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AGRICULTURIST

MANUFACTURING, COMMERCIAL, AND COLONIZATION INTELLIGNCER:

OFFICIAL SERIES OF THE AGRICULTURAL BOARD AND SOCIETIES

PUBLISHED UNDER THE DIRECTION OF

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Member of the Provincial Parliament for the County of Richelieu.
Pupil of the Royal Agricultural College of Cirencester, Gloucestershire, England
and of the Imperial Agricultural School of Grignon, Seine and Oise, France
Member of the Imperial Zoological Society of Paris, &c.

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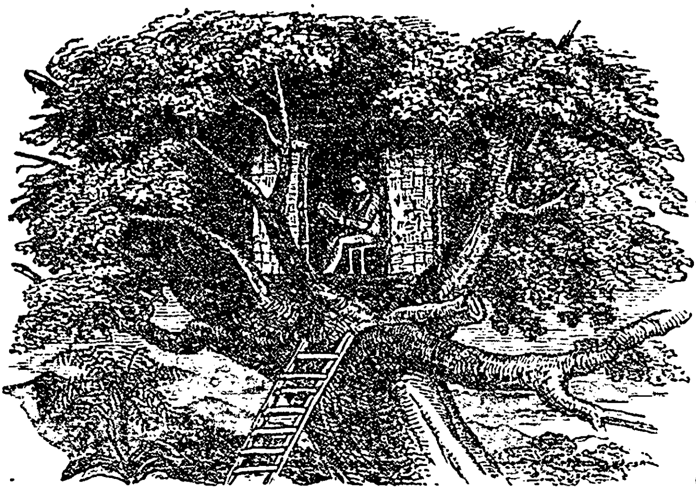

SCIENCE IN AGRICULTURE.

Agriculture, like every technical pursuit, is based on experience, that is, on the perception by the senses of facts and phenomena; and it has been enabled by experimental art to reach a certain stage of development. Simple observation shows a connection between the condition of the soil and its fertility. Thus a certain porosity and dark color bespeak frequently a heavy wheat crop. But as all soils do not possess porosity and blackness, experimental art seeks out the means of communicating these properties. It endeavours to produce for a given object, a passing or permanent connection between two facts; it seeks to win from the soil a high return by this or that plant, manure, or other means.

Every object attainable by experimental art must be pursued with certain ideas, but it is immaterial whether these ideas be right or wrong. For if we seek an object without knowing the proper way to do so, each path taken by us is, for the time being, the right one. If, then, thousands of persons with the same desire strike out thousands of different courses, it will generally happen that something useful is discovered, although not precisely the object sought. In this way trades have been developed. It is almost incredible what can be done, and has, in fact, been accomplished in this way.

The connection between two objects, such as the soil and manures, is known only through means of a third, viz., the amount of produce. For the practical man, "the matter-of-fact man," there exists no other connecting link.

The exercise of a trade pre-supposes no intellectual labor; a knowlege of facts, and of their visible manifest connection with each other, being quite sufficient for the purpose. The baker knows nothing about flour, leaven, or the influence of fermentation and heat; the soap-boiler is ignorant of the nature of the alkaline lye, of fat, and of soap; but doth know that by taking certain steps bread or soap is produced. If the articles look well they are said to have succeeded. In like manner, a few years ago, the agriculturist knew nothing about the soil, the atmosphere, or the action of the plow or of manures; things with which he was daily occupied.

The efforts of every tradesman are, as a matter of course, directed to his profits; every improvement in his business has the increase of his income for its object. Hence the baker regards the highest effort of his art to be the production of a white and weighty bread from inferior and bad colored flour; and the soap boiler aims at manufacturing from bad fatty matters a soap with good external aspect. The practical agriculturist, in the same way, endeavors to reap the richest harvest from the poorest soil with the least expenditure of labor and manure. In this petty aim is manifested the pa try principle of the small manufacturer.

The progress of every trade by mere empirical experience, and also that of agriculture has a limit. Every experimental method comes to an end when the senses are no longer sufficient for the perception of facts; when no new circumstance is presented to the sense for perception, when, in short, everything has been tried, and the facts resulting from such trials have been adopted into the par icular a t or trade. Further progress can then only be looked for, if hidden facts are sought out, the senses are sharpened for their perception, and the means of investigation are improved. But such a course is not possible without reflection, without the mind also taking in its share in the operation.

It is long since agriculture has reached this point of its progress. As, however, in following out their own practical mode, agriculturists had never troubled themselves about the way or the means of discovering hidden facts, it was evident that without the aid of Chemistry,—the science which communicates this knowlege,—they could never attain their end. Chemistry most readily responded to the call. In the very outset the practical agriculturist was informed by the chemist that his conception of the words had a fixed and definite meaning, and that it was only in this strictly defined form that they could be employed in processes of reasoning. Chemistry thus elevated more practical notions to the rank of scientific conceptions.

The newly-acquired conception of manure was accepted with enthusiasm by agriculturists, and they set themselves with zeal to work it. It was known that manure was the most important element in increasing a crop. It had been shown that the word "manure" was a collective term; that it consisted of parts, and that its activity depended upon its constituents. The practical agriculturist now began to operate with the parts as he had done with the whole manure. But as a part can never replace a whole, so the results, by this mode of proceeding, did not answer his expectations. No progress was made. Enthusiasm began to cool, and reaction commenced.

"It is utterly absurd," says Mr. Pusey, (late President of the Agricultural Society of England,) "to put any value on the doubtful precepts of Chemistry. It has done nothing for agriculture, with the exception of giving a r ceipt for increasing the efficacy of bones by the action of sulphuric acid, and of proposing to employ flax water instead of liquid manure. We must keep to practice, for it alone is worthy of confidence." Every practical man in Germany, England, and France, quite agreed in this opinion. Chemistry had done them no good; it had not increased their crops, nor augmented their incomes.

As if freed from a frightful nightmare, blind, empirical practice again raised her head, and made new and extraordinary efforts to refute the conclusions drawn from scientific principles. The continued efforts of ten years have, however, shown that practice has only been moving in a circle, like a horse in a mill. More horses have been yoked; but as the beam was not lengthened, the circle has remained the same, only somewhat more trodden than formerly.

A new movement now occurred in agriculture. Science pointed out that the very facts destined to refute her doctrines, exhibited the fullest proof of their soundness. Agriculturists had themselves to blame for their want of success, by not taking the right path and by mistaking the nature and essence of science. It is not at all the province of science to seek out the means of increasing produce or augmenting incomes. She inquires not after what is profitable; this belongs to experimental art, with which she has been confounded. The business of science is to seek for causes, and, like a light, to illuminate the surrounding darkness. Science confers power, not money; and power is the source of riches and of poverty,—of riches when it produces, and of poverty when it destroys; it is expended by use, and renewed by supply.

If agriculture is to arrive at results which are to be lasting, she must decide upon entering on that path which science has recognized to be the only trustworthy one to lead to a knowlege of hidden objects and their relations. This could be done without renouncing one of the facts acquired by experience. There is no lack of these, but agriculturists are at fault in their mode of comprehending them. They must, in the first place, desist from drawing hasty conclusions for special purposes from these facts, and only occupy themselves with investigating the proximate conditions of all the facts connected with the life and development of plants, the production of which is their object. From the favorable action of the constituent of a manure in one case, they must not at once infer its equally favorable action in another, in order to derive immediate profit from it; but they ought, in the first place, to inquire into the reason of its good effect in the special case.

Such investigations are in an agricultural point of view greatly facilitated by all the conditions of the incidents, or effects, or their proximate causes, being clearly perceptible by the senses, and palpably manifest if we know the proper way to proceed.—*Liebig.*

FARMING VS. OTHER CALLINGS.

THIS subject has, perhaps, occupied too much of your precious space already, and I thought not to continue the discussion, until in a late issue your Maine correspondent argued so strongly in favor of the mechanic and merchant, that I could scarce refrain from immediately taking up my pen in behalf of the under-valued farmer. I have but this one paper before me, but I believe the discussion commenced in favor of farmers' boys continuing to cultivate the soil for a livelihood, instead of seeking to make fortunes by other pursuits. Now I am not going to argue that in the line of money-making, farming has no business competitor—that sufficient of the "ready" may not be collected more speedily *in some other way—but I think I can* convince some intelligent reader of the Cultivator that health and happiness is wealth, and that the beaten track which the farmer pursues in his daily routine of industry is the highway of ease, contentment, honesty, health, and consequently of happiness—that the farmer's wife has no cares which are not common to the working class of all vocations—that she may be as accomplished and *intelligent as any of the* daughters of our land, and that her house, furniture and surroundings may be, and often are, as stylish and elegant as those of the professor, merchant, or mechanic.

Now, as I said in the commencement, it may be that fortunes are sometimes more speedily accumulated in other ways than by farming; and yet in these days of "fast living," where is the man of any grade who has arrived at the summit of opulence without having received his upward start from some relative or friend? A few of fortune's favored sons have—and but few—who may be esteemed honorable exceptions to the rule. In the olden time, when poverty and styleless living was thought no disgrace, young people could marry without a shilling ahead, "give a long pull, a strong pull, and both pull together" at the wheel of industry, and finally arrive at competency. Yet these days may be numbered with the things "that were, and are not." A young man must now have a fortune equal to her whom he wishes to make his partner for life, else she will refuse to become such. The farmer boy must have the homestead in expectation, and those who leave the farm for other pursuits, a generous "lift" in cash, else laborious toil and scanty living are too often their attendants through life. The gentleman to whom allusion was made contrasted but two classes with the farmer, viz. the mechanic and merchant. I will do the same.

To the mechanic we will suppose a trade has been given, and perchance a little of the shining dust in addition. He leaves his home, a little reluctantly, perhaps, but with hope beating high in his bosom, to seek his fortune anew, it may be, among strangers. If he needs a house, he invests his little capital in one, which he is happy in calling his home, and becomes a journeyman mechanic. If he is sick, or desires a holiday, or week, he loses his time, which is money to him, consequently he allows himself but little leisure. Day by day he toils on—and for what? not with the ex*pectation of riches, or to accumulate much* beside the common necessaries of life, for which he is wholly dependent upon the farmer; and when he makes his purchases, how often is he dissatisfied with his choice —*this or none.* He must accept of what he can get handily, and do without the rest. And in this respect the employer is not a fig better off than the employed. Often the young mechanic invests his all in business for himself, and as all know too often becomes bankrupt.

Your correspondent seems to regard the mercantile class of men as in enviable positions—having elegancies of life, with less labor, etc. Now while it is true that a few tradesmen are rich and able to live in luxurious ease, is it not equally true that by far the greater share have the semblance of wealth without the substance? Their families may live in a very "genteel" style, and luxuriate in abundance for a time, but by and by "a change comes over the spirit of their dream," and they awake to find themselves penniless. From observation I am inclined to credit the assertion that 90 per cents of all those who engage in trade fail.

The farmer's life, in comparison with that of the mechanic or tradesman, is a life of ease. Startle not at this announcement, dear reader, and I will tell you why. I have already described the toilsome life of the mechanic, and who will say that the weary unrest of mind—not to say conscience—of the mercantile man is any the less so? Heaven has bequeathed no occupation so replete with ease and peace of mind as that of the farmer. Farmers have their hurrying times—weeks when they toil from early dawn till evening—and in compensation, they have rainy days in plenty, for holidays, and weeks when they have little to do. If wife, sister, or daughter, propose going on a visit, they can attend them without loss, as their crops are growing the while, and time with them is *not money.*

A farmer can so arrange his business as to have little to do in winter. He should improve the first snows in getting up his year's supply of wood—immediately prepare it for the stove, and get it into his woodshed. If he have no lumbering to do, what can a northern farmer do in mid-winter but to tend his stock? He has plenty of time to read, visit, and do what he pleases. He usually leads a quiet, sober, honest, and contented life, and is free from most of the temptations which ensnare so many of our youth who leave the farm for city or village life. The pure breezes of the country invigorate his frame, and make him hale, jocose, and a candidate for long life. The successful farmer usually retires from business much earlier than most men, and not unfrequently do we find those who never have done much but manage their farms.

Now do not bewail the hard fortune of the farmer's wife or daughters; for ten to one of all the women of the land delight in country life, and would not exchange their comfortable homes for a display of beauty in towns. They had a thousand times rather "milk the cows and make the cheese," than to have their homes over-run with boarders, who are looking to them for a luscious dinner, which is obtained only from the rich storehouse of the farmer. Say not that elegance is unknown here—that there are no splendid houses and surroundings in the country. What should prevent? Not wealth, nor space, nor taste, nor lack of refinement of mind. All these things are as common in the country as elsewhere; and I doubt if more elegant houses, furniture, and surroundings, can be found in any country village than on the farm. The spirit-reviving music of the piano, harp, or melodeon, mingle with the voice of birds and the murmuring brooklet. Luxuriant gardens, with flowers of various hue are all around. "The orchard, the meadow, the deep-tangled wild-wood," and "the cattle upon a thousand hills," lend enchantment to the view, and surcharge the heart with happiness, *which is wealth.* Then let *me* dwell—" 'mid bowers and brooks, and, dearer yet, the sunshine of kind looks, and music of kind voices ever nigh" *forever.—Cor. Boston Cultivator.*

FARMERS ENCOURAGE YOUR BOYS.

A few years ago, it was a very common practice for farmers' sons to leave the farm as soon as they could get away from it—and the fathers themselves not unfrequently encouraged them in it. A hard hand, and a sunburnt face were considered as poor recommendations in life, if not deemed actually degrading, and the young men sought for some more "genteel" mode of getting a living. But a great and wholesome change has taken place in public sentiment in this respect, which promises to do much for the improvement of the country, and the condition of our people. We are beginning to look at the matter in its true light. The financial panics and reverses through which we have passed, have opened our eyes to the fact that no class of men can stand through all times like farmers. Though oft-times repeated, it is still true to the letter, that our farmers, as a class, are the most "independent" of all our people. It is true that, as a class, they are hard working men, but it is also true, that in what constitutes wear and tear of mind,—to which so many of the more "genteel" callings are inevitably exposed—the farmer is, happily, mostly exempted. He may in many cases be obliged to work hard, but it is work that leaves him a good digestion, and sound strength-restoring sleep.

No better proof can be asked, than that every year brought home to us in the numerous cases of men who, having spent the best years of their lives in mercantile pursuits, and accumulated a few thousand dollars, hasten to throw off their cankering cares, and seek bodily and mental rest among the crops and herds of the farm.

