the increasing education of the people is supplying such labor somewhat more rapidly than it is being demanded. Happily, however, the supply will increase the demand.

It is not spareness of laborers alone that has stimulated the inventive faculty of the American nation. Education is the birthright of the American child, and he gets it. He, therefore, enters upon life with more school knowledge than that possessed by the British workman of a like grade. In consequence, the British laborer is imported to do the manual drudgery which the American declines to perform even after he has reduced that to the lowest minimum by the application of labor-saving machinery to every possible handicraft. Owing to this adaptation of machinery it is that we are "whipped" by America in nearly every industry in which, by natural disadvantages, manufacturers in that country have not to encounter insuperable difficulties. In this we have much to learn from America, and until we have learnt it, the English artisan who has had the advantage of even a tolerably good training in a national or British school will not drudge at home."

Three Rules for Good Reading.

First, Finish each word. I use the phrase in the sense of a watchmaker or jeweller. The difference between two articles, which at a little distance looks much the same, all lies in the finish. Each wheel in a watch must be thoroughly finished; and so each word in a sentence must be most completely and carefully pronounced. This will make reading both pleasant and audible. Careful pronunciation is more important than noise: some time ago I heard a person make a speech in a large Hall, he spoke distinctly and I heard every word, unfortunately he became warm in his subject and spoke loudly and energetically and immediately his speech became an inarticulate noise. *Secondly*, Do not drop the voice at the end of a sentence, simple as this rule may appear, it is one most necessary to enforce. If the whole of a sentence be audible except the conclusion, the passage read becomes discontinuous, a series of intelligible portions interspersed with blanks. Confusion of necessity attaches to the whole. *Thirdly*, Always read from a full chest, the reading voice should always be a complete *voce de petti;* and the chest, which is truly the wind chest of the human organ, should never be exhausted. This is as important for the hearers as the speakers. The voice is delivered with ease and becomes agreeable, singers know the importance, indeed the necessity, of taking breath at proper places. The same thing is important for reading in a large building, where attention to this matter is indispensable.—*The dean of Ely.*

Sir Joseph Paxton.

Sir Joseph Paxton is dead, full of honours if not full of years. He began life the son of a poor farmer—a gardener's boy—he died a Member of Parliament, in free and friendly intercourse with every one worth knowing in all ranks of educated society. If he was not a man of genius he was very near it. On every subject to which he paid attention he had ideas worth listening to. His head was so noble and intellectual in its character and size that he attracted attention the moment he took off his hat in any crowd. He was one of the kindest, the most hospitable, of men; full of enthusiasm for every possible improvement, with great taste and wonderful fertility of invention. He was always ready to help humble merit, and although intensely fond of talking, listened most patiently to a poor man,s tale. As a landscape gardener he was unrivalled; as an architect he produced a revolution in public buildings. His greatest work, the Crystal Palace, with its gardens, will every year bear witness to his skill and taste, and be still growing into beauty when his remains are dust. He will be missed in every grade of society. Seldom has a man so much flattered been so little spoiled.—*British Journal of Gas Lighting.*

Canadian Petroleum.

The *Trade Review* gives the following as the quality and yield from the crude Canadian oil The gravity is from 34° to 38°. From 100 barrels distilled the following is an approximate estimate of the yield, viz.:—

Illuminating oil	80 brls.
Lubricating oil containing Paraffine	8 "
Benzine	1 "
Refuse	5 "
Waste	6 "
	100 "

The above may be taken as a fair average. Some refiners might, however, get the different products in slightly different proportions, as their processes vary. The lubricating oil is allowed to be equal to any other for ordinary machinery, and will command at least double the price of illuminating oil, and the refuse is valuable as a lubricator for cart wheels and railway cars. It is also used with great success by some refiners in the States for mixing with other ingredients for purposes of distillation.

