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TO OUR READERS.

It has frequently been recommended to the emigrant, as the best way to acquire a thorough knowledge of farming, to hire himself out to a practical farmer; and we would add, if his means should conveniently permit of it, to become a pupil to reside in the house of a good practical farmer. He can make choice of his locality and preceptor; and should his lines fall in pleasant places, he will live comfortably, while he will enjoy the supervision and teaching of an experienced Agriculturist, with every thing around him that can aid in his instruction both practical and economical. Here from association, and interchange of visits, and topics of conversation, and remarks illustrative of professional management and varied local practice, he will, if an attentive observer and listener —speedily derive much useful information. He will find, if he should persist in following out his studies, that he has selected a line of life which will permit of his living in peace, comfort and plenty—wherein he may be enabled to realize a competence—if indeed in this new country, some fortunate accident should not present the chance of realising a fortune.

The improvement of Agriculture is not only a good thing in itself, but does it not seem something like discharging a debt ofduty, when opportunity offers, to repay our obligation to our common Mother: for dust we are, and to the dust we must return? We are here but in our crysalis state,—but we shall put in our wings in due season, and repair to the new heavens and the New-earth which await us. Then what more dignified or pious calling could be ours, than that of *collaborateur* with the Supreme Ruler of the Universe—he who dwells in the highest heaven working with us—of whom we may say with mingled awe and pride,—"Thou waterest her furrows; thou sendest rain into the little valleys thereof; thou makest soft with the drops of grain, and blessest the increase of it."

There are some—the foolish and unthinking—who hold many pursuits more honourable than Agriculture:—but he, who is daily and hourly cheered with light and life flowing from the fountain of true happiness, can well afford to disregard such disparaging opinions, and forget their babbling,—whilst he listtens with native rapture to the merry songsters around him—making the hills to rejoice, and gladdening the valley with their melody.

The farmer is placed beyond the vulgar temptations of the city. He lives frugally—it may be—but comfortably, and in iudependence. He does not expect to amass a fortune;—but if thrifty, his means go in encreasing, without his being subjected to excitement. He cares for the well being of his dependants—for the education of his family—for the precious privileges of religion and neighbourhood, and he envies not the wealthy or the great—being contended with the assurance of enjoying moderate comfort while he lives; and when called on to bid adieu to the fields and scenes he so fondly loved, he rejoices in the prospect of rejoining his departed neighbours, who valued him while they lived as a friend and a brother. Who can deny that such a mode of life tends to make better men and women, and if so, better children likewise. He sees

every means of comfort and happiness around him, that a rational heart could desire. He is free from the excitement of the city—from the temptation of radicalism and infidelity;—and he is prepared to supply the cities of his country with new relays of health and strength—with robust and vigourous recruits—with a constant influx of fresh material:—for is it not well known that the very men who toil therein with the greatest energy owe much of their ability to do so to their early country training.

We wish to show our readers the mutual dependence existing between town and country. Can it be doubted that their true interests are and must continue to be reciprocal and in common. Whilst the Farmer lends his aid to beautify and adorn the earth, he is repaid by the return which his labours afford. And who becomes the purchaser of his surplus produce? Is it not his friend of the city, who supplies to him in exchange the many necessaries, comforts, and luxuries which a prudent expenditure can afford.

The cultivation of the farm is the natural employment of man. Perhaps virtue should thrive there best—the body and the mind should be developed most bountifully. There temptations are the weakest,—and social intercouse the simplest and the sweetest:—there life flows most tranquilly, runs its longest course,—and has usually the happiest passage and issues.

But though this *ought* to be strictly true, farming life, in its present stage of comparative social advancement on this continent, has still its drawbacks. How is it that so many are tempted away from these fabled shades of bliss—to mingle with the busy crowd and become forgetful if their fealty and devotion to nature and her enjoyments? Any one, who is acquainted with the style of living amongst the cultivators of our soil, knows well that there is hard work, as well as poetry, connected with the ancient and honourable calling. It is too often the case that, in rural districts, the *great* man is the individual who is most distinguished for his muscle and feats of physical strength, rather than for intellectual endowments. To fell huge trees—to mow acres of heavy grass in the quickest time—to raise enormous weights—to excell, when leisure affords, in athletic exercises,—these are the achievments which ensure applause, and place the youth foremost in the ranks of excellence.

Now a certain part, and most would unhesitatingly say, the better part of our humanity repudiates this award,—this glorification of brute strength over mind and heart. And the wife seconds her lord in his estimate, and begins to find the refinement of her womanhood rebel against a constant round of unvarying drudgery. She cannot abide that the *means* should be confounded with what ought to be regarded as the *end*. It is this feeling, so early developed, which makes the young of both sexes quit the farm in disgust; they become enchanted with the pictures of town life they eagerly devour in books, and of which they are permitted occasional glimpses at fairs and merry makings, and their youthful bosoms swell with the fond, and too often delusive hope, that by repairing to these elysian scenes, their labour may secure them higher rewards than the dull life of the country can afford; and they hope, besides, to revel in unknown bliss during the happy period of acquisition.

On most farms there is a studied avoidance of ornament. Everything is arranged with a view to utility. Our sense and appreciation of the beautiful—which is interwoven with our very being,—though for want of opportunities of education, it may be partially dormant—is left nothing to feed on—nothing to dote on; but it seems as if studied pains were taken to disgust with every combination most uninteresting and repellent. From the cellar to the garret—from the garden to the neglected way-side—in cuisine, in social intercourse,—in everything—we have a studied avoidance of the attractive,—and nought is deified but work—work work.

With the light of the nineteenth century, young people long for society and improvements, and naturally recoil from the tedium and barenness, from hopeless and endless toil without some interchange of the intellectual—the pleasurable. If their natural and commendable tastes cannot be gratified on the farm, young people will persist on going elsewhere, where even the transaction of every day business seems to have about it something of the pleasurable and attractive to the unsophisticated denizen of the farm. We shall endeavour to convince our tyro readers that this need not necessarily be the case. That after all,—the farmer's life *ought* to be the most attractive and pleasurable. We shall place within their view the easy means of innocent recreation and enjoyment; and deem that in thus providing for their permanent comfort and improvement, we are only performing one tithe of our multifarious duties as the faithful Agricultural Journalist.