Then, farmers, encourage your boys. Encourage them, by word and example, to become farmers. Convince them, by examples within your own knowledge—which every farmer can do—that a temperate, prudent farmer, never fails to secure a good living, a respectable position in society, a sufficiency of worldly goods to carry him safely through his old age, and a peace of mind to which most other professions and callings are more or less strangers.

Much depends upon first impressions. Be careful, then, that the first impressions of your boy shall be favorable. Be cautious that you do not lay too heavy burdens upon him while his body and mind are "growing." Many a boy has been ruined, and many another has conceived thorough hatred and disgust of farming, simply because they were subjected to too heavy tasks while their bodies were yet tender. Be mindful, then, that you do not require too much *work* from him while he is "getting his growth." You are never so forgetful as to over-work your young steers, or colts. Be at least as mindful of your boys.

Encourage your boys, by giving them good tools to work with. Don't put them off with the meanest hoe, and the meanest rake you have, but provide them with as good tools as you use yourself. We shall never forget our pleasure when we were furnished with a new hoe—"a little smaller than father's." We worked among the corn with a lighter heart after that, and the task of hoeing seemed less onerous than before.

Encourage them by giving them something to call their own, a lamb, a calf, a patch of land to cultivate, or a fruit tree to watch over. No matter what it may be, so that it be something that they can call their own, and see it gradually increase in value day by day.

Encourage them to pick up a penny or a dime whenever they can do so honestly, and when they have got them, encourage them to make judicious investments.

But enough. It is not necessary for us to point out the thousand ways in which a boy can be encouraged to become a prudent, industrious, and respected man. Each father can easily find ways of his own. It is enough that we have suggested the theme for him. We believe in the healthfulness, the reasonable profit, and the respectability of farming, and we would gladly see every encouragement given to our boys to become farmers.—*Plowman.*

AUTUMNAL COLORS OF FOREST TREES.

THE ordinary belief of nine in every ten people who speak of the change of color in our forest trees in autum is that it is due to frost alone, without even inquiring the reason why, if frost so changes the leaves, their color is not, in each variety tree alike?

As the change occurs in the season of frosts, they are unmindful whether it be previous to or after the first frosts have stricken them. Now, a thought or two upon the organic composition of those leaves would readily convince them that the changes were due to their gradual ripeness and decay, and that the frosts have nothing whatever to do with the high coloring they acquire, other than to distact, when it prematurely strikes them, from the rich, luxuriant, and full development which, in the absence of frosts, they would, in every successive season, each in its kind acquire alike.

The leaves of every different species of tree or shrub is composed of chemical elements, intermixed in greater or less degrees, which, when fully matured, and in their process of ripening, act variously upon each other, and develop those beautiful colors so gorgeously displayed, and never so strikingly as on the wide breast of a hill or mountain forest in the month of October up to the time of their falling into decay; and never is this display so grand and luxuriant as after a fine, genial season of full warmth, abundant rains, and a withholding of the frosts, giving the leaves abundant opportunity to perfect their growth and ripeness.

In all their thousand varieties, evergreens included,

"Leaves have their time to fall."

But accidental, or unseasonable influences may cause those times to be earlier or later Thus an early drouth, a blight at the top, a canker at the root, a violence at the bark on its stem, or a long flooding of the tree with water, will cause a change of color in its leaves a month earlier than is its natural wont, even to the entire shedding of the leaf before a sign of frost is visible. When a sharp, early frost strikes the leaves of our trees while they are yet green, they turn pale, dull, lifeless and crisp. The flow of their sap is chilled and they die at once. The chemical action of the elements composing them is languid. Yet it does move to a degree, in the mild and sunny days which follow, sufficient to elaborate their natural colors approximating to ripeness, but not fully. The leaf stems wilt and become toughened, holding them to the branches, perhaps for weeks. They may waver in sickly life even to the end of the season, but they are "frost work," after all. There is a moral to be learned in this last fact, when tree planters and those who wish to enjoy the full beauties and luxury of the material which embellish their grounds. The most luxuriant and well cultivated trees have thicker, heavier, hardier leaves than those of slow, stinted growth on poor land. They withstand frosts better, and have their autumnal colors brighter and later than the weaker trees. Perhaps the fact is not generally observed, but investigation will prove it. At first thought, it may appear to be only a poetic or fanciful view we have taken of the subject, but we believe there is something in it—*L. F. Allen, in N. Y. Obs.*

A FARMER'S THOUGHTS.

If the winter and early spring months are wisely and properly improved, the advantage and beneficial results arising therefrom will be plainly seen and felt throughout the year.

The farmer's duties and labors are not confined exclusively to the farm. Most farmers have sons and daughters to educate and fit for the varied duties and responsibilities of mature life, —and it is at this season of the year that the greatest portion of them receive the most of their education. This season of relaxation from farm labors affords them an opportunity to cultivate their minds and stock them with useful knowledge; and it is highly important that they should be properly trained and disciplined; for the human mind is a prolific soil, and without proper cultivation will send forth spontaneous productions, the evil consequences and influences of which will be seriously felt in every branch and department of society. At this season, every farmer, however advanced in life or well skilled in his profession, can find time for study, and gather new ideas that will enable him to prosecute his labors more successfully, and thus advance the interests of his high calling. Notwithstanding farming is an honorable and indispensable avocation, it is but lightly prized by many farmer's sons, and they seek other employments and follow less honorable pursuits But from a glance at the present condition of our country, I apprehend that the benefits and importance of Agriculture will ere long become more apparent even to a casual observer—and though it may not be the speediest road to wealth and distinction, it will be found to be a more sure foundation to build upon.

OUR FARMERS' CLUB.

In Feb. last, I took it into my head to get up a "Farmers' Club," and succeeded so well, considering many adverse circumstances, that I have now " taken it into my head to tell of it, and give our readers a wee bit of our sample, that some of them may be encouraged to go and do likewise—for sure if I can start a Club in a place where there has not been one for 40 years, any body can start one in a more favorable place.

We began with about a dozen members, Feb 10th, and met every Monday evening till April 14th, when the evenings being short, the going bad, and house wanted repairing, we discontinued with 25 members, having had interesting, profitable and very pleasant meetings.

Nov. 24 we resumed our meetings with good interest, and have now had four meetings this winter and number fifty members. I think one reason of the success of our Club thus far, is that it was formed for a more thorough dissemination of agricultural knowledge; 2d The promotion of acquaintance among ourselves 3d The improvement of its members, conversation, composition and public reading and speaking, 4th, The improvement of farms, farm implements, stock, buildings, and every department of agriculture.

The regular exercises of the meeting are " reading of the minutes of the last meeting, an original essay or speech not exceeding 15 minutes in delivery, and discussion upon the subject announced at the previous meeting. I think it is generally the opinion of the members that our meetings are among the most pleasant and profitable meetings of any description that were ever held in our village; and I wish similar ones were in progress in every village and hamlet in the country, and I know of no possible reason to prevent it. It's all moonshine that they can't be sustained because there are none or but few public speakers. Sustaining such a Club is just the way to make public speakers. No one can ever succeed in anything that they never tried to do. It is really amussing as well as remarkable, to see how rapidly grown up men will improve in public speaking after the " ice is broken, and the breaking is not really as bad by a long chalk, as it is cracked up to be—not half as bad as breaking baulky steers. No farmer who has raised a crop of corn is unable to tell a neighbor about how he did it, or two neighbours together, and it is as easy to tell 10 or 20 neighbors as one or two, all the difference is "in your eye."

But the actual agricultural profit of such Clubs is no trifle. I believe this town is worth more than one or two hundred dollars more than it otherwise would be in consequence of our neighborhood Club, for it does not embrace more than a fourth of the town in any respect. The scarcity of labour is getting to be such that every available agricultural facility is in requisition that agricultural products may be forthcoming proportionate to the demand. The war rests on the farmers themselves, and there never was a time when the best implements, breeds, seeds and methods of farming were so necessary as now; and he is a mean creature, not worthy to be called a man, who possesses either and is unwilling to tell others of it and facilitate their obtaining the same. Agricultural *periodicals are good, very good, and no* farmer can afford to be without one; but farmers' Clubs can do local good that they cannot do. The reports of the discussions of farmers' Clubs, published in the papers, are often so belabored for the press that much of their usefulness is lost to us plebeians.

A gardener of Dedham, U S., has raised this year on 285 feet of ground, over seven and a half bushels of well-ripened tomatoes.

The cheapest food for fattening poultry is ground oats. The grain is ground to a powder.

FARM OPERATIONS.

PREPARE FOR WINTER.

There are many small things that require attention in winter. A gate not kept fastened by a good self-fastening latch, and swinging in the wind, will be more injured in a short time, than by months of legitimate use. An *equal injury is sustained* if the gate has sagged and the latch strikes some other part of the post. Take a mild day and attend to all of them. It is important to keep latches and hinges greased; and in order to have grease always at hand when wanted, bore an inch hole in some part of the gate-posts, put in a lump of tallow and plug it up. It is then always ready.

Every farmer knows that a gate is rapidly twisted to pieces when it has settled, and has to be dragged over the ground every time it is opened and shut. The same injurious result is produced when snow drifts from an obstruction to its motion. All farm gates should therefore be so constructed as to be capable of being raised a foot or two, to avoid the snow. The raising of the gate is accomplished in various ways. One, which answers well where the amount of snow is small, is to make a screw and nut for the lower hinge, so that by turning the nut the hinge is lengthened, and the latch end of the gate raised several inches. Another way is to have two sets of holes through the hingeposts, so that the hinges may be changed for summer and winter. A third is to have the gate so made as not to come within a foot and a half of the ground, sliding in a wide board into a groove in the posts whenever small animals are to be shut off.

Examine stove-pipes, and see that they are all firm and safe. Do not allow the soot to accumulate in them, so that when it gets on fire some windy night it may set the house in flames. Never allow a stove-pipe to pass near wood. Burn the soot out of chimneys at some time when the roof has been wet with rain or melting snow, by lowering a bundle of straw or two from the top, and dropping a blazing wisp upon it. Probably nine-tenths of the houses that are burned in the country are ignited by the soot taking fire when the shingles are dry, and portions of it dropping on the roof. Keeping the soot well burned out of the chimney, and all that part of the roof near it, or the whole, whitewashed with a mixture of salt and lime, would be worth more and cost less than the best insurance.

What is the reason that so many bed rooms are badly ventilated in winter? One reason is, it is so hard to slip the sash up and down. See to it now, that all are made to slide comfortably and easily, and if they are not hung on pulleys by weights, provide the best and most easily working catches. A few hours time, and a few dimes of expense, may save twenty dollars in doctors' bills, to say nothing of suffering and lost time. Never allow a broken pane to remain a day.

Never allow a squeaking door, pass around once a week, if necessary, and give every hinge and latch a touch with an oiled feather.

Lay in a good supply of wood for next summer. Do not let it lie long in large sticks, but saw and split it up without delay, that it may be drying. Fresh wood quickly dried, is far more valuable than half decayed from a long retention of sap. If it can be exposed to the wind for a few weeks before housing, it will dry rapidly.

To winter animals profitably, remember that comfort is the great saver of flesh, and consequently of food. Feed regularly, that they may not fret off flesh in waiting for a delayed meal, for their stomachs are good chronometers: keep them clean, that they may not be subjected to the constant discomfort of dirt sticking in their hair and on their skins; let their quarters be warm, and especially avoid the annoyance of cold currents sweeping through cracks in boards or undersills on the windward side of barns; let the air they breathe be well ventilated, for no animal can do well that is taking foul or dirty air into the delicate tissues of its lungs fifty thousand times every twenty-four hours, or at every inspiration. Good wholesome food is cheaper than such as is poor or mouldy. It is more economical to feed in well constructed racks and boxes, than for animals to tread their food under foot, lie upon it, or mix it with mud. Feed often, regularly, and in small quantities, that the food may not become unpalatable by lying long in the animal's breath. Always have a good supply of pure water at hand in the yard. And remember the old saying that "one foot of boards (for shelter) is equal to one pound of beef."

Avoid the common error of trying to winter many animals on little food. By this error much food is consumed with no increase of growth. *A few well-fed animals will manufacture a far greater amount of flesh with the same feed*, and they will command a much readier market. We recently visited a small farmer whose whole herd of cattle was only eight; yet we are confident that they would sell for more money than any sixteen of the herds of most of his neighbours. He never tried to see how near he could come to starving them to death without doing it, and did not attempt to feed them on moonshine and sawdust.

Save manure. As wind is to the sailor, water to the miller, steam to the manufacturer, and money to the banker, so is manure to the farmer. Draw it out and spread it in winter, and early rains will soak it into the soil, and mix it with the particles of earth better than the finest harrow, and the clay of the soil will hold all the enriching portions, as the water charged with the liquid parts flows over it.

A place for everything, and everything in its place, will save many hours of searching, many weary steps, and much vexation every year. The tools should not only be in the room, but every one in its place, where the hand may be always laid on it in a moment. For this purpose they should always be hung up against the wall, and be neatly arranged. Nearly every tool can be hung on a spike or pin, or between two large nails. If hung perpendicularly, they will occupy less room, and may be quickly taken down and replaced. In order that each tool may be always in its place, the plan devised by Townsend Sharpless of Philadelphia, is the best. Hang each tool in its position; then draw its outline accurately on the board with pencil or chalk; then with a brush dipped in some dark colored paint, make a distinct representation of the shape of the tool. These outlines will not only show where the tool should be put, but show at a moment if any has been left out of place. The consciousness that there is such a tell-tale in the tool-room, will stimulate any careless labourer to return everything which he takes out.

Let all broken or injured tools be repaired by the farmer if he can do it, and by the mechanic if the farmer cannot; paint such as need painting and let all be ready for the active season on the opening of spring.

WINTERING BEES.

A GREAT drawback to successful bee culture is the loss they sustain in the winter. In all latitudes South of New York city, where the snow seldom falls to last over a day or two. we think the hives may as well remain out upon their stands, as the weather in such climates is not so cold as to do them much injury. Bees, when the hives are prosperous, will stand a few days of very severe cold weather, provided that the sun shines warm enough, once a week to warm the hives, and cause the frost which accumulates frequently at the tops of the combs to melt and run down.

It is a good plan, when hives are left all winter upon their stands, to remove the small boxes in the supers, and fill the upper sections of the hives with fine hay, packed in rather closely. We now refer to any hive that is constructed in two parts, or those that have doors on their backs to allow a set of small boxes to be slid in, in which the bees stow their surplus honey. The moisture generated by the bees will ascend through the holes leading to the supers, and become collected in the hay. In the spring it will be found in a wet and slightly mouldy condition, and may be thrown out as waste litter.