The number of wells in Canada cannot be less than four hundred, of which only about thirty are as yet in working order. Twenty of these are at Enniskillen, and ten at Bothwell. The yield is from five to sixty barrels a day. The price at the wells is from $4 to $4.75 per barrel. There are besides these several surface wells at Enniskillen which yield a heavy lubricating oil of a specific gravity of 26°. This oil is now much appreciated, and is similar to some crude oils produced in the United States which readily bring from $20 to $25 per barrel.

Turning Glass in a Lathe.

Glass may even be turned in a lathe. Strange as it seems, this is literally true. No special tools are even needed; any amateur turner who has operated on either of the metals may chuck a piece of glass on his lathe, and turn it with the same tools, and in the same way, as he would a piece of steel, only taking care to keep the chips from his eyes. This strange discovery was made, almost accidently, in the early part of 1860 by one of our most celebrated mechanical engineers, and might have been patented, but the inventor contented himself with simply putting it on record, and generously presented it to the nation. The consequence was, that no one cared or thought about it, and the idea has been suffered to lie nearly barren, though capable of being turned to great account. Let any amateur mechanic make the experiment, and he will be surprised at the ease with which this seemingly intractable material may be cut and fashioned according to his will.—*Chambers's Journal.*

Tom Paine and Cellular Bridges.

The London *Mechanics' Magazine* says that Tom Paine, the author of "The Rights of Man," was an engineer, and the undoubted originator of "Cellular Iron Bridges." In 1786 Paine made in America models of his bridges in wood, cast iron, and cast and wrought iron combined, which exhibited extraordinary skill in mechanics, and taste in construction. He also turned his attention to ships of war, and other engineering works. In 1788 Paine took out a patent for his bridges in England, and the bridge over the Wear at Sunderland can be pretty clearly proven to have been erected from Paine's model. He took his ideas from the spider's web, as the strongest mechanical method of construction; and the quills of birds, the bones of animals, reeds, and such like, were his models for increasing the strength of matter by dividing and combining it in a cellular form. In a memoir he presented to the American Congress, in 1803, he offers to construct a bridge, and requests that if his offer is not accepted, at least the memoir may be put on the journals, as evidence hereafter that the new system of bridging originated in America.

Mad Dogs.

One of the earliest signs of madness, in dogs, and one which should always arouse attention on the part of those in charge of dogs, is a sullenness combined with fidgetiness. When it means rabies, (madness,) the dog retires to his bed for several hours and may be seen curled up, his face buried between his paws and breast. He shows no disposition to bite, and will answer to the call, but he answers slowly and sullenly. After awhile he becomes restless, seeking out a new resting place and never satisfied long with one. He then returns to his bed, but continually shifts his posture. He rises up and lies down again, settles his body in a variety of postures, disposes his bed with his paws, shaking it in his mouth, bringing it to a head, on which he carefully lays his chest, and then rises up and bundles it all out of his kennel. If at liberty, he will seem to imagine something lost, and will eagerly search around with strange violence and indecision. That dog should be watched. If he begins to gaze strangely about him as he lies in bed, and if his countenance is clouded and suspicious, we may be certain that madness is coming on.—Sometimes he comes to those whom he loves and fixes on them a steadfast gaze, as if he would say, "I feel strangely ill; have you nothing to do with it?"

Dogs do not generally manifest a disposition to bite in the early stages of the disease, unless they are naturally ferocious, "but on the contrary there is an increase of affectionateness shown." Mr. Hewitt says, in the early stages of the disease, the attachmeut of the dog towards his master seems, rapidly to increase. He is employed almost without ceasing, licking the hands or face, or any part he can get at" The early symptoms of fidgetiness, sullenness, anxiety or affectionate importunity are equally to be attended to. No animal goes mad suddenly. There are always several stages of premonitory symptoms.

Cure for Hydrophobia.