We hold it to be our duty to furnish our friends of all ages in the country with every useful aid in their profession,—culling whatever is most valuable and greatest practical interest,—whether in the discoveries of science bearing upon their pursuits, or in the opinions, and practices of leading Agriculturists. We conceive it to be our duty, at the same time, occasionally to make such suggestions and remarks as will tend to form the judgment of junior aspirants on the best models, in combination with the judicious use of all such valuable helps as well selected books and a sound education are calculated to afford them. *No man can succeed in life who does not take a pride in his calling.* It is this which inspires with a generous emulation, encouraging the youthful aspirant, and leading him on—who can tell—to receive one day the high reward of the civic crown.

J. A.

AGRICULTURE IN ITS RELATION TO ORGANIC CHEMISTRY.

We find, on analysis, that the various substances in nature bear a close resemblance to each other. There seems to be a wonderful concordance and interchange between the components of the animal, vegetable, and mineral kingdoms as regards the organic and inorganic—the combustible and incombustible. A

naturally fertile soil, and capable of sustaining for a lengthened period a succession of valuable agricultural crops, is found to be, on examination, a very compound substance. For instance, we shall give the analysis of a soil and subsoil as an example,—

	SOIL.		SUBSOIL
Potash	2.8001	—	2.1761
Soda	1.4392	—	1.0450
Lime	0.8300	—	1.2756
Magnesia	1.0200	—	1.3958
Peroxyde of Iron	4.8700	—	6.2303
Sulphuric Acid	0.0911	—	0 0396
Phosphoric Acid	0.2400	—	0.2680
Carbonic Acid	0.0500	—	
Clorine	0.0098	—	
Alumina	14.0400	—	14.2470
Silica	63.1954	—	61 6358
Organic Matter	8.5508	—	6.8270
Water	2.7000	—	4.5750
	99.8364		99.7032

Here the soil contains more potash and soda than the subsoil, which has no doubt derived its surplusage of these components from the ingredients employed as manure. No additions of lime or magnesia were ever known to have been made to the soil. The silica and organic matter would, no doubt, be encreased by cultivation; and from the same cause, the peroxide of iron would be proportionably abstracted. The subsoil contains more water than the soil, which is more exposed to evaporation.

Here we have thirteen appreciable constituents; and though an idea is becoming very prevalent with many learned men, that, upon an ultimate analysis, the simple substances in nature will be found very few in number,—and that the one may be found passing into the other, and to a large extent convertible—yet this is one of her secrets which is still debateable, and its truth remains to be ascertained by the patient industry of the adventurous chemist.

Alkaline metals. We find contained in the above analysis four alkaline metals, viz., 1. potash, 2. soda, 3. lime, and 4. magnesia.

1.—*Potassa* is a white crystaline solid, and is only obtained in a state of purity by burning the metal in oxygen gas, or in air; but for ordinary purposes it is procured from wood ashes, which contain the potassa in combination with carbonic acid, which last being separated, the potassa is left pure,—with exception of containing 1 atom of water, which cannot be removed short of reducing the potassium to a metallic state. The article therefore, as thus obtained, is properly called a *hydrate of* potassa. When exposed to the air, it absorbs water from it and becomes liquid: this property is called deliquescence.

2.—*Soda.* This is a greyish white solid, and is formed when the metal is burnt in oxygen or in air; it is also formed when the metal is thrown on water, by uniting with its oxygen; but in whatever way procured, except by uniting the metal with dry oxygen, it retains a portion of water which cannot be separated by any means hitherto employed. It is therefore called *hydrate* of soda.

3.—*Lime* is composed of 1 atom of calcium, to 1 of oxygen. It is a greyish white, and is familiarly called quicklime. It is generally in nature, found com-

bined with some acid—most frequently the carbonic—forming *carbonate of lime*. Exposed to the air, it soon absorbs sufficient moisture to form a *hydrate*,—it is then air slacked.

4.—*Magnesia.* This is a white powder,—extremely light—nearly insoluble in water; and, when mixed with that liquid, containing a solution of blue cabbage, the latter is changed to green, proving the alkaline nature of magnesia. It is composed of 1 atom of metal and 1 of oxygen.

5.—We have next the *peroxide of iron*—familiarly called iron rust—which is a combination of iron with oxygen; and in the form of *rouge*, is used by silversmiths in polishing metals.

6.—*Sulphuric acid*, composed of 1 atom of sulphur, and 3 of oxygen,—familiarly called *oil of vitriol.* It is a dense and colourless oily liquid—nearly twice as heavy as water,—and decomposes animal and vegetable substances, converting them into charcoal. It has a great affinity for water, and unites with it in every proportion, causing considerable heat. It combines with the alkalies and oxides of metals, forming *sulphates*. A single drop will convert a large quantity of vegetable blue to red.

7.—*Phosphoric acid.* This compound is formed by burning phosphorus in pure oxygen, or in the air. It is crystaline and solid,—liquifies on exposure to the air—speedily absorbing moisture. It is intensely sour to the taste—reddens vegetable blues—and readily combines with the alkalies and oxides of metals, forming *phosphates.*

8.—*Carbonic acid.* This is one of the two compounds of carbon which are formed in ordinary combustion—they being carbonic acid and carbonic oxide. It is a colourless gas at the ordinary temperature and pressure of the atmosphere; heavier than air,—can be poured from one vessel to another like water, and its presence can be at all times easily ascertained from its smell alone. It will not support respiration, and an animal confined in this gas immediately perishes. It is present in the atmosphere, even in the highest region ever penetrated by man, to the amount of one fifteen hundredth part of its bulk.