Some apiarian's bore an inch hole near the tops of their hives, in order to allow the moisture to pass away. We never approved of this plan, as a vast deal of cold air must be constantly circulating up through the hives.

All hives left out upon their stands in winter, should either be raised up to allow a circulation of air beneath them, or once in three or four days, the dead bees around the passage ways should be cleared away, as an accumulation of bees at the entrances in the winter will sometimes become saturated with the melting snow or rain, and close up the passages by freezing, which will smother the bees, when they have no other means of ventilation. A long goose quill is an excellent thing to run into the passages to remove the dead bees.

We recommend the placing of short pieces of boards, a foot wide, up against the hives, so as to prevent the sun shining into the passage-ways, which always, in mild weather, causes the bees to leave their hives, and many become chilled, on alighting upon buildings, fences, &c., and never return. But more especially is great loss caused, when the ground is covered with snow, and the warm rays of the sun draw forth the bees in large numbers, to become dazzled by the reflection of the sun upon the snow, and fall down and die.—*Rural American.*

CHLORIDE OF LIME.

IT is not perhaps so generally known as it deserves to be, that chloride of lime is one of the most valuable articles available for top dressing grass lands. This substance is commonly purchased at the shops, and often at a much greater cost than the cheapness of the materials entering into its composition legitimately sanction. Any farmer may make it. To do this, it is only to slack one barrel of good lime with water, allowing a little more water than will dry slack it, and reduce it to a thick paste. Then dissolve one bushel of common salt, using no more water for the purpose than will just take up the mineral. This may either be used in slacking the lime, or applied after the water is used in effecting that process, has been evaporated by exposure. Chloride of lime is a perfect deodoriser, and should always be kept on hand for use, when wanted. Made in this way, it will be found to possess all the virtues of the best article from the laboratory of the chemist, and cost less than one-twentieth the price. After being made, it should be kept moist. Grass lands, top-dressed with chloride of lime, take a much earlier start, and retain their greenness much longer than those manured with other articles. It produces, also, a very favorable effect upon cereals—wheat, rye, oats, barley, and buckwheat—and has been used with success on corn, millet, and various pivoting crops.

BREEDERS' DEPARTMENT.

FATTENING ANIMALS.

A very common error among farmers, which needs correction, is the opinion that animals may be fattened in a few weeks, and fitted for market by heavy feeding, or as it is termed "pushing." Many farmers do not think of beginning to fatten their hogs or cattle for early winter market until autumn has actually commenced. Their food is then suddenly changed, and they are dosed with large quantities of grain or meal. This sudden change often deranges the system, and it is frequently some time before they recover from it. The attempt to fatten a poor animal in six weeks, reminds one of the puff advertisements to teach "French in six lessons." From observations and inquiry, we find that the most successful managers adopt a very different course—feed moderately, with great regularity, and for a long continued period. Regularity they find of the utmost importance, and they particularly avoid the course recommended by a correspondent a year or two since, to give a "feeding of meal now and then." The most successful pork raiser that we have met with, commences the fattening of his swine intended for winter market, *early in the preceding spring.* We might almost say he commences the autumn before, for he keeps his young swine in a good rapidly growing condition all through winter. He always begins very moderately, and increases the amount gradually and with great uniformity, taking care never to place before the animal more than it will freely eat. With this treatment, and attending strictly to cleanliness and the comfort of the animal at the same time, his spring pigs at ten months usually exceed three hundred pounds, and sometimes have gone as high as four hundred and fifty pounds, and wintered pigs run as high as five to six hundred; the corn, which is ground and scalded before feeding, nets him one dollar per bushel, when pork sells at five cents per pound.

Our readers are generally aware of the opinion of John Johnston on the subject of the heavy grain feeding of cattle, believing it to be attended with more waste than profit. This opinion has been corroborated by the careful experiments of a number of farmers, and among others, an accurate and enterprising neighbour, who weighs all his animals weekly, informs us that a fine steer, when fed regularly each day with four quarts of barley meal, gained eighteen pounds per week; being urged "to push" this animal, he increased his feed to eight quarts daily with a diminution in his growth; the feed was then increased to twelve quarts, when he scarcely gained at all. Another, and an extensive cattle-fattener, informed us that he and a neighbour commenced fattening each a fine steer at the same time; the neighbour's being the heaviest on the start. Our informant fed four quarts of meal daily; his neighbour. twelve quarts. When they were slaughtered, the latter was the inferior animal of the two in weight.

Another instance has recently occurred to our observation, illustrating the position here taken. An old cow, naturally raw-boned, was fed by the owner with the view of converting her into beef. Commencing about the middle of autumn, or as soon as the corn was ripe, with the hope of turning her off to the butcher about the first of winter, she was stuffed with all she could eat, and by the end of the year had scarcely gained in weight. The owner concluded that she did not take on flesh naturally, and that there was no use in trying to fatten her, and she passed into other hands and different treatment. Before winter was over, a regular system of feeding with barley meal was commenced, first with only a pint each night and morning, which was afterwards gradually increased to a quart. In a few weeks the improved appearance of the animal was quite visible; she was placed in good pasture, and by the middle of summer her feed had been gradually increased to two quarts each night and morning. By the first of autumn she had become fat, sleek, and beautiful, and was sold for a good price to the butcher.

Intelligent farmers differ as to the propriety of feeding meal at all to pastured cattle; some insisting that it only destroys their appetite for the grass, and that if fed on the latter alone, they will improve in condition more rapidly and steadily than in any other way. This is certainly not true with all animals, as, for example with the case just mentioned; but there are others which have a natural propensity to flesh, that seem to improve best on rich pasturage alone, doubtless partly in consequence of the long continued and regular supply of good food, which they thus receive, as contrasted with sudden and irregular grain feedings. We should be glad to receive the results of every carefully tried experiment in relation to this point from our correspondents.

What we wish to urge more particularly at the present time is a caution against the common error of attempting to fatten suddenly by over dosing with grain and meal as a sort of compensation for the previous starvation and raw-boned system of treatment. Instead of beginning to fatten just at the last stages of an animal's life, the work should be commenced as soon as it is born, at least so far as preserving a good growing, healthy condition right onward, without any interruption through winter and summer. Farmers who practice on this plan make the largest profits, and can dispose of their herds at any time at high prices for cash in hand. Their less successful neighbours term them "always lucky," but do not seem to be aware of the truth of the old saying, that "diligence is the mother of good luck."

BREEDING.

IN selecting animals for coupling, especial pains should be taken not to interbreed those possessing the *same* defect, because in that case, observation proves that the offspring inherit something like the aggregate of the defect of both parents—that is to say, if the ram is defective in the crops (in the proper fullness back of the shoulders,) to an extent expressed by 2, and the ewe to an extent expressed by 3, their offspring will possess the defect to something like the extent of 5. Of course, this rule is not invariable, and would not continue to apply to its full extent if breeding between the produce of these similarly defective animals was continued, for in that case they would soon have no crops at all. I like the arithmetical form of the statement, however, because it holds up before the mind in a tangible and impressive form the consequences of one of the worst errors of bad breeding.

A defect may be an individual or family one. The latter is far more likely to be transmitted to the progeny. The other sometimes appears to be accidental, and is not forcibly transmitted. I would rather breed from a slightly defective animal from a very perfect family, than from a very perfect animal from a slightly defective family.

The defects by one parent should be met by peculiar excellence of the other parent in the same point. If the dam is "high on legs," she should be bred to a ram with short legs; if thin-fleeced, to an uncommonly thick-fleeced ram, and so on. This, however, is to be understood within certain limitations. These counteractions are to be sought within the circle of proper excellence and proper uniformity in other particulars. The distinguishing features aimed at in the flock are neither to be sacrificed nor constantly changed nor disturbed for the purpose of producing a sudden amendment in a single point.

There is a practical point of the utmost importance in the selection of breeding rams. All do not transmit their qualities in an equal degree to their offspring. The power of "mark offspring," as it is termed, according to my observation, depends most on two properties. The first and by far the most influential of these is blood. By blood I mean nothing mysterious or unexplainable. I simply mean that blood which has flowed so long in one distinct channel, and through animals so closely alike in all their properties, that it has acquired a power resembling that of species—a power continuously to reproduce animals of the same family and almost the same individual characteristics. Under this definition the unsightly ass may have as high and pure blood as the winged courser of Asia and Africa, or as the far descended Merino of Spain.

The ram should not only then have a faultless pedigree, but, if practicable, be drawn from an old, distinct, well-marked family of Merinos that have been the same as a whole, and uniform among themselves for a long course of generations. I used to notice, when I dabbled in crosses between Merinos and coarse breeds, that a ram which was the produce of in-and-in breeding stamped his properties on the mongrel offspring with peculiar force; and I am not certain this rule does not obtain to some degree among full bloods. I am inclined to question whether the great cavana of Spain, some of them once numbering 40,000 sheep, would ever have acquired their remarkable identity of characteristics without that in-and-in breeding to which they were subjected. Some intelligent observer of them in Spain, fifty or sixty years ago, whose name I do not remember, said that in every hundred there were ten rather better and ten rather worse ones, but that the other eighty could hardly be distinguished one from another.

The second property I have noticed in the ram, which gives him the power strongly to impress his qualities on his offspring, is constitutional vigor. He should be thoroughly masculine. He should be compact and massive in every part—his large scrotum almost sweeping the ground. He should not have a particle of a "ewe look" about him. Even his fleece should not be as fine as a ewe's fleece. He should have strength to knock down an ox. He should have *undaunted courage and delight in battle*—fighting with desperate determination until slain or acknowledged master of the flock! I have often seen a ram that if shut in a barn would go through the side of it at a single blow like a catapult. Other things being equal, such are more usually, according to my experience, the rams which transmit their characteristics to their descendants.

WHY HOGS EAT ASHES, &c.

Mr. Mechi, of Tip-Tree Hall, England, has discovered that pigs, when shut up to fatten, are very fond of cinders, and improve in condition by eating a certain portion of them every day. Some persons are unable to account for this singular propensity in swine. Poultry are very fond of egg shells, lime, sand, &c., and it is well known these substances are necessary in order to form the shells of eggs, and to furnish material for the bones of fowl.

Now, it is reasonable to suppose that swine eat ashes and cinders for the purpose of supplying the material for their bones, and this singular instinct in animals so low in the scale of intelligence, is truly wonderful, for ashes contain the ingredients which are *necessary to form bones*, viz., *carbonate* and sulphate of lime, and magnesia, clay, silica gelatinized and made soluble by the fire.

When hogs are at large, they take in clay and silica with their food, and eat bones and roots which contain the necessary ingredients; but when they are pent up they endeavour to supply the material necessary for keeping up their frames by devouring ashes and cinders. Let them have plenty of them.

ONE DAY'S WORK ON A DAIRY FARM.

THE Prattsville News gives the following account of one day's work on the Hon. Z. Pratt's dairy farm, at Prattsville, Greene Co.:

"Thinking it might interest our readers to know what amount of work may be accomplished on a large dairy farm, where everything is systematized, in a single day, we have obtained from Colonel Pratt's farmer the following account of labor performed, with accompanying results, on his dairy farm (which produces 20,000 pounds of butter yearly), on the first of July. The persons employed consist of three men, three women, and three boys, who rise at half-past four o'clock A. M. The day's work for the men and boys commences, first, by driving in from pasture, ninety cows, and putting them in the stable ready to milk; second, feeding and watering horses, bulls, calves, 49 hogs, 130 turkeys, and 120 chickens.

Milking cows begins at 6 o'clock, and finishes at 7½ o'clock. The cows are then let out to pasture, the stables cleaned, and everything ready for field work at 8½ o'clock, when the weeding of carrots and hoeing of corn and potatoes commence. Between 11 A. M. and 2 P. M., three swarms of bees (50 hives) have been hived. Dinner at 12 M.; after dinner the horses, &c., are fed and watered, and all is ready for field work at half-past one o'clock. At four o'clock start for the cows, and at five o'clock they are all stabled, ready for milking. Supper at five o'clock, and at half-past five milking commences. Milking finished, sixty pails full are carried to the dairy. At seven o'clock the cows are let out of the yard, and driven to their night pasture. The stables are then cleaned, the horses, bulls, calves, hogs, and poultry fed, and firkins opened.

We have, so far, given an account of the men's work done; we now proceed to the female management of the dairy: Three women are employed, two in the dairy room and one at house work. The day's work begins by the two skimming milk, while the third prepares the breakfast for half-past five o'clock. Milking begins at six o'clock, and is finished and the milk carried in by half past seven o'clock. The quantity of milk obtained this morning was 631 quarts, equal in weight to 1228 pounds. When the milk is brought into the milk-room, it is strained into large cans, then dipped by the two women and the two boys, and put into pans and placed upon the milk racks, and while the milk pails, cans and strainers are being washed, the churns well filled with cream, two in number, each the size of a barrel, and worked by water-power, are set to work. The number of pans of milk skimmed this day is 509. Near to the churns, and in the churn-room, is a wooden tunnel, in the bottom of which is a trough, leading under ground to the hog-pen, and as fast as the pans are skimmed the refuse milk is emptied into this tunnel, and by the trough conveyed to a milk reservoir in the hog-pen, from which the hogs are fed as required. The cream skimmed from these 509 pans of milk made 123 pounds of butter. The newly made butter is now salted, the milk-house scrubbed, the pans and churns washed and carried out to the air and sun to dry.

Next in order is the working and packing of the butter churned the day previous. Hot water is now put in the firkin last opened, and brine is changed from one firkin to the other, and the empty firkin rubbed with fine salt, and got ready to receive the packed butter. It is now five o'clock in the afternoon, and all hands go to supper, and at half-past five the milking commences, and by seven o'clock has been carried in the milk-room. Then follows the dipping and putting into pans, and placing the pans on the rack, as before stated, and this by the washing of the pails and strainers; and at eight o'clock the work of the day is done. This day (July 1), from 90 cows, 111 pounds of butter were made.

DESIGN FOR A DAIRY HOUSE.

MR. J. Wilkinson of Baltimore contributes to the Germantown Telegraph the following description of his Spring or Dairy House:—

I constructed a spring-house during the summer of 1861, which has been very much admired, and believing it to be very perfect in principle, I will describe it for the benefit of your readers. This house is for a small dairy: it will accommodate but twenty pans or crocks, that are fifteen inches in diameter each, though its capacity may be doubled without increasing the size of the house, by placing another sink for water twelve inches above the one I shall describe, supporting it in the same manner, and allowing the water to flow into the uppermost one first, thence to the lower one. The building is circular, 10 feet in diameter on the inside, and has a 10 feet ceiling.