A French physician, Dr. Buisson, of Lyons, appears to have discovered a cure for hydrophobia in the use of the vapour bath at a high temperature. He had cured many persons of hydrophobia by putting the patients so affected into a vapor bath, when he imprudently wiped his hand with a handkerchief wetted with the saliva of a hydrophobia patient on whom he was attending. There happened to be a slight abrasion of the skin of the index finger of the left hand, but, Dr. Buisson, confident in the virtue of his remedy, merely washed his hand with fresh water. He was, however, fully aware of the imprudence he had committed, and constantly intended to resort to the method of which he makes use in his practice, viz., the administration of the vapor bath every day, for seven days, until the perspiration has effectually eliminated the virus. He says, "Believing that the Malady would not declare itself until the fortieth day, and being very busy, I put off, from day to day, the application of my remedy, that is to say of vapour baths. On the ninth day, being in my cabinet, I suddenly felt a pain in my throat, and a still more voilent pain in my eyes. My body seemed so light that I felt as though I could jump to a prodigious height, or to throw myself out of the window, that I could sustain myself in the air. My hair was so sensitive that I fancied I could count each hair separately without looking at them. Saliva kept forming in my mouth. Any movement of the air caused me

great pain, and I was obliged to avoid the sight of brilliant objects. I had a continual desire to run and bite, not human beings but animals, and everything near me. I drank with difficulty, and remarked that the sight of the water distressed me more than the pain in the throat, and I think that, by shutting the eyes, patients suffering under hydrophobia would be able to drink. The fits came on every five minutes, and I then felt the pain start from my index finger, and run up the shoulder. In this state, fancying myself past cure, I took a vapor bath with the intention of suffocating myself. When the bath was at a heat of 52 centigrade (93, 3, 5, Fahrenheit) all the symptoms disappeared as if by magic, and I have never felt anything more of them, I have treated more than 80 persons bitten by mad animals, and I have not lost a single case." When a person has been bitten by a mad dog, he must for seven successive days take a "Russian Bath," as it is called, of 51 to 63 degrees. This is the preventative remedy. When the disease is declared, it only requires one vapour bath, rapidly increased to 37 centigrade and then slowly raised to 63; the patient must strictly confine himself to his chamber until the cure is complete. Dr. Buisson mentions, among other curious facts, that an American who had been bitten by a rattlesnake about a league from his home, and wished to die amidst his family, ran to his house, and there, going to bed, perspired profusely, and the wound healed like a simple cut. The bite of the tarantula adds the Doctor, is cured by dancing, the perspiration which ensues eliminating the virus; and if a child is made to take a bath after vaccination, the vaccine does not take.

Benzol in Canadian Petroleum.

In a note to a long and interesting paper on certain hydro-carbons obtained from petroleum, read before the Royal Society, on April 6th, by Mr. C. Schorlemmer, of Owen's College, Manchester, it is stated by that gentleman that he has found "a not inconsiderable quantity of hydrocarbons of the benzol series in Canadian petroleum." He first found traces of these compounds in some petroleum oils upon which he was experimenting, and which he supposed to be American. Pelouze and Cahours, however, state positively that the American petroleum used by them did not contain hydro-carbons of the benzol family. Knowing, therefore, the marvellous accuracy with which all experiments have been carried out by these famous chemists, Mr. Schorlemmer thought it not impossible that there had been some accidental or intentional mixture. He accordingly endeavored to procure an authentic specimen of crude Pennsylvania petroleum, but unsuccessfully, as none had come into the Liverpool market for several months. He, however, succeeded in getting some real Canadian rock-oil, in the shape of thick, black liquid, having a very unpleasant odor. He distilled it, and treated the portion, boiling below 302° F. (150° C.) with concentrated nitric acid, which acted upon it with great violence. The acid liquid was then diluted with water, and heavy nitro-compounds separated, possessing the characteristic odor of bitter almonds, belonging to nitro-benzol and its congeners. These were treated with tin and hydrochloric acid, and the solution obtained distilled with caustic potash. The aqueous distillate, in which drops of an oily fluid, possessing several of the properties of aniline, were found, gave, with a solution of hydrochlorate of lime, the most distinct violet color, showing without question, that aniline was present. The test was further affirmed by the addition of a few grains of bichloride of mercury, which formed rosaniline crimson. There can be no doubt, therefore, that Canadian petroleum contains the series of benzol compounds, which, as our readers know, form the starting-point of the aniline dyes. The importance of this discovery depends, in a great measure, upon the amount of benzol compounds to be obtained from Canadian petroleum; and we could have wished that Mr. Schorlemmer had given us a more definite idea of the amount of these bodies contained in the crude oil than "a not inconsiderable quantity." When will chemists give up the use of such terms as "a little," "a small amount," etc.? Whether the American oil will yield these bodies remains to be proved, and we should advise those of our readers who possess authentic specimens of American oil—and there must be many such—to try the simple series of experiments necessary to prove the presence or absence of these important hydro carbons.—*Chemist and Druggist.*