9.—*Clorine.* This substance takes its name from the Greek word *cloros* (green). It exists in the gaseous form at the ordinary temperature and pressure of the atmosphere; but is found in nature in the liquid or solid state in combination with other substances. It exists in sea water, and bleaching powder. It is necessary to the health of animals and even to the existence of many. It is a yellowish green coloured gas, and to show its bleaching powers, if a red rose, or any other coloured flower, or in the absence of these a green leaf previously moistened, be immersed in a vessel of the gas, in a few moments its colour will be discharged - all vegetable and animal colours are immediately destroyed.

10.—*Alumina.* Is composed of 1 atom of alumina and 1½ of oxygen;—an earthy metal, found everywhere, under the name of clay. It constitutes the chief materiel of bricks, pipes and manufactured earthenware. It is used in the preparation of *alum.* Clays which, when burnt become red, contain oxide of iron, as seen in the common brick. The ruby, the saphire, the oriental amythyst, emerald and topaz are nearly pure alumina, or earth of clay,—in a crystalline state.

11.—*Silica.* Silicon, a dark brown substance, somewhat like black lead; when heated to redness in oxygen gas, it takes fire and burns with great brilliancy, forming *oxide* of *silicon*—called *silica* or *silex.* It is the chief ingredient in pure white sand, rock crystal, and crystalized quartz, flint, cornelian, agate, granite, &c., &c. When pure it is white, brittle, and nearly opaque—though rock crystal be transparent. It also exists in the epidermis of plants. It exists in brick clay, earthenware, and with potash or soda, it forms glass.

12.—*Organic matter.* The different forms of decaying or decomposing animal and vegetable substances.

13.—Water—everywhere present.

The mineral constituents which must be present in soils in due proportion to enable them to grow a long succession of the remunerative crops of agriculture are potash, soda, lime, magnesia, alumina, silica, iron, manganese, sulphur, phosphorus, and clorine. We observe that many of these are present in the example of analysis given above; and soils which require no manure, are thus constituted, and there are many such among the virgin soils of all our colonies. Now why is it that all fertile soils must contain 10 or 11 different substances? It arises from the single fact, that the plant itself, when chemically analysed, contains nine or ten, or it may be more different substances, which are exactly the same as are present in the inorganic part of the soil. These substances are to be detected in the ash of our cultivated crops, and are wholly derived from the soil. It is clear that as the plant derives these substances mainly from the soil, every fertile soil must contain them, in order that plants may live in health and vigour upon its surface. But the ash of one plant contains a larger proportion of one of these substances than another; some more lime and magnesia—others more sulphur, or phosphorus, or clorine; so that as a general law one crop will abstract more of one description of organic matter—another of another, and different parts of the same plant contain these substances in different proportions;—requiring more at one stage of their growth than at another. We must therefore see that the requirements of the plants we grow are adapted to the soil we cultivate; if not, in order to ensure a healthy and vigourous growth and remunerating produce, the deficit, whatever it may be, must be supplied to it. If any one ingredient should so abound as to become noxious or prejudicial to the cultivated crops, it must be removed, or its effects neutralized or counteracted by manuring or chemical appliances. If any or all the desired ingredients should have been exhausted by severe cropping, its fruitfulness must be restored by an adequate supply of the things which are deficient,—and which all our cultivated crops and all their parts require for their perfect development, and which they necessarily carry off from the soil in the shape of nourishment in the progress of their growth.

In this introductory article we do not expect to convey much valuable information to the student, but we are anxious to awaken a spirit of enquiry, especially among our junior agricultural aspirants, inducing them at leisure hours, and when the opportunity offers, to prosecute their reading of select authors; and we have some idea, besides, of giving, in this Journal, in successive articles, a connected exposition at greater length, of the application of the sciences to agriculture.

J. A.

SEPTEMBER.

Under, Frequent, or Thorough Draining.

Some public writers are disposed to regard this subject with disfavour, if not derision.—They call it the hobby of certain writers, on which they are pleased like unthinking children, to ride perservingly, leading many into an extravagant expenditure; and excusing this view by remarking that under drainage is always costly, and unless executed in the most thoroughly efficient manner, which is seldom the case in this country, is by no means durable or to be commended.

That, as we have remarked in the last number, open drains are easily made and easily repaired. That a good plough will leave a trench at the close of a land—and that when this is not deep enough, if the next lands be laid off in the same direction, a good ditch may be made without expense. That farmers cannot, generally, afford to expend more on an acre than it will be worth when all is done. They will tell you that the eulogists of under draining are but the owners of *new* drains—that, when choked, they will need relaying at a cost greater far than the clearing out if an open ditch.

Autumn is the season for improving wet lands, especially in a wet summer like the last: and in spite of the cautions and vaticinations of those prophets of evil advising young farmers against making outlays which yield no immediate adequate return, and the felicitations of those who boast of having saved immense outlays to American Farmers by warning them against adopting hastily the schemes of the inexperienced, we still have same confidence in an unusually large personal experience, supported, as it has been, by the unvarying testimony of the leading farmers of the neighbouring states, and by many in these provinces.

It is of great importance, as a preparation for ploughing and sowing down grass lands in the fall, whether with grain or seeds, that they should have been timeously freed from superfluous moisture; and, in many cases, the sowing of grain in such instances is precluded, and a valuable crop irretrievably lost to the farmer. If the ground be sufficiently dry, too, the renovation of grass lands may be satisfactorily proceeded with.—You will not be consigning your seeds to a watery bed, neither will you be spreading forth your manure and top-dressing to be soured and converted into unwholesome nutriment to the coming vegetation.—Owing to the late wet season, independently of threatenings of nocturnal frosts, it is feared there will be in the corn crop more straw than grain.—But though the crop be rather late, yet, if the present month should prove favourable throughout, we may still expect heavy crops of corn.