The wall may be of brick or stone. If of brick it need be but of nine inches thick; if of stone, eighteen inches thick.

The floor to be cemented on the earth. The building to be located below the spring, so that the water will flow through a pipe to the height of two feet nine inches above the floor of the dairy room. The water is received into one end, and discharged at the other end of the sink, in which the pans of milk are set.

The sink is in the shape of a horse-shoe, the opening at the heel being placed in front of the door.

It is of iron, eighteen inches wide at the top, and thirteen inches at the bottom, and twenty-six feet long.

It is supported on iron brackets, set in the wall of the building, two feet six inches from the floor, and being circular in form, and surrounding the interior of the building, is most conveniently located.

In the absence of both bricks and stones, it may be a double frame building, with an air space between the two frames. In the use of a frame building, it should be constructed by laying two foundation walls, with a 4-inch air space between them, which should extend at least two feet below the surface of the ground, as it is at that point that the heat is conducted into the building more than at any other. The outer foundation wall should be laid at least eight inches above the surface of the ground.

The floor should be built the same as in the brick or stone structure.

The exterior of the building may be lathed and plastered, or sided with boards. In either case, the side of the outer studs should be lathed and plastered before the inner ones are erected, and the interior should be neatly plastered and lime-washed.

If arranged thus, this building will be found equal if not superior to one of bricks or stones.

The ventilation should be effected in the manner I shall describe, whatever may be the material used in construction. The mode of ventilation which I use is an original idea, and the action of it just the opposite of that used in ventilating heated buildings, or where the air within is warmer than that without the building. The cold spring water used for cooling the milk, if it is allowed to flow in and out perpetually as it should, has the effect to reduce the temperature of the building below that of the air without it in summer, the season when the dairy house is used. Hence, there will be a circulation downward if there are openings for circulation both above and below.

I provide the lower escapes for air, by inserting in a building of the size described, eight 2 inch glazed draining tiles, equally spaced around the building. The tiles should not project within or without the walls, and should be set just below the sink. There should be a space of one inch between the inner wall and the sink, that the air may have free passage over and behind the sink, to the openings in the wall, and to prevent the heat from being conducted from the wall to the sink. The eaves of the roof should project 2 feet 6 inches, and the boards with which the projection is ceiled on the under side should be laid with a space of 3-8ths of an inch between them, as these are the ingress openings for air. By this arrangement the air is taken into the space between the roof and the ceiling of the room, where all dust that may be floating in it will be deposited before it descends into the dairy through the opening in the centre of the ceiling, where the air is admitted through an ornamental iron lattice two feet in diameter.

In the downward passage of the air towards the egress openings, it is required to pass over all the milk in the sink, equally, which is of great importance.

A circular marble table is set in the middle of the room on a single iron column, set in the cement floor. On this table the milk is skimmed and the butter worked.

This location of the table in the centre of the space surrounded by the sink, it will be seen, is as convenient as it can be, as none of the pans are to be moved more than two feet and a half, to or from the table.

The building being entirely above ground, the carrying of the milk up and down stairs is avoided.

The cost of a building constructed of stone, of the dimensions and with all the appurtenances described, finished in a neat and workmanlike manner, is 225 dollars.

CASE OF SPASMS OF THE BOWELS OCCURRING WITH CONVULSIONS.

ON the tenth of the present month I was requested to visit a sick horse, the property of Mr. P. on State street. On making an examination of the animal the following symptoms were observed: Pulse very strong and wirey, and averaging twenty beats above the natural standard; surfaces of the mouth, nose, and eyes very vascular, or highly reddened, the surface of the body was bedewed, in patches, with perspiration, there appeared to be much rigidity of the muscles, especially in the abdominal region. All at once the animal would throw himself violently on the floor, throw his limbs about in the wildest and most reckless manner; he would assume all sorts of positions, yet seemed to obtain most ease when flat on his back, yet if closely approached or touched, he would kick and strike with fury, as if he were intent on mischief. In short, the horse cut up such antics that it was almost impossible to approach him, yet I finally succeeded in delivering an antispasmodic drench while the animal lay on his back, in which position I also gave an enema composed of warm water and lobelia.

The animal kept growing more restive and uncontrollable, till at last it became very evident that convulsions had set in; the breathing had been fearfully laborious and rapid, his nostrils were dilated to their utmost capacity, the sight had become so affected through temporary paralysis of the optic nerve, that blindness had set in.

There seemed to be little hope for the animal, and fearing that he might either kill himself by violence or injure those in attendance, I concluded to chloroform him, and thus put a stop to his dangerous performances; he had the best of us about long enough, and now it was for me to show what science had in store for such otherwise unmanageable cases. I procured a mixture composed of four ounces of chloroform and the same quantity of sulphuric æther, next a sponge was tied on to a broom-handle; the latter enabled me to chloroform at a safe distance.

The patient did not seem to relish my mode of practice; he fought me some,—tried to strike and kick me, but he being temporarily blind I had the advantage of him. It was soon evident that the chloroform was beginning to do its work; he gradually settled himself on the floor, and was soon completely ætherised. As it is dangerous to keep a horse under the full effects of chloroform any great length of time, I now removed the sponge and only applied it occasionally, slightly saturated, so as to insure a sort of incomplete state of insensibility. It was an encouraging sight to behold the once powerful and furious animal, now lying free from pain and deprived of the power to injure himself or those in attendance; and it is also gratifying to know that science ministers to the wants and necessities of the *inferior* as well as the *superior* orders of creation.

At the expiration of an hour, during which time the animal was more or less under the anasthetic agent, he was allowed to rise; he gave himself a few shakes, seemed very much relieved and more tranquil. I now gave a drench of spirits of nitre and infusion of lobelia administered also a lobelia enema, and left the patient to the care of his attendants.

A few hours afterwards I again visited the patient, and learned that he had a slight spasm occasionally, for which I prescribed two drachms of powdered assafœtida. I then introduced the male catheter into the bladder, drew off a small quantity of urine, and this comprises the whole of the treatment.

The animal, however, had injured himself about the external surface a good deal, for which arnica and water was used with success.

TURNIPY TASTE IN MILK.

THE unpleasant taste given to milk and butter when the cows are fed upon turnips, is effectually corrected by the use of a little common nitre, or saltpetre, but the common mode of using this preventive is not the best. It has been usual to put a lump of saltpetre into the milk-pail, but it sometimes happens that the nitre remains undissolved, and the milk retains the objectionable flavor. Instead of this, make a strong solution of saltpetre—say a pint of boiling water upon an ounce of saltpetre; when thoroughly dissolved, put it in a bottle and stand in a cool place. Before milking, put into the milk-pail a spoonful of this solution, or more, according to the quantity of milk expected, and all turnip flavor will be entirely destroyed. It also, in a great degree, destroys the bad flavor given to butter by the yellow crowsfoot or buttercup. This has been tried in our family, and found serviceable.—*Country Gentleman.*

LARGE HOG.

We are informed that Joseph Patton, of West Pittsfield, Me., slaughtered, in March last, a hog twenty-two months old, which weighed, dressed, 780 pounds.

POULTRY AND POULTRY HOUSE

MUCH has been said and written upon this subject, and but very little practical information has ever been given to the reading public. I propose to give my experience in raising poultry, and my plan for a poultry house—a plan which will be the most fitted for the easy management of fowls, as well as being the least expensive. For a hen-house, it may be built on one side of the barn, or if you have no building suitable, get four posts, hew two sides; let them be, for the high side, say 9 feet; for the low side, say 6 or 7 feet, which will be enough pitch of roof, provided the house is not more than 9 feet wide. Twelve feet by nine will be large enough for 20 hens; plant your posts firmly in the earth, so as to keep your house firm and steady; get second quality pine or hemlock boards; nail them on lengthwise. If you do not choose to get plates so as to have the boards run up and down, a shingle roof will be the best, though a good board or slab roof will do well enough, the slabs to cover the cracks between the boards. The house must have a window, with lath nailed across to let in air and sunshine. The roosts or perches should be placed in the highest side, so as to leave space enough for the convenient placing of the nests, which ought to be in the warmest part; fit a tight door on with good hinges and a good lock, and you will have as nice a hen-house as you could wish for. The cost will not be more than $8, with lumber at 2 cents per foot. A good feed or water trough is made out of a chestnut log, something of the shape of a hog-trough. The best breed of fowls, in my estimation, is the Poland, or top-knot; they are excellent layers, and are of profit till 5 or 6 years old. There are no better hens than the Poland to raise with. As a good, hardy breed, the English pheasants have no equals; they are good layers, and are excellent for the table. Description: They are of *middle size, with blue legs* and double combs; the males are in color red, intermixed with black. A good feed for fowls is a mixture of corn, wheat screenings, oats or any grain you can get, mixed together; fresh meat is very good, but I would not feed on it altogether. To have hens lay through the winter, they must not be affected by sudden changes of the weather. Hens that lay steadily through the summer, do not lay in winter. Pure water is indispensable in poultry breeding.

BANTAMS.

NO one will dispute that for beauty, animation, plumage and courage, the bantam is entitled to rank next to the game fowl. All are, or ought to be, of small size, but lively and vigorous, exhibiting in their movements both grace and stateliness. Above all is placed the celebrated and beautiful breed called "Sebrights." This breed, which Sir John Sebright brought to perfection after years of careful training, is very small, with unfeathered legs, and a rose comb and short hackles. The plumage is gold or silver spangled, every feather being of golden orange, or of a silver white, with a glossy jet-black margin. The cocks have the tail folded like that of the hen with the sickle feathers shortened straight or nearly so, and broader than usual.

The term *hen-cocks* is, in consequence, often applied to them; but although the sickle feathers are thus modified, no bird possesses higher courage, or a more gallant carriage. The attitude of the cock is, in truth, singularly proud; and he is often seen to bear himself so haughtily, that his head, thrown back as if in disdain, nearly touches the two upper feathers—sickles they can can scarcely be called—of his tail. Half-bred birds of this breed are not uncommon; but birds of the pure breed are not to be obtained without trouble and expense—indeed, some time ago, it was almost impossible to procure either a fowl or an egg. There is also another beautiful variety—the game bantam. Gold and silver Sebrights should be of very small size, perfectly clean legs, strutting carriage; head and tail thrown back till they nearly touch; wing drooped, almost reaching the ground. *Scottish Farmer.*

ENGINEERING DEPARTMENT.

ENGINEERING EXAMPLES—THE BRUNELS.

In a late number of the *London Quarterly* there is an interesting essay on two of the greatest engineers of the present century, namely the two Brunels, father and son. The elder Brunel has perhaps been most widely known as the engineer of the great tunnel under the river Thames in London; the son as the author of the broad guage on railways, the engineer of several stupendous bridges, and the designer of the steamer *Great Eastern*. Sir Marc Isambard Brunel, the father, was born 1769, at Hacqueville in France; and when eight years of age he was sent to college to be educated for the priesthood. He early exhibited such a predilection for mechanics, that he neglected theological studies, and greatly pained the heart of his father, who sometimes shut him up in close confinement, and whipped and coaxed him by turns to make him cease making wooden clocks, water wheels and windmills; but all in vain. Brunel was born an inventor, and it formed part of his existence to construct machines. When he arrived at seventeen years of age, his father, who had very strong affection for him, obtained a situation for him as an officer on board a French war vessel. Being a good mathematician and draftsman, he soon became a good navigator, and constructed his own nautical instruments. The French revolution broke out about this time, and he being a fervent royalist had to fly for his life, and so he came to New York in 1793. Here he resided for six years, and made a moderate livelihood as surveyor, architect and civil engineer. It is stated that he designed several buildings in this city, also some of the fortifications in the harbor. He went to London in 1799, and was soon engaged by the British Admiralty in constructing self-acting machinery, which he had invented for making ships' blocks. In this way he was very successful, and his reputation as a mechanical genius established.

Having received a considerable sum for his invention of ship-block machinery, he then designed machinery for making shoes, and engaged in this business; but, although an able inventor, he was a very indifferent merchant, and was soon involved in debt, and put into prison, from which he was kindly released by the British Government paying $25,000 to satisfy the claims of his creditors. In 1822 he invented a carbonic acid gas engine, as a substitute for the steam engine, intending to use liquid carbonic acid, which is very sensitive to the influence of heat. But, like many other persons of the present day, he did not understand the subject fully, and failure was the result. About this time it was publicly proposed to make a tunnel under the river Thames in London, but no good method for accomplishing the object was proposed. The attention of Brunel being directed to the subject, it is stated that, while he was in the navy yard one day, he lifted a small piece of timber which had been penetrated by the *teredo navalis*, and while examining the little mollusc, he found that its head was armed with a pair of strong shell valves, and that it worked into the wood by having its nose attached as a center bit to the timber, while its shell moved like an auger. In this manner it was enabled to bore under water, into the planking of the stoutest ship. Reflecting upon this natural method of boring under water by this little shell fish, Brunel was led step by step, to invent peculiar mechanism, embracing slowly-rotating shield for forming tunnels under ground, and he secured a patent for his invention, submitting his plans to a number of scientific persons, as adapted for tunneling under the Thames; and the result was the formation of a company, with a capital of $1,000,000, to carry out his plan. Brunel, being appointed engineer, constructed a great tunneling machine, upon the basis of the *teredo navalis*. It weighed 200 tons, was divided into several parts, and was operated by a powerful steam engine. The work of tunneling was of a very difficult character. The river broke in several times, and operations ceased occasionally for a long period. Arrangements were made to commence the undertaking in 1825; it was not completed and opened until March, 1843, a period of eighteen years. Some idea of Brunel's arduous labors may be learned from one fact. While the excavations were going on by night (it went on by night as well as day), he was awakened, by his own orders, every two hours, and informed of its progress. His house was close to the tunnel; and when a bell in his bed-room was rung from below, he arose, struck a light, and examined a portion of the excavated soil which was sent up to him in a tube for inspection. A record was then made in his journal: he gave such instructions as were necessary, and went to bed again. For several months after the tunnel had been finished, such was the force of habit, that he awakened regularly every two hours during night. The Thames tunnel was successful as a feat of engineering; and the genius and endurance of Brunel shone out conspicuously in all that was achieved; but it cost $2,320,000, which was more than double the original estimates, and it was next to useless after it was finished. It proved disastrous as an investment to all who were concerned in it. Brunel died at the advanced age of 81 years in December, 1849.