Business Rules.

An Eastern paper gives the following seasonable and excellent rules for young men commencing business:—

The world estimates men by their success in life, and, by general consent, success is evidence of superiority.

Never under any circumstances assume a responsibility you can avoid consistently with your duty to yourself and others.

Base all your actions upon a principle of right; preserve your integrity of character, and in doing this never reckon on the cost.

Remember that self-interest is more likely to warp your judgment than all other circumstances combined; therefore look well to your duty when your interest is concerned.

Never make money at the expense of your re putation.

Be neither lavish nor niggardly: of the two avoid the latter. A mean man is universally despised, but public favor is a stepping-stone to preferment; therefore, generous feelings should be cultivated.

Say but little—think much and do little.

Let your expenses be such as to leave a balance in your pocket. Ready money is a friend in need.

Keep clear of the law; for, even if you gain your case you are generally a loser.

Avoid borrowing and lending.

Wine-drinking and smoking cigars are bad habits; they impair the mind and pocket, and lead to a waste of time.

Never relate your misfortunes, and never grieve over what you cannot prevent.

Dry Soil Closets.

The deposits are at once deodorised by coal ashes or dry finely pulverised earth, and thus thrown out into a shoot or iron bin for removal by the dustman's cart, or for garden use. These closets are coming much into use in England, where drainage is imperfect. By the admixture of earth or ashes with night soil, it is not only immediately deodorised, but the ammonia and other fertilising properties are absorbed and retained for the field or garden.

A Cheap and Valuable Paint.

The *Genesee Farmer* says:—"One of our neighbors has painted his out-houses, fences, &c., with a paint made as follows, and found it nearly as good as oil paint, and vastly cheaper. In fact the cost is scarcely anything except the labor:

"'Take half a bushel of nice unslacked lime; slack it with boiling water, cover it during the process to keep in the steam, and add to it a peck of clean salt, previously well dissolved in warm water; three pounds of ground rice, boiled to a thin paste, and stirred in boiling hot; half a pound of clean glue, which has been previously dissolved by first soaking it well, and then hanging it over a slow fire, in a small kettle within a large one filled with water. Add five gallons of hot water to the whole mixture; stir it well, and let it stand a few days covered from the dirt. It should be put on right hot; for this purpose, it can be kept in a kettle on a portable furnace. It is said that about one pint of this mixture will cover a square yard upon the outside of a house, if properly applied.

"'Brushes more or less small may be used according to the neatness of the job required. It answers as well as oil paint for wood, brick or stone, and is cheaper. It retains its brilliancy for many years. There is nothing of the kind that will compare with it, either for inside or outside walls. Coloring matter may be put in, and made of any shade you like.

"'Spanish brown stirred in will make red or pink more or less deep, according to the quantity. A delicate tinge of this is very pretty for inside walls. Finely pulverised common clay, well mixed with Spanish-brown before it is stirred into the mixture, makes a lilac color. Lamp-black in moderate quantities makes a slate color, very suitable for the outside of buildings. Lamp-black and Spanish-brown mixed together produce a reddish stone color. Yellow ochre stirred in makes a yellow wash; but chrome goes farther, and makes a color generally esteemed prettier. In all these cases, the darkness of the shade will of course be determined by the quantity of coloring used. It is difficult to make a rule, because tastes are very different; it would be best to try experiments on a shingle, and let it dry. We have been told that green must not be mixed with lime. The lime destroys the color, and the color has an effect on the whitewash which makes it crack and peel.