We hear complaints of rot from some localities in the potato crop. The Jackson whites, though favorite earlies, are rotting in the hills; the Davies seedling, is said in similar situations, to have escaped with impunity.—Wet and warm weather this month, is destructive to the potato crop,—but warmth is necessary to mature the corn crop.—This, with clear sunshine will mature the products of the garden,—sweeten the pastures of the meadow and will reward the cultivator of every order, with a more bountiful increase. This month the later crops—the golden corn,—the potatoes.—the roots,—the squashes,—the pumpkins and fruits are to be harvested, and the crops are rather late owing to the cool weather in the latter part of July and early part of August. But dry warm weather will speedily convert the milky juice into gluten, starch and oil, and gild the hardening grain with the rich golden tint, ever so desirable. The days and nights will speedily be of equal length, and thereafter the days will gradually shorten, and the cheering rays of the sun will be progressively decreasing in duration and brilliance.—We have seen, in the former number, that, during this month we

have a busy time on the farm. Neglected grass lands must be seeded down, and should be attended to as early as possible, so as to be well rooted before the coming frosts.—Ditches should be dug and cleared out, and mud and peat prepared for composts. Early potatoes should be dug. Rye end oats should be threshed—ruta bagas and turnips thinned out—your cellars secured against the coming frosts.—We would again recommend the extension of the turnip crop, so easily raised,—surpassed, in this respect, by none save mangelwurtzel—so valuable for fattening—for producing milk and for promoting the health of the feeding and farm stock.—Could farmers only afford to add to their meadow hay or other fodder a few turnips, they would be enabled to carry through their stock of all descriptions in much better condition; and they would not have to waste a great part of the summer in recovering their lost condition in the winter and spring-time.

Mais revenons à nos Moutons.—From Genessee, Albany and New-York the testimony of the leading farmers establishes that the results of thorough draining have fully justified the expenditure. The advantage is not limited to any district soil or country. It depends on conditions common to all. There can be little doubt that the largest and best portions of the soils of Canada would justify and amply repay the expenditure—if judiciously applied.—But success depends on this condition.—It is unfair to blame a system, because its application has been bungled. Our growing season is short in this country, and therefore our spring-time must be hastened and extended, and the evils of wet weather at this important season greatly mitigated, and partially removed. The evil consequences of excessive droughts will be obviated—for the roots of the growing crops may safely extend themselves downward in search of healthful nourishment. Thorough draining with subsoiling, will supply nourishment to the growing crop in dry weather.—This appears paradoxical—but we can attest to it from our experience on a very obdurate soil. We repeat that thorough draining combined with subsoiling, will render the farmer comparatively independent of the mutations of a variable climate.—In a cold and rainy season such improved practice enables him to put in his crops two or three weeks earlier; ameliorating warmth is supplied to the plant in every stage of its growth by withdrawal of all prejudicial superabundant moisture; it permits the roots a freer and wider range in search of nutriment, and enables the provident farmer to conclude his harvest some three weeks earlier, in many cases, than his thriftless neighbour. As we have said, in long droughts, the depth and friability of the soil will encourage the rootlets to push downward and latterally and feed abundantly on the treasured nutriment in cool retreats far beneath the withering influence of a burning sun. On shallow obdurate soils, improved by such thorough culture, evaporation will take place more slowly; on ths simple principle, that open and porous bodies form the worst conductors of heat besides that thorough pulverisation permits of heightened capillary action, sucking up moisture from below and diffusing and preserving a uniform healthful moisture around the tender roots of the growing crop.

To all this we can bear ample testimony from personal experience, which is elsewhere recorded and from which we will have occasion to extract liberally on future occasions. All correct reasonings on this subject are based on undoubted geological and chemical principles. It shall be our care to point out the difficult, but thoroughly reliable path between the seeming antagonism of practice and theory, under the guidance of a large experience. By passing the mole plough through the subsoil, in the furrow made by the ordinary plough, the indurated and sterile mass is broken up and disturbed, and myriads of channels are formed for the passage of the water into the drains underneath.—This is the perfection of draining. The question of cost is the chief difficulty. Next the execution of the work on an efficient and economical system—We think that in the end we

may safely prophecy that the general opinion and practice will be, in all well improved districts, to employ the pipe tile in properly formed drains :—and these will be found in the end, the best and the cheapest.

In all systems of drainage, the *Main Drains*—their directions and dimensions —must be the first care of the improver. We have sunk pits in different places to test the nature of the subsoil and ascertain the direction of the greatest flow of water—where it could be arrested with the greatest ease and certainty, and got quit of with the greatest facility. We have also run deep drains up the slope at distances from the lowest to the highest level with the same view, making these to serve as the main ducts in the several systems of subdrains connected with each of them. Having ascertained the nature of the strata, then, and the main direction of the flow of the subjacent water,—the whole of the main drains, are laid out and cut—being always placed in the lowest parts of the ground. The depth must in many cases, be carefully regulated by the fall to be obtained for carrying off the water from the whole extent of the drained surface.—The sub-drains can be lined out either by drawing a furrow slice with the plough along each line, or by digging a few holes along.—to mark the line - the width of a main drain is best determined by the ease with which men are able to work at the bottom.—You have next to determine the distance and direction of your sub-drains.—This may vary from 18 to 40 feet—the nature of the soil regulating the relative distance.—The direction of the subdrains is important—which should be as nearly as possible in the direction of the fall of the land, and not sloping across it. Science and extensive practice have both proved the correctness of this rule.—If necessity absolutely compels it, let the slope be as small as possible.—One inch of fall in 150 feet, or 3 feet in a mile is enough to secure the perfect passage of water where well prepared tiles are employed. You will be acting wisely by making your subdrains as deep as the main drains will permit of.—In cutting drains for 2 inch tiles, or upwards you need not open them at top beyond from 12 to 14 inches, if intended to be 3 to 4 feet deep.—In strong clay, lay the mould on one side, and the subsoil on the other.—In other soils, the separation will not be necessary.

The throwing over of the surface mould is effected by the man who first breaks the soil or surface :—a second man follows, and shovels off all the loose mould left by the first :—a third loosens the top of the subsoil by a foot pick, or common pick axe, which is shovelled away in its turn,—but to the opposite side of the drain; and this alternate picking and shovelling are continued until the requisite depth is attained; but, towards the bottom, a narrower shovel, called the ditchers shovel,—must be used, as the drain shall then have become too narrow for ordinary tools.