Isambard Kingdom Brunel, the son of Marc, became quite distinguished as an engineer when a youth,—he acting as assistant engineer of the tunnel, to his father. When it was completed, he devoted himself to railway engineering, and being somewhat ambitious perhaps for distinction, he projected the wide guage of seven feet for the Great Western Railway in England. He produced many arguments to show that it was preferable to the common narrow guage of four feet eight and a half inches, which had been adopted by George Stephenson and others. Brunel's plan was violently attacked by leading engineers, but he was successful in carrying out his wishes. This was the parent of wide guage railroads; and it is the most magnificent railway in the world. Some of the structures on it are splendid exhibitions of daring engineering skill. One viaduct over the river Trent is 880 feet in length; it is supported by eight elliptical arches of seventy feet span, having a spring of eighteen feet in the center. Gigantic square columns rise in pairs from a broad square basement, each pair being united at the top by bold architraves, forming the pier from which the arches spring. The structure imparts the idea of massiveness combined with elegance. A bridge on the same line, at Maidenhead, consists of ten brick arches, two of which have 128 feet span, each with a spring of only twenty-four and a half feet. They are the flattest arches ever made in brick. Brunel was apparently fond of executing daring projects, and doing things differently from other engineers; but he sometimes committed great mistakes. He became engineer of the Croydon and South Devon Company, for constructing an atmospheric railway; which he advocated against the opinions of several scientific engineers. He invested $100,000 in the project and lost it all, as it was a complete failure. Compressed air with stationary engines was not found equal to steam locomotives; and in view of this fact, one of its shareholders, in 1848, described himself and his fellows, "as the most unfortunate proprietors of the most unfortunate railway in the kingdom."

The younger Brunel was the engineer of several railways; and all the structures which he designed are distinguished for boldness and grandeur. We can form but a very inadequate idea of the great bridges and viaducts, and other similar structures on English railways, from those on most American railways. Take for example one of two similar bridges designed by Brunel and constructed under his superintendence. It is called Saltash Viaduct, and passes over the river Tamar, on the Cornwall Railway. It consists of nineteen arches, seventeen of which are from seventy to ninety-three feet span, and the two main central spans are no less than 445 feet each.

THE DEPTH OF DRAINS.

On this subject the Irish Farmers' Gazette gives the result of experiments on one of the largest estates in Ireland: "The case we allude to is the draining of Mount Stewart demesne, in the county of Down, Mr. Andrews, Lord Londonderry's agent. having found drains 30 to 32 inches deep, and 20 feet apart, most effective in draining the stiff soils of his own farms near Comber, even after a period of 30 years had elapsed since those drains were made, resisted the Board's regulations regarding the depth and distance apart. The result was a compromise between the views entertained by Mr. Andrews and those held by the Board, ending in the drains at Mount Stewart being cut 36 inches deep and 21 feet apart, filled with 9 inches of stones, the largest of which do not exceed 2½ inches, over which is laid a sod, having the grassy side under. That drainage is perfectly effective."

SIMPLE BAROMETER.

I beg to call your readers' attention to a very simple, but at the same time most effective barometer, which I have now used since last July, and I have found it quite as true, both for rain and wind, as the aneroid. It is constructed as follows:—Take a common glass pickle-bottle, fill it within about three inches of the top with water, then take a Florence oil-flask (remove the straw covering and clean well out from all remains of oil,) and plunge the neck of the flask into the pickle bottle, and the barometer is complete. In fine weather the water will rise into the neck of the flask, even above the mouth of the pickle bottle, and in wet and windy weather it will fall to within an inch or so of the flask's mouth. Before a heavy gale of wind I have twice seen the water leave the flask altogether at least eight hours before the gale came to its height. I find in my journal, Oct. 19, "Rained and blew tremendously in the afternoon and evening. Rain-glass fell to zero. Barometer 28; lower than it has been since Nov. 1, 1859, when the Royal Charter was lost." I believe that no better weather guide can be used. I do not lay any claim to its invention, for I read an account of it in an extract from the *Athenæum* last summer, signed Thomas Zuiller.—G. MORANT, jr., in *London Field*.

An agricultural Show is proposed at an early period at the city of Calcutta, India.

HORTICULTURAL DEPARTMENT.

PREPARATION AND MANAGEMENT OF LAWNS.

The following essay, from the Gardener's Monthly, was lately read before the Pennsylvania Horticultural Society, by W. Bright:

The most important point in the preparation of a lawn, is to obtain an open, porous, well-drained soil, of *good depth.* To this end, if the soil be naturally wet, it must be drained in some manner, either by tile or stone drains. If sufficiently drained the requisite depth may be obtained by thorough ploughing and subsoiling, using such ploughs and such force of team as will open the soil to the depth of eighteen inches at least.

The subsoil ploughing should be performed in the dry weather of the summer or fall, previous to seeding the following spring. Free harrowing is of course useful.

The *quality* of the soil must next receive attention, and it is vastly important that this should be of *uniform quality* all over the surface, and of *uniform depth.* Nearly all lawns are graded more or less, and when this is done, be careful that the soil is kept of uniform quality and thickness. The surface soil must frequently be taken off large spaces, and after the grading has been done, it must be replaced in such a manner that it shall as nearly as possible resemble in quality and depth the natural soil.

Sandy soils, as everybody knows, may be greatly improved by a dressing of clay or good clayey loom, and clay soils by the addition of sand. This is a simple fact, but one not sufficiently heeded in the hurry which usually attends the preparation of new grounds.

As to manuring, if the land be very poor, it may be heavily manured in the fall, with good, short, well-rotted stable manure; or with a compost of muck and stable manure. Bone dust, superphosphate of lime, and wood ashes are of course valuable additions to such a compost. If the land is good, that is, good corn or wheat land, it will need no manure. It is not so much richness of soil as *dearth*, freedom from excess of moisture, and uniformly good texture and good quality that we desire—Mixing poor and good soil, in spots, in various parts of the lawn, when grading, will produce a soil which can never be made of uniform color and beauty by any future dressing or manuring.. The soil must be of uniform good quality and uniform depth, to make a good lawn.

The treatment of the lawn, the first spring after it is graded, will be as follows;—The first day, after the frost is out of the ground and the soil is sufficiently dry to be worked, let the winter-washed places be repaired, then harrow the whole surface carefully, and if not quite smooth, hand-rake the rougher parts using also the roller if necessary to obtain a fine smooth surface. A little lime, and well-rotted compost may also be applied at this time if required.

The seed should be sown as early as possible. Sow on recently harrowed ground, not too rough. The seed needs to be barely covered with earth. It is better, perhaps, after sowing to cover the seed with a hand rake, using both teeth and back of rake to cover it.

It is not desirable to sow any sort of grain with the seeds for a lawn, nor to sow a great variety of mixed grasses. The best grass seed is the common green-grass (*Poa pratensis*), [otherwise known as Kentucky blue-grass, June grass, &c.]

As soon as the seed germinates, and the grass comes up an inch, on a dry day pass a light roller over it. When the grass is three or four inches high, cut it with a sharp scythe, as close as possible. Mow it with the blade of the scythe *hard on the ground.*—Cut the grass every two weeks during summer in the same manner. A little hay may be obtained by spreading the grass, when cut, very thin, and moving it once a day, without injury to the lawn. But it is better to mow *often* and *close*, and remove the grass at once, using it for mulching trees, &c.

Take out dock, dandelion, and other large coarse plants and weeds, with a chisel on the end of a short pole. Pull red clover by hand, but no small weeds will need to be removed by hand if the lawn is mowed often and closely as directed every two weeks. The grass will soon overcome the small weeds.

Mow very close the last thing in the fall, to keep mice from harboring in the old grass. About the first of November, or later, top-dress the lawn with compost or manure, if necessary, and hand-rake smooth and clean.

Rake the surface of the lawn, in the spring of the second year, and every year thereafter, as hard and close as possible, with an iron rake, to take out the old grass, stones, and sticks; and roll when the ground is moderately dry.

Cut the grass early and often the second year, and very close, the same as at first projected. When the lawn is an extensive one, and well made, a lawn mowing machine may be used with great advanatge, as often as the grass is three or four inches high. If the grass is five or six inches high, the scythe works best. Use the longest bladed scythe that is made. This gives a more even appearance to the lawn than when a short bladed scythe is used.

The lawn should be so made and so graded, raked and rolled, that the scythe and roller will touch every square inch of the surface. This is of course a point of the first importance.

The great requisites of a good lawn are smooth grading, a good loamy soil of even quality, broken up to a depth of eighteen inches or more, and so porous and well-drained that it will readily part with excess of moisture, and yet of such a character that it will retain a proper degree of humidity to sustain a heavy growth of grass. Well-rotted manure, leaf-mould, clayey loam and clay, of course assist to retain moisture in light soils, and are exceedingly useful additions to most lawns. With the points herein enumerated faithfully attended to, there is no difficulty in obtaining a beautiful and durable lawn.

When the reading of the essay was concluded, a discussion took place is regard to the general subject. Mr. Harrison said he did not approve of mixed seeds for lawns. The great object is to obtain a uniform turf, which is not attained by the use of mixtures. The green-grass (*poa pratensis*) endures drought better than any other, and the leaf is very fine and of a beautiful rich green tint. Mr. Mitchel has tried the Italian rye grass; it is handsome but not hardy. Mr. Pollock said his lawn was entirely of Kentucky blue-grass or green-grass. It is admitted to be always green, luxuriant and uniform.—*Boston Cultivator.*

TRANSPLANTING FRUIT TREES.

TREES and plants derive their aliment from the soil in a state of solution, and that this is effected through the agency of the minute terminal points or spongioles of the roots. These are almost microscopical in their tinity, and indeed are so fragile that they can only permeate the finest and most perfectly favorable soil. Any obstruction in the form of a stone, consolidate mass of earth, or other obstacles, operates to divert them, and consequently to prevent them supplying their proportional share of nourishment to the tree. They are, in many respects, strictly analogous to the lacteals of the human system, and comparatively possess all the fragility and minuteness of organization which characterize the latter. It will hence be seen that any exposure or unnecessary drying of the roots, previous to their transplanting, and subsequent to their removal from the nursery, must be, of necessity, highly detrimental and injurious to their health. On the same account all harsh stamping and crowding while transplanting is to be avoided, as it endangers these organs, which are so essential to the health and increment of the tree. In "Kenrick's Orchardist," we have the following in relation to the circulation of the sap:

"These innumerable mouths, or spongelets, absorb and drink in, without discrimination, all the fluid substances which come in their way. These fluids ascend through the alburnum or sapwood to the leaves, which are true laboratories of all plants as well as the organs of respiration. The circulation of the sap, which commences its movements, first in the branches, and last of all in the roots, is produced by the attraction of the leaf buds and leaves, which are developed by the warmth of spring—their transpiration requiring supplies so great and continual, that some plants are stated to perspire even twice their weight in twenty-four hours. The true sap thus generated in the leaves, and separated from the more watery particles, descends through the inner bark, having now acquired new powers, and being now peculiarly prepared to nourish and give flavor to the fruit; and continuing its descent, it deposits in its course the cambium or mucilaginous substance, by which new and successive layers of wood and bark are annually added to the tree; while whatever is not adapted as aliment to the p culiar wants of the plant, is again returned by the roots to the earth."

Another very important matter to be attended to in transplanting fruit trees, and one which we are sorry to perceive is very often neglected, is to keep down the weeds around the trunks. When a good orchard is desirable, one that will progress rapidly to maturity, it will be well to keep the soil under careful cultivation with weeded crops, avoiding of course, in the routine, all such vegetables as will shade the soil too much, and preferring, as a general practice, those which are called pivoting crops—such as turnips, beets, parsnips, carrots, &c.,—and seeing that the fertility is kept up, or on the increase, by copious applications of the best manure. After the removal of the crops in the fall, the surface should be carefully cleansed of all spurious vegetation, and plowed, but not harrowed, as the rougher it is left, the more efficiently will the frost act upon it. This is of importance in effecting the destruction of the roots of weeds, and their seeds, as well as in exposing the ova of worms and other insects deposited beneath the surface. It has also a favorable effect upon the constituents of the soil itself, rendering the latter fine, by its powerfully disintegrating action. It is scarcely possible to reduce the soil devoted to young fruit trees to too *fine* a tilth. The more, therefore, it is worked, the better it will be for the trees—always king special care to avoid disturbing the roots.—*Cor. Ger. Telegraph:*

KEEPING FRUIT THROUGH WINTER.

How to ripen fruits, is a branch of pomological knowledge as important as how to grow them; yet it is one very little understood. It is questionable whether this knowledge can be taught; for experience shows that no rule is applicable to all varieties alike,–for some apples and pears are improved by being taken off the trees before they are ripe, while other kinds are best when left on the tree as long as possible.

With regard to apples and pears,—kinds of fruit most generally understood when we talk about preserving fruits,—the fall fruit, for the most part are best gathered a few days, or, it may be a week, before they would drop of their own accord from the tree; while others ripening at the same season are best left on until they will scarcely bear their own weight without falling.

The Bartlett Pear, for instance, may be gathered at least two weeks before apparently ripe, and will mature well in a cool, shady place, and, to some tastes, be even better for it; while the Duchesse d'Angouleme is ruined by what, in the same instance, would be called premature gathering. All these nice points have to be practically determined,—and the only safe general rule can be given that when a fruit will part readily from the tree when gently lifted; or when the seeds inside are of a deep black color, the crop may be gathered and stored away.

In most cases, by far too many fall-ripening varieties of fruit are planted. If the orchard be intended to supply family consumption, the crop will not keep till all is used; and if for market purposes, many will rot before purchasers are found for them; as more important duties have to be neglected to give attention to them.

Where a great abundance of fall fruit exists, and it is desirable to keep them as long as possible, they should be gathered before fully ripe, just as the seeds are changing color, and kept in a cool, dark, room,—one not too dry, however,—until they can receive attention. This coolness and darkness is moreover the main secret of keeping fruit of the winter ripening kinds through to their proper season; and it is in endeavoring to find the exact conditions that so many fail. If too dry they shrivel; if too hot they particularly ripen and are worthless; if too damp they rot; and if too cold they are tasteless and insipid.

To just hit the mark is not easy to a beginner, and yet in practice it is found not so difficult as it appears to be. Some house cellars are so constructed as to be just the suitable thing; but the majority usually border on some one of the extremes we have noted.