"'When walls have been badly smoked, and when you wish to have them a clean white, it is well to squeeze indigo plentifully through a bag into the water you use, before it is stirred in the whole mixture.

"'If a larger quantity than five gallons is wanted, the same proportions should be observed.'

"Our friend says that thirty cents worth of coloring matter will be enough for the half bushel of lime. Spanish-brown, yellow ochre, cost three cents a pound. Lamp-black and Princes brown five cents a pound. The latter gives a handsome lilac shade."

Pins of Commerce.

The pins of commerce—so familiar to us all—are of various sizes, from the large three inch blanket pin to the smallest ribbon pins, of which 300,000 weigh only one pound. But then there is even a smaller; we allude to the smallest of the insect pins, used by entomologists. In Gloucestershire, pin making was introduced in 1662, giving employment at that remote period to upwards of fifteen hundred persons. In London it was established ten years later, and subsequently in Birmingham.

Previous to the introduction of machinery for the purpose, pin manufacture was one of the greatest prodigies in the division of labor, as it furnished 12,000 articles for three shillings—each of which engaged the united diligence of fourteen operatives. A workman could head fifteen hundred in the course of an hour, a boy could point 16,000 in the same brief space, and a smart child acquired the habit of papering 36,000 per day! Most interesting fact, connected with this branch of our subject, may be found in "Smith's Wealth of Nations," as well as in "Babbage's Economy of Manufactures." But all of these operations have since been brought within the scope of machinery of marvellous ingenuity.

During the war of 1812, in consequence of the interruption of commerce a paper of inferior pins sold *here* for one dollar, which can now be had for six cents. This exorbitant price induced Englishmen, confined in the Old State Prison in Greenwich village (now a part of the city of New York) to attempt their manufacture; but when the war was ended, this country was suddenly glutted with English pins, at a price so low that the Greenwich enterprise was ruined. In 1820, the manufacture was once more resumed in New York, and again was unsuccessful.

Pins were first made by machinery in England, in 1824, under a patent of Lemuel W. Wright, of Massachusetts—who invented the first solid-headed pin. Wright's *original* machine made forty perfect pins per minute—from the coil of wire—without any manual assistance. It was very easy of adjustment, as the pins could be lengthened and strengthened at pleasure; but the inventive genius of the forty years has greatly improved even it. J. J. Howe obtained patents both for the United States and England, in 1832–34, and established the Company in New York, which was subsequently located at Birmingham, Connecticut. S. Slocum obtained another patent, and in 1838 established their manufacture at Poughkeepsie—but his interest was finally transferred to the "American Pin Company" at Waterbury, Connecticut, which is now the largest factory of the kind on this continent, perhaps in the world. The papering of pins is likewise done by machin-

ery, patented by T. Fowler, also of Connecticut—one person only being required to attend to this wonderful piece of mechanical ingenuity. All of these improvements, *originating in the United States*, have been for several years adopted in England, and throughout Europe. At the present time, the total weight of pins manufactured in this country is upwards of twelve tons per week, and in quality they are quite equal to those of British manufacture.—*Home Journal.*

Rules to observe when you handle a Gun.

Whenever you take a gun in your hand, inquire if it is loaded. Should there be no person to answer you, if the gun is a muzzle loader, place the butt on the ground, outside the left foot, having previously fixed the hammer at half-cock, and holding the muzzle in a forward direction, clear of your person, draw the ramrod, insert it gently into the barrel. If there is a charge in, you will feel the "thud" of the ramrod upon it, while the rod's upper end will project about three fingers' breadth above the muzzle of the gun. Should the piece not be loaded, the ramrod will sink right down, and the broad metal end will soon announce the empty barrel by the tap against the breech-plug. Never handle a loaded gun except for the purpose of discharging it, and never, at any time, in jest or earnest, point a gun at any living thing you don't deliberately intend to kill.