Laying the pipes or tiles would seem to require no instruction. They must be carefully placed in contact—preserving a suitable fall throughout the whole course of the drain; and care being taken that no portion of the loose earth, by any accident, becomes inserted.

The following table may be useful :—

Drains	12	feet apart	require 3630	pipes per acre, made in lengths of 1 foot.
do	15	do	do 2934	do
do	18	do	do 2420	do
do	21	do	do 2074	do
do	24	do	do 1815	do
do	27	do	do 1613	do
do	30	do	do 1452	do
do	33	do	do 1320	do
do	36	do	do 1210	do

We have thrown together above a few plain and brief directions on under drainage.—But this is a subject of the first importance, and we shall recur to it, not only with a view to a further explanation of details, but to urge, with all our influence, the more general adoption of this invaluable improvement. J. A.

REMAKS ON OCTOBER.

EXHIBITIONS AND CATTLE SHOWS. THEIR SALUTARY INFLUENCES. AGRICULTURE IN LOWER CANADA.

This month will be occupied with securing the crops.

We must be especially careful to place root crops beyond the reach of injury. Potatoes should be packed away in such a manner as to ensure their keeping well, should the winter be more severe than common. They must be well secured from the injurious action of frost and moisture, whether stored in the cellar or in the field. If Ruta Baga be stored in the open ground, it should be placed in long heaps, 3 or 4 feet wide, in a roof like form and terminating in a ridge at top. They may then be well covered with straw, and afterwards earth. They are not so easily injured as Potatoes, and do not require such a depth of covering. But to prevent rotting and fermentation, holes should be made through the earth over the heap with a crow bar, at intervals of a few feet to permit the escape of pent up vapour, and the holes carefully covered with straw. If the soil should be of such a nature as to preclude any apprehension of injury from moisture, the heaps may be placed in broad trenches formed for the purpose. Mangel Wrtzel requires nearly the same treatment as the Patato. They are more easily injured by frost, and should therefore be first secured. A dry cellar with a good circulation of air is the most convenient place for keeping these roots if they are to be fed out during winter. Ploughing for spring crops next season should be completed. The weather is cool and favourable,—the operation performed at this season assists greatly in the destruction of weeds and their seeds, the teams are in good condition, and the labour saved in hoeing during the next season will amply compensate diligence. The season for the cattle show is approaching, and this should awaken a spirit of improvement throughout every section of the country. The seeds of instruction are annually sown, and they will no doubt produce in due time an abundant and valuable harvest. These should afford the best practical education combining as they do, science with art—encourage the adoption of an improved system of culture and stock raising and tend likewise to promote the natural welfare of the rural population of the country. The honourable rewards held out should create a justifiable emulation to cultivate and manage in the best manner. Every encouragement is held out to tempt to the introduction of the best breeds of live stock; and herein we have the materials required for commencing, constituting and perpetuating the most approved agricultural system, adapted to the soil and climate of this country. Though the emigrants who arrive on our shore may not be experienced agriculturists and breeders, yet they will experience little difficulty, under the recent benevolent and judicious arrangements of the emigration department of the Bureau of Agriculture, in obtaining employment with an experienced farmer, where the means will be afforded of obtaining on the spot a practical education, and of becoming thoroughly instructed and disciplined in the habits and requirements of their adopted country. In another page (in the introductory article to the present number) we have stated our opinion and advice shortly, frankly and unreservedly on this score: capitalists would, in like manner, do well to seek for practical instruction by residence in the family or neighbourhood of some leading agriculturists—to watch his system and practice, and become acquainted with those modifications of the most approved rules which the distinguishing constitutionand variety of the soil, and the prevailing climate influences of these Provinces would especially seem to require,—and this before attempting investment or entering on active operations on their own account. Waste is never desirable, and there

is nothing for the general welfare to be compared to well directed expenditure. To this every man of experience and principle—every true patriot will cheerfully and heartily respond. If the cultivator find wheat and indian corn will not, year by year, and in all situations in Lower Canada, exhibit such favourable results as in Upper Canada, every other grain will succeed equally well. Root crops, hay and pasture, under good management will, upon an average, be more productive in this section of the province; and there can be no doubt that the days are approaching when the Lower Provinces will excel in stock farming. The farmers cannot complain of the want of good markets, and there can be no doubt that, at the present moment, though not so general as could be desired, we have as good farming in Lower Canada as in any locality on this continent. It is not so easy to ingraft a perfect system on a faulty,—this is a work of time in every instance, and in every country. But still, in a new country, with continued emigration from older countries; the task does not appear by any means so hopeless. The generous emulation of our Agricultural Exhibitions and Shows affords the very best practical teaching, and much instruction can be obtained by visiting well conducted farms and well farmed districts; and, if the leisure and funds could be spared, neither the one nor the other would be thrown away, but wisely and prudently expended. There is nothing like seeing and judging for ones-self.—This will certainly produce conviction. Improvement is extending in Lower Canada; and the more widely known the advantages of an improved system become, from such exhibitions as the present, the more rapidly and surprisingly, will improvement extend, favoured by the stimulus of example. There are no insurmountable objections in soil, climate or situation—nor in the fearful ravages of the wheat fly. All these will be undoubtedly and easily surmounted by science combined with practice, under intelligent direction. As for our stock—good selection,—judicious crossing—proper shelter and feeding, will gradually increase their size, weight and quality, and they will become more profitable to the farmer, and at the same time, more acceptable to the consumer. We can produce, from a given extent of land in Lower Canada, as great a quantity of nutritious cattle feed as in Upper Canada; and we cannot see, under such circumstances, that any reasonable complaint can be made on the head of climate. It is strange how discontented men, can talk themselves, or be talked into forgetfulness of the advantages of their situation. It is fortunate we can afford to rally the unreasonable grumblers after this fashion; for it is well known we have examples of as perfect farming, and remunerative cultivation in Lower Canada as the heart of man could desire to look upon. But a truce to grumbling, it is childish and unpatriotic. Let us rather put our energies to work, to make the best of our lot in the accidental situation wherein a kind providence has placed us.