Probably the best plan for the apple where the fruit is perfectly sound, is to carefully hand pick the fruit, and pack them gently in flour barrels, being careful not to bruise them in the least, either in filling the barrels or in handling them afterwards. In this way they will keep in cool cellars that are tolerably dry, when in the same cellars they would probably shrivel on open shelves. Where the fruit are subject to the depredations of the apple moth, or to fungoid diseases, this plan is liable to objections, as the injured fruit will decay; and is difficult to get at inside the barrels; and if not taken out in time, a considerable portion of the fruit will be destroyed by the heat evolved in putrefaction. The English fruit rooms, which are mostly constructed more with an eye to perfect fruit preserving and ripening than to economy of arrangement however, are usually made expressly for fruit, and all gardens of any pretensions have the fruit room as regularly as the tool shed. They are usually built on the north side of a wall or other buildings, in order to secure a regular temperature.

The walls are thick to ensure against frost penetrating them and many of them have a roof of straw thatch which tends still more to keep out frost, and a regular natural temperature inside. Along all four sides of the building are tiers of shelves arranged above another, like the sleeping berths of a ship, and on these boards are spread the fruit in thin layers—usually but one course thick. Some of them have ventilation provided both from below and above; but those we have seen were not thus arranged, and there were no means of communication with the external air beyond what the doors and windows afforded. In these rooms apples and pears kept perfectly, ripening in succession, according to their season, and some of them keeping till apples and pears came again.

The secret of their success undoubtedly is the keeping up of a natural temperature of between 40° and 50°.

In our climate this arrangement would not answer. The severity of the winters demands more protection from a low temperature than the strongest walls would alone afford. Where a dry gravelly bank is at command, a room could be constructed, part beneath the surface, and part above—the exposed part covered with the earth thrown out from below; which would make a fruit room to perfection.

After all, the keeping of fruit on a large scale is not within the wants of most of our readers, who have but a few bushels, and in whose eyes a special fruit house would not be warranted by the small quantity to be kept. There is then no alternative but to make the best use of the facilities, cellars, rooms or out-buildings afford; and for this, barrels, boxes, cupboards and enclosed cases must be called into requisition; being careful to ensure a temperature of about 40° to 50°, not too damp or dry, and if somewhat dark the better.

CULTIVATING ORCHARDS.

ALL young orchards, for the first few years, should be cultivated in some manner, to some hoed crop, in order to allow the trees to get such an advance in growth, as not to be injured by a grass sward. The following remarks from the Gardener's Monthly are applicable to the case:

We must repeat, that we regard the plan of not allowing even the merest blade of vegetation to grow in an orchard from the time it is set until it is old enough to cut cut up for firewood, as nothing but a sentiment. We have never seen such an orchard; and if any one can tell us of one, we will go and see it. It would not pay, and we need not point out why. The reasons are obvious, and all this,—granting, for the sake of argument, that the trees might be a little better for it.

First, To make an orchard profitable something must and will be grown on the ground during the first few years of its existence, at the very least. Supposing we admit cropping an injury, grass crops are least so of any. We do not, however, consider it an injury, unless suffered to mature, or under other limited circumstances.

Second, It makes all the difference how a thing is done. An auctioneer was selling a lot of German sausages, of very uncertain age, and got but one bid. "Only fifty cents a barrel!" said the crier; "why, they are worth more than that for manure." A city ruralizer took up the idea. He had just bought a farm in the country, and he sent out his ten barrels of sausages, with directions to Peter to drop one in each hill of corn; which was done accordingly.

The next week formed an awful time in that county. The inhabitants thought all the plagues of Egypt were to be repeated on them. Dogs by hundreds were running here and running there, each with an ancient and odorous sausage; and, if the mysterious hints we sometimes have of the unexplained scarcity of dogs about sausage time have any weight at all, certainly the dogs now had a full revenge. But the city farmer—he voted sausage manure a humbug of the purest water; and to this day nothing but the strongest barn-yard fertilizer will go down with him.

The fact is, the best of principles are fraught with danger in ignorant hands; and we can point to scores of instances where orchards are "ruined by grass;" and we know "many good orchards under cultivation." in good hands. Instead of principles we had better give you an example for practice.

If your land has a tenacious subsoil, underdrain it; then manure with whatever fertilizer you may decide on as best adapted to your soil and circumstances. Plow deep, then set your trees 25 feet apart, and sow at once with grass seed and white clover. The object now should be to get a tough sod; this is obtained by mowing often—say three times during the season around the trees, and twice at least over other parts of the ground, leaving the grass to lie where it falls. In some cases, perhaps, the grass may injure a particular tree; that tree may have weak roots, or the grass may get extra strong, and run the tree too severely for moisture. In such cases pull the grass out. Common sense will do more for you than the best rules. This is the art of gardening, to apply knowledge to varied and varying circumstances. Perhaps in that case, mulching may help it. The second year you may cut your crop of grass—never allowing it to get too old; in fact, make a rule to take two crops a year—immediately under the trees three times if you wish, and let the grass rot where it falls. When your trees or grass are likely to fail, top-dress; in many cases perhaps annually. Should any one tree, at any time, not seem to grow as well as you would wish under this treatment, haul a load of old vegetable muck, and spread, say two inches deep under the tree, and you will find all as well as you can wish.

TRIMMING GRAPE VINES.

THE fall is the best season to prune grape vines in all latitudes. It is, however, a custom with some grape growers who reside where winter protection of vines is not necessary, to prune either in the winter or in the spring, before the sap begins to flow. This custom arises, as we believe, in many cases, from neglect to prune in November preceding, rather than from any substantial reasons for delaying this work.

We will now lay down the principles on which pruning should be based; and some portion of our remarks will be addressed to the *novice* in grape culture. It is a well understood fact, with experienced grape growers, that the same cane or grape wood never bears but one crop of fruit. For instance, you have a vine that is cut down to the ground in the fall, in order to obtain all new wood. The next season, we will suppose that you allow but one cane to grow, and every bud of this cane is presumed to throw out a lateral shoot in the following spring, which produce fruit at their *bases*, where they connect with the parent cane.—Now, let us suppose that this vine is left unpruned, with all its lateral canes as they grew, and we will see where the fruit is produced the next season. The original cane now produces no fruit; it has borne its only crop, and no art of man can make it produce another; but the *laterals* will each bear its crop, like the original cane, and throw out other laterals to bear the fruit of the succeeding year, and so on till the vines would become an unwieldly mass of entangled canes, if left to the guidance of nature. It, therefore, requires the hand of man to restrain grape vines with a proper growth, and also to see that each season produces suitable wood for producing the crop of that which is to follow.

There is, properly speaking, but one system of pruning—the *renewal* system—which comprehends the yearly renewing of new wood to bear fruit; but there are scores of ways of *training* vines; and the grape grower should have his mind fully made up as regards the system of training he desires to adopt, before he commences to prune. The reader will now probably expect us to give our opinion on the best methods of training vines; but to do justice to that subject, we ought to write a special article on it, filling several columns of this paper; and, therefore, we can say but little on that point at present.

It depends in a great measure, what *variety* of grape you desire to train, to be able to give the proper information. A vine that will grow fifty feet in a season, and spread over a square rod of ground, should be trained differently from one that is a slow grower, and never extends its canes, in one season beyond some few feet. for instance, the *Delaware*, a slow growing variety, may be trained to stakes, while the Concord would do better trained to a trellis, as it is a rampant grower, and could not well be confined to a single stake.

When vines are trained to trellises, generally two good strong canes are produced the *third* year, (where vines have not been re-set, which puts them back one season,) to be used as *horizontal arms*, each extending six to ten feet, about eighteen inches from the ground. The laterals are all trained perpendicularly, as they shoot off from the arms, and cut back in August, when they have reached beyond the height of the trellis, seven to eight feet. In November, at pruning time, *each alternate* cane is cut down to the last eye, near the horizontal arm. Those canes not cut down are the fruit-bearing wood of the following year, while the buds left on the canes cut down will produce the fruit-bearing wood of the succeeding season; and so on from year to year, each alternate cane is cut down to one bud, being *every* cane that has produced a crop of fruit, after this system has become perfect.

The only other system of training vines, much practiced, is that of tying them to stakes. The German vine dressers in Ohio mostly adopt this system, in training the Catawba grape, which is the principal variety grown there in vineyards. They curve around the vines—two canes to each —and tie them in a circle; but that system does not do as well with our rampant native vines, such as the Isabella and Concord. It will answer, however, by setting the stakes two to three feet apart, so that the canes can be made to cover the entire space along the rows of vines in a vineyard.

TRIMMING.—If the surplus wood is wanted to propagate from, it may be cut either into long or short cuttings. A long cutting contains, at least, *two* buds, and when the joints are short, three or four buds or eyes. When the eyes are from eight to twelve inches apart, there is no necessity to have more than two to a long cutting, which, when set in the ground, will allow its lower eye to be full six to eight inches below the surface of the soil.

Short cuttings consist of a single eye only to each, and are propagated in the open air, by placing them horizontally about one inch and a half below the surface, and kept moist in dry weather by hand watering. On this system of making cuttings double the number of vines can be produced, from a given number of cuttings, than can by setting the long cuttings in a diagonal position, as they should be set, as the lower eye in the latter case forms the roots of the plant, whereas in the former case an upright cane, as well as roots is produced. The one eye system is attended frequently with a great deal of labor in watering, while the other generally requires no water, except what the clouds supply.

You first select two, or more if you please, of the best canes the vine has produced, either such as were entirely grown the present season (and always select such when they are to be found of well ripened wood, and sufficient length,) or those that contain the most new wood, and these are to be your fruit-bearing canes for next season.

Sometimes, when care has not been taken to grow canes, especially for producing fruit the next season, one has to depend on the *laterals* of the fruit-bearing canes of the present season in which case, every other one is sufficient, which will give you an opportunity, if desired, to grow a supply of fruit-bearing wood the next season, from the laterals cut back to one eye.—*Rural American.*

POTATO TOPS, &c.—Every thing in the shape of rubbish, such as early potato tops, cucumber vines, refuse radishes, spring mulching, &c., should be buried on the spot, leaving a clean and neat surface. When an assistant digs a mess of potatoes, cause him to bury the tops at the time. They will decay and enrich the land.

BLIGHT IN APPLE AND PEAR TREES.

BENJAMIN D. Walsh, President of the Illinois Natural History Society, and well known as an entomologist, recently read a paper before the Society mentioned, on the cause of the blight, or the "fireblight" in the apple and pear tree. The conclusion to which he has arrived is, that the blight is caused by certain species of insects called leaf-hoppers. We give below a summary of the points laid down as the result of his investigations. It may not be amiss, however, to remark, that blight in pear trees has often occurred in this vicinity where no trace of injury by the insect alluded to, several species of which are well known here, could be discovered, even by experienced and careful entomologists. The following are Mr. Walsh's points:

1. Fire-blight in the apple and pear is caused by two species of leaf-hoppers (*Tettigonia*) described by me, in the Prairie Farmer last year, as *Chloroneura malefica* and *Chl. maligna.*

2. In the autumn these insects lay their eggs, from 7 to 10 in number, in slits about $\frac{5}{8}$ of an inch long, cut lengthwise, in the bark of twigs and branches, and easily recognized by their scaly, rough appearance. They also pass the winter in large numbers in the perfect, or winged state.

3. As these eggs lie dormant for eight months before they hatch, and as the sapwood turns brown on each side of the egg slit, there must be some poisonous fluid deposited by the mother insect in the egg slit; otherwise the wound would grow over and heal up.

4. This poisonous fluid is absorbed into the system of the tree, and blight results the next spring, even before the young *Tettigonians* are hatched.

5. The beak of the Tettigonian appears to have some poisonous property, for the leaves turn brown when they are punctured by it. This is called, out West, "leaf-blight," and may also be seen on grape vines badly infested by their peculiar leaf-hoppers.

6. Almost every tree has one or more peculiar leaf-hopper. For example, two species occur on the crab, thorn, pear and apple, the same that I believe to cause the fire-blight: another on the white elm; another on the oak; another on the sycamore or button-wood—all three of them undescribed; and four distinct species on

the grape-vine, two of which were first described by me in the Prairie Farmer.

7. On the elm it requires a very great number of egg-slits to cause blight; on the crab a less number; on the pear, a very small number.

8. On the elm and crab-apple, and most other trees, the egg is generally placed half in the sap-wood and half in the bark. On most varieties of the pear, it is generally placed in the bark, not penetrating into the sap-wood.

9. The most feasible remedy for "fire-blight" is to destroy the leaf-hopper eggs, as soon as possible after the fall of the leaf, either by trimming off the twigs containing them, or throwing them on the ground, or by shaving off a very thin slice of the bark with a *sharp* knife, wherever egg-slits are observed, so as to cut into the eggs. It is of no use to trim off twigs which are already blighted.—*Boston Cul.*

PURCHASE OF SEEDS.

The chapter under this head we copy in full, for nowhere is the information and advice it contains more needed:

"It costs as much trouble to grow flowers from bad seed as from good, and whoever takes the trouble should make sure of seed that will be worth it. The stuff sold at little seed-shops and corn-chandlers is generally only good enough for the birds, and all the skill in the world would be exercised in vain upon it with a view to getting good flowers. Some of the common kinds are pretty sure to be good, no matter where you get them; but asters, stocks, balsams, zinnias, and others prized for their high coloring and distinctness of habit, should be purchased at none but first-class houses. The seed of choice flowers is saved with as much care as gold dust—for it is gold dust in another form—by all the leading growers. The plants for seed are picked with the greatest care; and as the best flowers produce the least seed, and single colorless and ragged ones plenty, that which is skilfully saved is valuable to a grain, and the rubbish is valuable only in pounds and bushels. All sorts of tricks are practised upon seeds. Good seed is purchased at a fair price, and mixed with the worst to increase its quantity, so that in a packet of some hundreds there will perhaps be only half a dozen worth the trouble of culture, and you cannot know it till your trouble is nearly over and the plants are in bloom; then you are dismayed to find only one in fifty worth looking at. Asters, stocks, and balsams have been brought to such high excellence by careful culture and skilful saving of the seed of the best flowers, that those who grow from penny and two-penny packets have no idea of the beauty of the flowers which may be secured from a pinch of first-rate seed. Asters are now to be had of the size and fulness of dahlias, and of all shades of color. Balsams the same. Stocks of the best kinds produce grand pyramids, equal to the best hyacinths, and all the leading annuals are saved in distinct colors, so that the grower is in no quandary as to what the tints will be, if the seeds come from a first-rate house, and are sown separate as received, and with tallies to distinguish them. There is an immense trade carried on in penny packets of dead or worthless seeds in London, and that is one reason why the London people are so far behindhand in the growth of flowers. As a rule, never save seed of your own growing; you can buy for sixpence what it will cost you five shillings in trouble to obtain; and there are a hundred chances against your saving a single pinch that shall be worth the paper you wrap it in."