Swallows.

As a proof of the valuable services rendered by swallows, it is estimated that one of these birds will destroy, at a low calculation, nine hundred insects per day, and when it is considered that some insects produce as many as nine generations in a summer, the state of the air but for these birds may be readily conceived. One kind of insect alone might produce 560,970,480,000,000,000 of its race in a single year.

The Coarse Arts.

"The fine arts do not interest me," said Theodore Parker, "so much as the coarse arts, which feed, clothe, house, and comfort a people. I should rather be a great man as Franklin than a Michael Angelo—nay if I had a son, I should rather see him a great mechanic, who organized use like the late George Stephenson, in England, than a great painter like Rubens, who only copied beauty. In short, I take more interest in a cattle show, and feel more sympathy with the pope's bull than his *bul lum*. Men talk to me about the absence of art in America. You remember the stuff which Mr ——used to twaddle forth on that theme, and what transcendental nonsense got delivered from gawky girls and long-haired young men. I tell them we have cattle-shows and mechanics' fairs, and ploughs and harrows and saw-mills, sowing-machines and reaping-machines, threshing-machines and planing-machines. There is not a saw-mill in Rome. I doubt if there is in the Pontifical States."

It costs nothing to carry knowledge, and you do not know what day it may become of use to you.

SUMMARY.

Virginia, says the *Petersburg News*, has not a glass factory, a button factory, a paper mill, a broom factory, a manufactory of wooden ware, a brass foundry, a porcelain factory, a chair factory, a carpet mill, a pin machine, an agricultural implement factory, a manufactory for cutlery, a type-foundry, a factory wherein a single article of printer's use is made, a brewery, a calico-print factory, a lock factory, a linen factory, or a cotton factory, above capacity for the commonest work. ——It is proposed to construct a Pneumatic Railway from Whitehall to one of the Railway Stations, which shall run through an iron tunnel under the River Thames. Another Metropolitan Railway of 8 miles in length is projected, that will run through the Thames Tunnel.——A Mr. Gale of Plymouth, England, has discovered a mode of rendering gunpowder non-explosive, in five minutes; and in another five minutes to restore its explosive character. Powder thus prepared may be stirred with a red hot poker, or a shell may burst amongst it, without exploding it.——A large deposit of guano, some eight hundred cubic metres, the produce of bats, has been discovered in a cave in France.—— For some time past the Second Avenue Street Railway cars, in New York, have been run by three "dummy" engines. They can be stopped more readily than horse-cars, and so far no accident has occurred.——A poor man who was killed in one of the recent railway disasters in England, had paid 4d. for a return journey Insurance ticket, and his family received thereby £500 sterling. A poor compensation to the family for the loss of its head, but proves the utility of such Companies. ——The late Handel Festival in the Sydenham Crystal Palace, composed of 4,000 performers, is described as the most stupendous Musical performance the world, perhaps, ever knew.—— Another new light is said to have been discovered in Turin, Italy, applicable both to photography and social life, and costs little or nothing. It does not dazzle the eye like the electric light, nor is it intermittent like that produced by magnesium. We are anxious to know what it is.——One of the peculiarities of the magnesium light is, that it displays colors as in sunshine, which fact may be proved by burning some wire in a garden at night. It is now used to distinguish delicate shades of color at night, or during cloudy or dark foggy weather, as well as in taking photographic pictures.

The reading of a large proportion of the light and frivolous books now-a-days published, is a mere fashionable duty, entered into not for any supposed advantage to be derived by the reader, except to avoid being deemed out of the mode.

In no kind of employment are the chances of reaching a given result, through a long series of years, so great as with the Farmer.

Many persons find it difficult to take the lower box from a copper pump. Just pour some hot water on the outside of the pump and it will expand it so as to release the box.