J. A.

THE CROPS FOR 1858.

BUREAU OF AGRICULTURE AND STATISTICS,
September 3rd. 1858.

Sir.—A number of circulars having been issued by this Department for the purpose of gleaning information about the probable yield of the crops of 1858, and the disease affecting them, it is desirable at this season of the year to let

the farmers know the result of some of these inquiries, in order to guide them in the sowing of Fall wheat, and enable them to judge of the propriety of leaving part of the land for Spring wheat. Twenty-seven returns from thirty-six counties have been received and analysed. In eighteen of these counties the wheat midge and rust have been very prevalent, in Waterloo, Oxford, Grey, Norfolk, Durham, South Simcoe, York, Kent, Welland, Victoria, Perth, Essex, Wentworth, Elgin, and Ontario, in Canada West, and Vercheres, Broome and Dorchester in Canada East. In three the rust and mildew, without the midge, were very destructive—namely, Waterloo, Peel and Pontiac. The wheat crops in Stormont, Carleton, Grenville, Lanark, and Russell, in Canada West, and Huntingdon in Canada East, are said to be free from disease of any kind, except a slight rust in Russell.

The average produce of the whole twenty-six counties is 12½ bushels per acre of winter wheat, and 14½ bushels of spring wheat,—showing a deficiency of about 40 per cent, in winter wheat, and 10 per cent. in spring wheat. A fact worth knowing is, that the spring wheat called Fife or Glasgow wheat, has entirely escaped injury from rust; and also that all spring wheat sown after the 26th of May, has escaped injury from the midge (or wheat fly,) being too late for the fly, which deposits its ova from the 20th June to the middle of July. Wheat thus late sown is not forward enough to receive the deposit. A species of wheat, called the Mediterranean wheat, is also said to be free from the ravages of the midge, but does not appear to be highly approved in other respects. The spring wheat called club-wheat is universally condemned, as being subject to rust.

Never before in the history of Canada, has so much injury been done by rust as this year. Many of these reports show that it arises generally, if not always, from want of proper drainage, and of early sowing of early kinds of wheat on well shaped ridges, well water-furrowed, which are a great aid in the way of drainage. It may be, that the influences of hot, damp, close, muggy weather after a drought, are *less sudden* on well drained, deeply ploughed, well cultivated land; and these sudden influences are what cause rust, by the greatly increased sap bursting the straw and flowing downwards, instead of rising to nourish the ear. This is more probably the cause of rust than fungi, or insects, to which many attribute this most destructive disease; the straw of rusted wheat will, on examination, be found to be cracked longitudinally. With regard to the midge, all reports seem to concur that early sowing of early seed on early land, made by good drainage and well shaped ridges, is the best preventive; but,—under present circumstances, I think a cautious farmer would do well to sow one half of his land in winter wheat, and the other half in spring wheat, using the above precaution of good draining, &c.

A Mr. Alexander McKenzie, a practical farmer, has written a valuable little pamphlet, showing from repeated experiments that a dressing of lime spread on the land soon after the grub of the midge has fallen from the wheat ear, and whilst in a soft state, is a complete remedy, destroying the grub entirely. This little pamphlet is well deserving the attention of farmers, as lime can be easily procured throughout almost all of Upper Canada and can be burned without any very great expense, and in addition to killing the grub, will add much to the fertility of the soil. A Mr. Swan, the owner of the farm to which was awarded the first prize in Cayuga County, New-York, as being the best managed farm, stated that he lessened the destructiveness of the midge very materially by sowing a barrel of salt to the acre after the wheat had brairded.

With regard to other green crops, the reports show an average yield about the same as in other years: rye, 19½ bushels per acre; barley, 19; oats, 31½; Indian corn, 36½; peas, 21½: potatoes, 124½. Of these last there are fifteen re-

turns which state that they were free from rot up to the 30th August last, and eight which state that the rot has commenced; the other twelve give no report as to rot, which no doubt they would have done had it been prevalent. There is certainly a decrease in the extent and destructiveness of this disease, and it is hoped the root will hereafter be more generally cultivated. The prevalence of the rot has hitherto detered many from planting.

I may add that there are other counties which have not yet reported, but which are said to be very seriously affected by midge; rust and blight,—viz: Hastings Prince Edward, Middlesex, Lennox, Addington, &c. The new lands, however, north of Hastings, on the Free Grant Road, are entirely free from midge, and nearly so from rust.

Yours truly,

William HUTTON, S. c.

FORAGE PLANTS.

Of late much has been published respecting the so called Hungarian grass, or millet. Many have supposed it a newly introduced plant into this country. But from accounts respecting it, it does not seem to differ materially, if any, from the variety long cultivated here, and known as German millet. There seems to be a difference of color in the seeds - some being yellow, others of a purple color. Since the 1st of January there has been so much published in our paper in reference to this grass or millet, that it is unnecessary to enlarge upon it at this time. Large crops have been successfully grown in Iowa, Illinois, and other Western States, and we presume it can be grown much more profitably on the light, richer, and more easily worked soils of the new States, than it can on the harder and more meagre soils of New-England, though doubtless it might be for the interest of the farmers at the North, to cultivate more extensively millet for winter feed for their stock. From this being an annual plant, and requiring a good corn soil for growing heavy crops, we think it will be a long while before it will root out the perennial grasses now grown for winter feed.

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ALSYKE OR SWEDISH CLOVER.—Three or four years ago, the seed of the Alsyke clover was imported from England, through the agency of the Agricultural Department of the Patent Office, and of course widely disseminated over the country. But as we have seen no accounts respecting its culture, we had been led to suppose it had not succeeded well.

The Patent Office Report for 1854 says: "It is best adapted to moist and strong soils, and has the property of self-sowing, when the flowers are left to mature, which will cause it to endure fifteen, twenty, or more years. The usual course to pursue, is to cut it once a year for hay, afterwards leaving it for pasturage. Its flowers, which put forth in June in great profusion, resemble in shape those of the common white clover, but are larger, and of a rosy tint, of a sweet, agreeable odor, and afford an excellent forage for bees. It may be sown with autumn or spring grain; with the later it is preferable, to prevent winter-killing."