DOMESTIC ECONOMY.

MAKING AND KEEPING CIDER.

CIDER on the farm, is a democratic drink, not so much used as it was forty years ago in New England, but more used now than it was a dozen or more years ago, when it was thought to be the forerunner of something worse, by initiating a taste for ardent spirits. Many people still condemn the use of cider as a beverage, with whom we shall not argue the question upon its merits, but will only say that those people who will drink cider, should try to secure an article of the best quality; for to our certain knowledge, there is a kind of cider made from good honest apples, but spoiled in the handling, which is not fit for any human stomach, except in the shape of vinegar, while we do also aver that there may be cider which will give an agreeable flavor to the palate, and sit nicely upon an unperverted stomach.

The introduction of little portable cider mills has been a damage to the quality of the cider,—not absolutely of necessity, but because the cider maker was tempted to press off his pomace as fast as it came from the mill. Cider-making, like cheese-making, is not entirely a mechanical process, but partakes largely of the chemical, and there is nicety of chemical ripening in the pomace of the cider-maker, as well as in the curds of the dairyman.

Whatever mill is used for grinding the apples, to secure a good cider, the pomace should not be pressed out under six hours after grinding; by keeping the whole together in this way, the free juice acts upon the more fixed aroma of the pulp, seeds and skins, so that when it is pressed out, it takes the soul of the fruit—so to speak—along with it: whereas, if pressed as soon as ground, the juice is thin, watery, and destitute of aroma and that peculiar fruity body, which makes good cider such a luxury.

The cider once pressed out, should be stored in casks absolutely clean and free from taint of mustiness. Musty casks, if to be used at all, should have something more than a rinsing of cold water. Let them be thoroughly soaked and scalded, and then fumigated with brimstone. It is poor economy to put good cider in foul casks, to be spoiled. Store the casks in the cellar, take out the bungs so the fermentation will work over, and keep the casks filled so the fermented pomace will all go over and not settle as lees in the bottom, to hasten a second fermentation and give you a premature hard cider. For a nice beverage, as soon as the vinous or first fermentation ceases, either rack off the liquid into clean casks or bottle it, and close the packages air tight. There are various devices of drugs and the like, for keeping cider sweet, but we prefer our cider as we do our wine free from all such mixtures.

CHAMPAGNE CIDER.

After the apples are crushed, press out the juice, put in a clean cask, and leave out the bung. It will work without anything being put in. In four or five days draw off, and put into another clean cask. Do this three or four times, allowing as many days between each changing. It does not work well in cloudy weather, and so must be left longer. If it does not fine well, it will not keep sweet, To assist the fining, dissolve six ounces of gelatine for each hogshead, and mix; do this previous to the last change of cask.

The quality of cider depends upon the sort of apples used. Two parts sour apples and one part sweet will make good cider.

Now observe, let there be no time lost in the whole process, but allow sufficient time to do it well. It is particles of pulp left in the cider that causes it to turn sour. To effect the proper clarifying and working, it will require four changes of cask, that is if you want first-rate cider. Do not put any water in any part of the process—having all juice.

After the last change, the cider may remain in the cask, bunged up two or three months. You can then bottle off—lay the bottles down in a cold, dark cellar—some will burst, but then you must put up with it. It will be fit for use during the summer, when all parts of the work have been well done. The bottled cider will be equal to champagne, and will keep sweet.

Some put brandy, rum, gin or other spirits in—it does not preserve it but only makes it intoxicating.

HOW TO CURE HAMS AND SIDES.

THERE are many ways to cure hams, but some of them are not desirable, unless we are satisfied to eat poor hams in preference to good. A ham well cured, well smoked and well cooked, is a favorite dish with most people; but there are very few indeed who can relish ham which has been hardened and spoiled by salt, or tainted for the want of salt in curing, and may be worse spoiled in cooking; but if ham is spoiled by too much salt, or too little, or becomes tainted before the salt has thoroughly penetrated through it, I defy any cook to make a good dish out of it. I have tried many ways of curing hams, and have lost them sometimes by having them become rancid and tainted in warm weather, and also by having them so salt and hard that they were unpalatable.

I have for some twenty years practiced the following simple recipe in curing pork hams and shoulders, and find it preferable to any recipe I ever tried; and when I have had any to sell they have taken the preference of sugar cured hams with those acquainted with them:

I trim the hams and shoulders in the usual way, but I cut the leg off close up to the ham and shoulder, to have them pack close; and then sprinkle a little fine salt on the bottom of a sweet cask, and pack down the hams and shoulders promiscuously, as they will best pack in, and sprinkle a *little* fine salt on each layer, just enough to make it show white; then heat a kettle of water and put in salt, and stir well until it will bear up a good-sized potato, between the size of a quarter and a half dollar; boil and skim the brine, and pour it on the hams boiling hot, and cover them over one or two inches deep with the brine, having put a stone on the meat to keep it down. I sometimes use saltpetre, and sometimes do not; consider it useless, except to color the meat. I now use my judgment as to the time to take them out of the brine. If the hams are small, they will cure in three weeks, if large, say five weeks; again, if the meat is packed loose, it will take more brine to cover it, consequently more salt will penetrate the meat in a given time than if it is packed close; on this account it is useless to weigh the meat and salt for the brine, as the meat must be kept covered with the brine, let it take more or less. Leave the casks uncovered until cool. When the hams have been in brine long enough, I take them out and leave them in the cellar if the weather is not suitable to smoke them. I consider clean corncobs better for smoking meat than anything I have ever tried, and now use nothing else. Continue the smoke until it penetrates the meat, or the skin becomes a dark cherry brown. I then wrap the pieces I wish to keep in paper any time before the flies or bugs have deposited their eggs on them, and pack them down in casks with dry ashes. In the cellar, both hams and shoulders will keep as good as when packed, through the summer or year. Cured in this way, it is hard to distinguish between the shoulder and ham when boiled.

HOP BEER.

We have the pleasure, says the *Genesee Farmer*, of giving, this month, a receipt for beer which is really valuable. The beer is easily made, and will keep six or eight months. Three months after it is fermented, it is almost equal to ale.—This receipt is for fifteen gallons: Twelve ounces of hops, six quart of molasses, ten eggs. Put the hops in a bag, and boil them fifteen minutes in three pailfuls of water. Put in the molasses while hot, and pour immediately into a strong ale cask which can be made perfectly air-tight, and put in the remainder of the water cold. Let the mixture stand until cool, and then add eggs. This beer will not ferment in cold weather unless put in quite a warm place.

PICKLING CUCUMBERS.

As a general thing, sufficient care is not taken in pickling cucumbers, and large numbers of them "spoil" in less than three months' time. The following method we think the best: Select a sufficient quantity of the size you prefer, which probably cannot be done at one time. Put them in a stone pot, and pour over them a strong brine; to this add a small bit of alum to secure the colour. Let them stand a week, then exchange the brine for clear water, in which they must remain two or three days. Boil the best cider vinegar, and when nearly cool, pour it over the cucumbers, having previously turned off the water. Prepared in this manner, with the addition of cloves, allspice, mustard, and cinnamon, boiled in the vinegar, pickles of every kind will keep for a year In pickling cauliflower, tomatoes, and other vegetables, which easily apsorb the vinegar, spiced vinegar should be added when cold.—*Rural New-Yorker.*

COPPERAS AS A DISINFECTANT.

Green copperas dissolved in water will effectually concentrate and destroy the foulest smells, and if placed under a bed in hospitals and sick rooms will render the atmosphere free and pure. For butchers' stalls, fish markets, sinks, and wherever there are offensive, putrid gases, dissolved copperas sprinkled about will, in a day or two, purify the atmosphere, and an application once a week will keep it sweet and healthy.

GOLD AND SILVER INKS.

The following is the method described by Dr. Ure for making gold ink. Take gold leaf and grind it with white honey upon a slab of porphyry with a muller, until it is reduced to an impalpable powder, in a pasty condition. This golden honey paste is then diffused in water which dissolves the honey, when the gold falls to the bottom in the form of very fine powder. The honey is then washed off carefully, and the gold powder thus obtained is mixed with gum arabic mucilage, and forms the gold ink. When used, it is allowed to dry on the paper, then it may be burnished with an agate burnisher, when it becomes brilliant. Silver ink is prepared in the same manner, by substituting silver for gold leaf.—*Scientific American.*

CREAM BEER.—This is an effervescing drink, but far pleasanter than soda water, inasmuch as you do not have to drink for your life in order to get your money's worth. The effervescence is much more slow. Two ounces of tartaric acid, two pounds white sugar, the juice of half a lemon, three pints of water. Boil together five minutes. When nearly cold, add the whites of three eggs well beaten with half a cup of flour, and have an ounce of essence of wintergreen. Bottle, and keep in a cool place. Take two tablespoonsful of this syrup for a tumbler of water, and add one-quarter of a teaspoonful of soda.

CREAM CAKE.—Put two eggs in a coffee cup, fill the cup with cream; beat the cream and eggs together, add half a tea-spoonful of soda, a coffee cup of sugar, half a coffee cup of flour, and a little salt. This will make one loaf.

COLONIZATION REVIEW.

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

The great and practical value of the British North American Provinces and possessions is seldom appreciated. Stretching from the Atlantic to the Pacific ocean, they contain an area of at least 3,478,380 square miles—more than is owned by the United States, and not much less than the whole of Europe, with its family of nations. No small portion of British territory consists of barren and inhospitable regions in the extreme; but as a recompense, the arid plains extending through Texas, and thence northward beyond the limits of the United States, are comparatively insignificant as they enter the British Possessions, where the Rocky mountains are less elevated and have a more narrow base. The isothermal line of 60° for summer rises in the interior plains of this connent as high as the sixty-first parallel, its average position in Europe: and a favourable comparison may also be traced for winter and other seasons of the year. Spring opens almost simultaneously on the vast plains reaching from St. Paul's to the Mackenzie river—a distance northerly of about 1,200 miles. Westward from these regions—now, scarcely inhabited, but of incalculable value in the future—are countries of yet milder climate, on the Pacific slope and in Vancouver's Island, whose relations to California are already important. On the eastward, but yet far distant from other abodes of civilization, are the small settlements enjoying the rich lands and pleasant climate of the Red River of the North, a stream capable of steamboat navigation for four hundred miles.

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

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

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

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

New Brunswick is 190 miles in length and 150 in breadth. Its interests are inseparably connected with those of the adjacent State of Maine. It has an area of 22,000,000 acres, and a seacoast 400 miles in extent and abounding in harbors. Its population some years ago numbered 210,000, whose chief occupations are connected with shipbuilding, the fisheries, and the timber trade. Commissioners appointed by the government of Great Britain affirm that it is impossible to speak too highly of its climate, soil, and capabilities. Few countries are so well wooded and watered. On its unreclaimed surface is an abundant stock of the finest timber; beneath are coal fields. The rivers, lakes, and sea-coast abound with fish.

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

The province of Prince Edward's Island is separated from New Brunswick and Nova Scotia by straits only nine miles in width. It is crescent-shaped, 130 miles in length, and at its broadest part is 34 miles wide. It is a level region, of a more moderate temperature than that of Lower Canada, and well adapted to agricultural purposes. Its population in 1854 was estimated at 90,000.

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

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

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

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

It is rich in metallic ore and in the resources of its forests. Large portions of its territory are peculiarly favorable to the growth of wheat, barley, and the other cereals of the north. During the life of the present generation, or the last quarter of a century, its population has increased more than fourfold, or from 582,000 to 2,500,000.

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

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

They imply freedom for ourselves, and those rules of fraternity or equality which enjoin us to regard our neighbours as ourselves. We can trust in our policy.

COMMERCIAL REVIEW.

PETROLEUM GAS.

The London *Times* roughly estimates that the quantity of Petroleum or Rock Oil which will be exported to Europe in 1863 will amount to fifty or sixty million gallons. Numerous uses for the different light and heavy oils, which can be procured from petroleum by distillation, are already known, and application is now made of this curious product in a great number of forms. But it is as an illuminator that it will find most favor with the public, where the supply is constant and cheap; and it is very probable that, as an economical source of gas for illuminating and heating purposes, it will advance rapidly into general use.

The results of a series of experiments which have recently been made at the gas works from which the small towns of Homer and Courtland, in the State of New York, are supplied, are most satisfactory and encouraging, both with regard to the luminous qualities and the remarkable cheapness of petroleum gas.

The following details are the results of careful measurement in all particulars, from which information as to the economy of the manufacture of petroleum gas could be derived.

The process employed at Homer and Courtland is similar, in most respects, to that which enables the proprietor of the Stevenson House, St, Catherines, C W., to light his establishment with 180 burners, at a cost of 86 cents a night, under what is known as Thompson's patent.

The retorts at Homer are two in number, and of the following dimensions:—

Length	7½ feet.
Breadth........................	16 inches.
Height	12 "

Two vertical tubes are cast on each retort for the purpose of supplying water and petroleum. The retorts are laid horizontally in an arch, exactly the same as ordinary coal gas retorts, for which they can be substituted without much trouble or expense. Each retort is divided into three chambers called petroleum, the water, and the coke chambers respectively.

Petroleum and water are introduced in continuous streams through the tubes before described, so that when once a barrel of petroleum is placed at a sufficient height to allow a pipe provided with a a stop-cock to feed the retort, the fluid may be admitted and the process of conversion into gas goes on without further trouble until the barrel is exhausted.

Two series of experiments were recently made at Homer, with the following results:—

First trial.

Quantity of gas made by each retort, per hour, 450 cubic feet.
Total quantity of gas made, 3,380 cubic feet.
Petroleum consumed, 38 wine gallons.

Condensed petroleum, capable of being used over again, 4 gallons.
Quantity of petroleum per 1,000 feet of gas, 10$\frac{1}{17}$ gallons.
Time required to make 3,380 feet, 3 hours 45 min.
Time of heating the retorts; the same as for coal gas.
Quantity of fuel; same as for coal gas.

Second trial	C. F.
Quantity of gas made by the retorts in the first hour	1,080
Quantity of gas made in second hour, less 10 minutes	820
Proportionate quantity in second hour	984
Total quantity in two hours	2,064
Mean quantity per hour	1,032
" " for each retort per hour	516

Quantity of fuel; same as for coal gas.
Time of heating retorts; same as for coal gas.
Quantity of petroleum consumed ... 25 wine gals
" condensed petroleum, capable of being used again ... 1¾ "
Actual quantity of petroleum used 23¼ "
Quantity per 1,000 feet .... 11$\frac{1}{10}$ "

Mean of the two experiments.