In the February No. of the *Canadian Agriculturist*, we find an article on this variety of clover, by Patrick R. Wright, more than sustaining all that is said in its favor in the Patent Office Report. We make some extracts from Mr. W.'s letter. He says: "Having had inquiry made by several of my friends, who were aware of my having cultivated the "Alsyke clover" for several years, and believing I am the only one who has done so in Canada, I wish, through the *Agriculturist*, to draw the attention of farmers to this new and admirable variety of *trifolium*.

"Sturm says it is found in Holland, and that he has tried its cultivation, along with that of a great number of other clovers placed under the same circumstances, and the result convinced him that there is no other kind of clover equal to it, for the purpose of cattle feeding. With these remarks I most cordially concur. Both cattle and sheep are so fond of it, that the common kind of clover, or timothy and clover mixed, are quite disregarded, if access can be had to the alsyke, both as pasture and hay. The common red clover will last only two years in perfection, and often, if the soil is cold and moist, nearly half the plants will rot, besides its liability to be thrown out or winter killed, and in the second year bald patches will be found in every part of the field; besides that, in September and October many crops left for seed are lost in consequence of the heavy rains during that period; while the alsyke clover, on the contrary, ripening its seed perfectly the *first crop*, and continuing its vigor much longer, much risk and expense are avoided, and a large profit accrues; and when this plant is once established, it will remain for many years in full vigor, and produce annually a great quantity of herbage of excellent quantity. Four years ago I obtained from Messrs. Lawson, Edinburgh, five pounds of seed, which I sowed on one acre, and as I was cautious in my experiment, mixed it with about two or three pounds of timothy. It stood the winter admirably, and I cut the following year certainly *not less than three tons* of the finest clover hay I had ever seen. In the end of June and before ripening its seeds, I expected to have the second crop run to seed, which it did not, but produced an unparallelled mass of feed, so close and even, and about one foot in length, that I could have fancied it would bear one to walk over it. The second year I had an equal quantity mixed with timothy, and I found the clover, when the seeds ripened, to suit the time for cutting the timothy exactly, without blackening and going to waste, as the common red clover does. I consider this as its *greatest* recommendation, for we all know well that the red clover and timothy, the usual mixture sown, is on account of the inequality of its ripening, but ill suited for producing an abundant crop of *first class hay*, as one or the other must be partially sacrificed. The third cutting last year was heavier than either of the former. * * By shaking I got as much seed as has covered four acres," and he feels confident of taking twelve tons of hay from the piece the coming season. "I feel confident that red clover, both as mixture with timothy, and for forage by itself, will soon be numbered among the grasses that were in Canada. * * I am a practical man, and the number of years which have elapsed since I first got the seed from Scotland, must be held a proof that my views have not been forced on the public until I was myself *thoroughly convinced*. I give my name to your readers without fear, believing a much better system than the *sub rosa*, where a mere theoretical tyro may, by a superior faculty in the art of composition, throw dust in the eyes of a common sense farmer by *almost* persuading him that turnips are but "*improved potatoes*." The foregoing letter is dated Coburg, Feb. 1st, 1858.

Believing the alsyke clover can be profitably cultivated in many sections of our country, and that it possesses some advantages over the common red clover, we have copied largely from Mr. W.'s letter. It does not read as though he

intended to "perpetrate a swindle" upon farmers, but rather to impart useful information, which is probably the "motive power" that has moved him. We have witnessed so many agricultural excitements during the past quarter of a century that our bump of caution is much more fully developed than it was in our younger days; and we would therefore caution our readers not to be over-zealous in mounting every hobby that is brought forward by unscrupulous men and speculators for the purpose of gulling farmers and filching from them their hard-earned dollars. Neither would we encourage farmers in their prejudices, so far as to reject every newly introduced plant, fruit, grain, &c., merely because they are new. Exercise reason and judgment in these matters, and as far as possible embrace the good and reject the worthless.

ALFALFA OR LUCERNE.—Lucerne is largely cultivated in Chili and some others of the South American States as a forage plant, and is there called Alfalfa. It is in fact the common Lucerne slightly modified by climate. Lieuts. Herndon and Gibson, in their exploration of the Valley of the Amazon, frequently refer to it in their journals, as it was the principal food used for feeding their mules. It is a variety of clover, and is somewhat more difficult of cultivation for the first year or two than clover, requiring a deep and thoroughly pulverized soil, free from the seeds of weeds and grasses; for the first year it should be kept as clean of weeds as a bed of carrots, or other esculents. Many attempts have been made to cultivate it in this country, and generally with poor success. Many years ago that eminent and worthy patron of agriculture, the late Hon. John Lowell of Massachusetts, frequently and strongly, through the columns of the *New-England Farmer*, urged upon farmers the extensive culture of Lucerne, both for soiling purposes and for winter forage. Mr. Lowell was very successful in its culture, which clearly proves that there is nothing unfavorable to its culture in our climate, nor in our soil, if rightly prepared. The roots of this plant penetrate the soil to a great depth, therefore deep loamy or alluvial soils are much better adapted to its growth than shallow impervious ones. We think it could be most profitably cultivated on the deep loamy soils of the west, and would recommend the enterprising farmer of that region to "give it a fair trial." We do not see why it may not flourish as well in Illinois or Iowa and other States, as it does in California. It has recently been introduced into that land of gold, and has succeeded admirably, as we will show by the "Report of the Visiting Committee on Farms, &c., as reported in the last or 4th Report of the California Ag. Society. The Committee say: "On the bank of the Yuba River, and near the city, is the Quintery farm of Messrs. Pinnex & Cameron, containing four hundred acres, three hundred of which is laid down to Alfalfa, and is divided by a good fence into three fields, in which they herd or feed stock for hire. This is their business, and so good is it, that while they charge just twice as much per month as their neighbors who feed with the ordinary grasses, they cannot take half as many head as are offered to them. Their terms are three dollars per month per head, and they limit the number to two hundred. The field into which cattle had just been turned (they feed down the fields alternately) had been fed down twice this season, and now the clover is nearly three feet high and in bloom. (This was about the 12th of last June.) While all other grasses and clovers under similar circumstances are perfectly dry and yellow, the Alfalfa exhibits the most fresh and luxurious green. The roots of this clover run down through a close soil till they reach water, though the same be twenty feet below the surface. Last year's freshet washed away the bank of the river, and exposed the roots about twenty feet below the surface."