Total quantity of gas made 5,280 cubic feet.
Total time occupied in making the gas, 5 hours 35 minutes, or very nearly 1,000 feet per hour, or 500 feet for each retort.
Petroleum consumed; 11 gallons per 1,000 feet.

In the first hour of the second experiment, the quantity made was 1,080 cubic feet; and the condenser shewed that too much water was admitted, (about one-eight of the whole quantity of petroleum.) This unecessary quantity of water evidently cooled the retort, and prevented the gas from being formed so rapidly as during the first trial.

A one-foot burner, with this gas, gives as brilliant a light as a four-feet burner supplied with common coal gas.* Hence, 1,000 feet of petroleum gas will go as far as 4,000 feet of ordinary coal gas for illuminating purposes.

Now, when we examine these results, and compare them with what has been done in the manufacture of coal gas, the following remarkable comparisons present themselves.

In making coal gas a charge of 150 lbs. of coal is generally introduced into the retort, and allowed to remain for five hours. It generates 600 feet of gas, if the coal is of moderately good quality. This is at the rate 8,000 feet for 2,000 lbs., or one ton of coal. To produce 600 feet of gas, the destructive distillation has to be carried on for a period of five hours. In a retort of the same dimensions and heated in the same manner, no less than 2,500 cubic feet of petroleum gas are produced, under precisely similar conditions. But one cubic foot of petroleum gas is equal in illuminating power to 4 cubic feet of coal gas. Hence, in five hours the petroleum produces, when reduced to the equivalent of coal gas, the enormous quantity of 10,000 cubic feet of gas, against 600 by the coal process. The saving of fuel and labor is consequently enormous.

If we assume that the illuminating power of petroleum gas is only three times that of coal gas, the proportion of each kind produced in 5 hours is as follows:—

7,500 cubic feet of gas by the petroleum process.
600 " " by the coal process.

Hence in this case, which is below the actual results, the GAIN IN TIME required for the manufacture of petroleum gas, as compared with coal gas, is as TEWLVE TO ONE. This fact alone reduces the number of retorts in petroleum gas works on a large scale, to at least, say, one-sixth of the number required for coal gas works. Actually one petroleum retort can produce the equivalent in gas of twelve coal gas retorts. When the annual expense of retorts is taken into consideration, this item alone establishes a great argument in favor of the petroleum process; for not only is the number of retorts required diminished to the extent named, but all connecting pipes, huge hydraulic mains, and the extensive system of coolers and purifyers, are dispensed with in equal proportion. The labor of handling the coal is done away with, and a larger proportion of capital in the construction of works saved.

To proceed now to the question of cost. Assuming that two benches, each containing two retorts, are used for making petroleum and coal gas respectively. The cost of apparatus in the first instance is about the same. The time for heating and the fuel consumed is the same. The cost of 11 gallons of petroleum (or 1,000 feet of petroleum gas) at 6 cents a gallon (the price Toronto) is 66 cents. The cost of 250 lbs. of coal (or 1,000 feet of coal gas, at $5 a ton, is 62½ cents. But 1,000 feet of petroleum gas is, at the lowest estimate, equal to 3,000 feet of coal gas. Hence the cost of 3,000 feet of coal gas (equal to 1,000 feet of petroleum gas) or 170 lbs. of coal, at $5 a ton, is $1.87½. Then there is the coke to be deducted from the price of the coal used in making 3,000 feet of gas, which may fairly be set against the smaller amount of labor required in handling the petroleum, when compared with the handling of the coal.

Where petroleum is 10 cents a gallon, and $6 a ton, the proportionate cost of the raw materials used will be as follows:—

Cost of 1,000 feet of petroleum gas	$1 10
" 3,000 feet of coal gas	2 25

The foregoing comparisons refer to the orignal cost of the material from which the gases are made, but if we take the price actually charged by gas companies into consideration, the results are the more striking.

The cost of private works to supply 200 burners will be about $1,000; the labor of one man per diem; lime for purifying; three bushels of cake at 10 cents a bushel; so that the entire cost will be—

Interest on capital at 8 per cent. per ann.	$8 00
Labor at $1 per day	365 00
Lime for purifying 200 bushels per ann. at 20 cents a bushel	40 00
Petroleum to produce gas for 200 one-foot burners, 5 hours a day throughout the year (365,000 feet of gas); 4,015 gallons at 6 cents a gallon	240 90
Fuel, say 4 bushels of coke a day, at 10 cents a bushel	240 00
Total cost	$487 90

The equivalent of 365,000 cubic feet of petroleum gas in coal gas is 1,395,000, reckoning one foot of petroleum gas equal to three feet only of coal gas.

Cost of 1,095,000 cubic feet of coal gas, at $2.50 per 1,000 feet (a low price in the United States and Canada)	$2,737 50
Difference per annum in favor of petroleum gas	1,865 60

If the price of petroleum is 10 cents a gallon, instead of 5 cents, the difference in favor of the gas will be, per annum, $1,705.

Thus:

Interest on capital	$ 80 00
Labour	365 00
Lime	40 00
Petroleum	401 50
Coke	146 00
	$1032 50

1,095,000 c. ft. coal gas. at $2 50 per 1,000, $2737 50 Diff. in favor of petroleum gas, per ann. $1705 00. In works where twelve coal gas retorts are in operation day and night, each being charged with 150 lbs. of coal, they can produce 36,000 cubic feet of gas in 24 hours. This quantity can be yielded by two petroleum retorts in twelve hours. Thus:—

2 petroleum retorts yielded 1000 cubic ft. per hour. In 12 hours the yield will be 12,000 feet. The equivalent of 12,000 feet of petroleum gas is equal to 36,000 feet of coal gas.

If reduced to the same unit of time, namely, 24 hours, two petroleum retorts, of the same dimensions as coal gas retorts, will yield 24,000 cubic feet of petroleum gas, the equivalent of 72,000 ft. of coal gas, or as much as 24 ordinary coal retorts charged with 150 lbs. of each, every five hours, can produce in 24 hours.

There are other facts which make the production of gas from petroleum more economical than from coal. The quantity of lime required for purifying is not so great by one-half. The amount of water needed for cooling and washing is considerably less, and the tar produced is small in quantity when the yield of gas is taken into account. The gas is more free from those noxious sulphurous compounds which render badly purified coal gas so disagreeable and prejudicial.

The destruction of retorts in the manufacture of coal gas is immense. This arises in a great measure from the formation of graphite in the inside of the retorts, which accumulates in concentric layers, and sometimes forms a coating one or two inches thick. The retorts also suffer to a great extent by the entrance of air when introducing the charge of coal. This source of rapid destruction is avoided altogether in the petroleum retorts, which do not communicate with the atmosphere when in a heated state, and only require to be occasonally opened to remove the deposited carbon or graphite, which, by the way, can very conveniently be removed by partially filling the petroleum chamber with fire brick, whereby the heated surface to which the rich hydrocarbon vapors are exposed is greatly increased, and their conversion into permanent illuminating gases much facilitated. The deposition of carbon is materially diminished by reducing the pressure of the gas on the retort, and this by a simple adjustment of the water joints in the petroleum apparatus may be reduced to a minimum.

The use of water in the process by which the result described in the proceeding pages is produced, is for the purpose of converting the volatile hydrocarbon vapours of petroleum into permanent gases. It is thrown into its spheriodal condition the moment it strikes the interior of the retort, and in this state its spheriods continually develop steam of very high temperature and great reducing power. The rich petroleum gas may be largely diluted by the formation of the so-called water gas, but this has been shown to be an expensive process, and it is far more economical to employ a one-foot burner with a highly luminous gas than a three or four-foot burner with a diluted gas. The use of water gas as a diluant for rich hydrocarbon gases, which will burn without smoke or smell, and give a brilliant light from a small burner, is of not only very questionable economy, but it is thought by some to be a dangerous expedient, on account of the mixture of poisonous carbonic oxid into the gas, which, if leakage should by any accident occur in dwelling houses, might be followed by those fatal results to human life which have occurred time and again in every country where coal gas is manufactered, and particularly where water gas is used either with hydrocarbons or in any other form. Water gas, in order to be economical, implies the conversion of the carbonic acid produced into carbonic oxide, the one being a feeble illuminator, the other not only an incombustible, but so prejudicial to illumination that one per cent. of carbonic acid in coal gas diminishes its illuminating power by 6 per cent. The use of water gas has been interdicted by several European governments, on account of the poisonous properties of the carbonic oxide it contains. In the petroleum process, only so much water is used as will ensure the conversion of the volatile hydrocarbon vapours into permanent gases by their reduction to a lower hydrocarbon condition; and an analysis of its constituents show that it contains much less carbonic acid than common coal gas. Its great illuminating power is derived from a very large percentage of olefiant gas, together with carburetted hydrogen.

Mr. G. Howitz, the manager of the Copenhagen gas works, obtained 1000 feet of water gas by the combustion of 140. lbs of coke in the furnace, and about 20 lbs. of charcoal (15 lbs. pure carbon) in the retort. The water gas of the following.

Hydrogen	64
Carbonic oxide	18
Carbonic acid	18
	100

M. Gillard and M. Isard, in France, make water gas by passing superheated steam over coke or charcoal; but by progress 1000 cubic feet of mixed gas require 15 lbs. of pure carbon in the retort, and 118 lbs. of coke in the furnace.

1000 cubic feet of water gas can be obtained theoretically from 27·4 lbs. of water, although in practice much more is used, as a considerable portion of the steam is passed over undecomposed.

White's process for the manufacture of 1000 ft. of water gas.

Coke in the furnace	112 lbs.
Charcoal in retort (equal to 15 lbs. carbon)	18
Lime for purifying	37

Gillard's water gas (carbon).

Coke in the furnace	118 lbs.
Charcoal in the retort	18
Lime for purifying	67

The amount of fuel expended is not very considerable, but the lime required for the abstraction of the carbonic acid is immense. When coal gas contains 5 per cent. of sulphuretted hydrogen and carbonic acid, it requires only 15 lbs. of lime to purify 1000 feet. But by the foregoing table, White requires 37 lbs., and Gillard 67 lbs. of this material to abstract the carbonic acid from the same quantity of the water gas.

The advantages possessed by petroleum gas as a cheap illuminator, have already been sufficiently established; but its claim to public patronage does not rest on this fact alone. It is a most economical and valuable source of heat. Coal-gas stoves have long been in limited use, but they have not met with general favor, because they do not supply a sufficient amount of heat, and they are besides too costly when the coal gas is maintained at $2 50 per thousand feet. Petroleum gas is admirably adapted as a source of heat. It contains a much larger proportion of carburetted hydrogen generates more heat during combustion than either the same measure of hydrogen or carbonic oxide, as the following table, reduced from Dulong's experiments, proves;—One cubic foot of carburetted hydrogen, during its combustions, causes a rise of temperature from 60° to 80° in a room 2,500 cubic feet of air; whereas a cubic foot carbonic oxide elevates the temperature of a room of 2,500 cubic feet from 60° to 66.6°, and one cubic foot of hydrogen raises the temperature of a room of the same cubical capacity as before stated, from 60° to 66.4°. Or in other words: a cubic foot of carburetted hydrogen is capable of heating 5 lbs. 14 oz. water from 32° to 212°, a cubic foot of carbonic oxide 1 lb. 14 oz. through the same degrees of temperature, and a cubic foot of hydrogen 1 lb. 13 oz of water from 32° to 212°. With a burner and apparatus of peculiar construction, and consuming six feet per hour, a petroleum gas flame from eighteen inches to two feet in length can be produced under the same pressure as used for lightening purposes. The flame is almost destitute of illuminating qualities, but the heat it emits is intense. It can be used for heating private dwellings, for cooking, and other domestic purposes. The cost of this gas fuel is, at the rate of one stove burning for 30 days, 10 hours a day, $1 30, when petroleum is 6c. a gallon; when it is 10c. the cost per month is $2. For two dollars a month the house of a poor man may be supplied with light and fuel during ten hours of the day. With a burner of less dimensions—say three feet per hour—a cooking stove, and a one-foot burner, supplying abundance of warmth and light for one room during each day, may be fed at a cost of $2 a month. This, of course, is the price of the raw material alone. It is some consolation to reflect, that at a period when the price of fuel is rapidly rising in the United States and Canada, a means for affording the poor man cheap light and warmth has been developed by the discoveries of the rich stores of petroleum on the American continent.

After a perusal of this article, every candid reader will acknowledge that gas from petroleum, manufactured by the process described, is not only the most economical and agreeable mode of illumination which has yet been brought before the public, but as a cheap source of heat it may present its claim to the patronage and encouragement of the public, with the best prospects of general adoption.

ENGLISH CROPS.

THE London Daily News says that owing to the large increase in the yield, the harvest is estimated to be worth £20,000,000 to £30,000,000 more than that of last year, and there will consequently be no necessity for the importation of large supplies of breadstuffs from abroad.

NEW YORK CATTLE MARKET.

THE telegraph reports another overstocked market of Beef Cattle this week, and a very decided decline in prices. The greater proportion offering were poor and sold for 6 to 8c., while some inferior sold as low as 4 to 5c., the lowest rate for some months. First quality held up to 10 to 11c. The number in market was 6,581. Sheep ranged, for extra $5 to $5.50 per head, prime $4 to $5, common $3.50 to $4. Hogs, corn fed, $4.50 to $5.37, still fed $4.87 to $5.12.

MONTREAL MARKETS.

Since the receipt of last accounts, there has been a more brisk demand for flour and grain of all descriptions, and sales to some extent have been made. The following are the latest quotations:—

Potash, per cwt.,	$6.10 to 6.15
Pearlash, "	6.85 to 6.90
Flour, Fine, per 196 lbs.	4.00 to 4.10
No. 2 Superfine,	4.20 to 4.25
No. 1 "	4.30 to 4.40
Fancy "	4.50 to 4.70
Extra "	5.20 to 5.30
S. Extra Superfine	0.00 to 0.00
Wheat, U.C. White, per 60 lbs.,	$0.90 to 1.02
" U.C. Red, "	0.90 to 0.91
Peas, per 66 lbs.,	0.70 to 0.71
Indian Corn, per 56 lbs.,	0.55 to 0.56
Barley, per 50 lbs.,	0.80 to 0.85
Oats, per 40 lbs.,	0.47 to 0.50
Butter, per lb.,	0.15 to 0.16
Cheese, per lb.,	0.08 to 0.08½