We farther make an extract from the address of William Garrard, President of the Society. He says, in speaking of the raising of pork in that State: "The

rich clover pastures that are found so essential to the hog crops in the Western States, have heretofore been wanting among us after the month of May, owing to our long dry season. But the successful cultivation of two new crops just introduced among us, will remove entirely this deficiency, and if I am not mistaken, it will be but a few years when the importation of pork, bacon and lard will have ceased. The value of these crops must be estimated by millions; I refer, of course, to the introduction of Chinese Sugar Cane and Chili clover—especially the latter. It is certain that on large districts of our country, when other grass crops dry entirely up before the month of June, Alfalfa will when once well rooted, continue green the year round, yielding three crops of hay annually, and affording a full pasture, equal in richness to a grain field. This crop seems designed by Providence for our peculiar climate. Whilst it makes good hay—good pasture—spring, summer, fall, and winter, it has the capacity to send its roots to water, however deep, and thus draw sufficient moisture to keep green throughout the dry season. This crop however, is said to have its peculiarity, which should be well understood, that when once well rooted it cannot be exterminated, and of course no other crop can be cultivated on the same land."

Every year or two, in nearly all sections of our country, we have severe summer and autumn drouths, and as the Alfalfa so readily bids defiance to them, we think it would be well to give this plant a fair trial, both for the purprose of hay and pasture. If it should not succeed in the north, it might in the south or west—and who would wish to eradicate such a profitable forage plant. We think none need fear its seeds overspreading the country like those of the Canada thistle, white weed, and some other vegetable pests of the farm.—*Cor. Country Gentlemen.*

Important to Farmers; Llamas.—Mr. Whitehead Gee has shown in the Cattle-market, Glasgow, the flock of llamas brought by him to that city, *via* New York, from Peru. The llama is an animal of peculiar value in those countries where it is naturalized, and the opportunity now afforded of domesticating it here should not be lightly esteemed. It is valuable for its fleece, which is soft and silken, and is a beast of burden, able to bear from 100 to 150 lbs., at the rate of twenty miles per day. At the time of the Spanish conquest of Peru 300,000 of these graceful ruminants were employed in the transport of silver from the mines of Potosi. Their flesh is said to be delicious to the palate; while they themselves subsist on the most moderate allowance—preferring in this country oat straw. The present flock not only appear to live well, but seem to thrive under the influence of the climate and the care of their owner. They are we believe, the only flock out of Peru, and the only one likely to be taken thence, as the natives object to their removal—llamas and guano being the principal sources of revenue. Their owner has been offered £70 a-head for them by a party who wishes to transport them to Australia. He has also offers for them from the directors of the Zoological Gardens, London, and the French Government, but is desirous to retain them in his native country. The ewes of the flock (23) are with young, and there can be no doubt that the probability of naturalizing such valuable animals in this country will be thoroughly put to the test, if the owner be supported in his endeavour as he should be.

Foreign Agricultural Intelligence.

ENGLAND.

The Farmers have secured most of their wheat in excellent condition. The diversity, however, in the yield and quality will be found as remarkable as the season. Blighted *white* wheat does not exceed 47 lbs. per bushel, and is only fit for chicken food. Samples from strong lands weigh as high as 65 lbs. per bushel, and there can be no doubt the average will be much below last year. *Red* wheats have been much more equal, and have given fair results in the same field where *white* failed. France, and it is believed other countries, will present similar inequalities. The accounts from many of the American States are unfavourable. In Selesia there have been desolating floods, and the Russian accounts are not so favourable. If the yield in England should be somewhat deficient, Scotland and Ireland, with more humid climates, have suffered less from severe drought. The Oat crop in England is but moderate, and deficient abroad. So that prices are expected to rule high through the season. The clover seed crop promises well both in England and France. Tares, though small, sell high. Scotland and Ireland have had excellent harvesting weather. Potatoes continue in Britain, most promising. Over 1,250,000 acres are planted in the North of Ireland. Early crop very superior. Disease extremely rare. There have been severe floods in Selesia and Saxony. The reports from Odessa of the Polish harvest are unpromising. From Kiel Rapeseed light,—Rye much below last year, Barley deficient, Peas very bad—Wheat various—Potatoes very good. Oats and Corn are reported deficient in Ohio. Denmark will have an average harvest,—but the reports from the interior of Germany and Poland are most unfavourable. In Upper Germany wheat can be imported from England with advantage. Besarabian wheat crops poor—but Wallachian beans abundant.

J. A,

Critical Notices.

On the Theory of Igneous Rocks and Volcanoes, (read before the Canadian Institute) by T. Sterry Hunt, Chemist to the Geological Survey of Canada.

In order to acquire a true idea of a metamorphic rock let us assume a molten mass of igneous matter impelled from within the earth outwards against its deposited crusts;—ultimately breaking through them, appearing in masses of varying elevation on the earth's surface; finally cooling and assuming the

characteristics of an igneous rock. This kind of phenomenon appears to have frequently occurred during the long geological periods of the globe; and, indeed, a phenomenon of the sort has often been furnished by the occurrence of New Volcanoes. It is evident that the contact of a molten fiery mass with an aqueous or deposited rock must necessarily modify the constituents of the latter, destroying their organic remains, partially fusing them, and in short giving many indications of the agency of fire. All stratified rocks thus affected—it matters not to what epochs they belong—are termed "metamorphic." All stratified rocks are liable to undergo this metamorphic change, although the Primary rocks, being nearest the focus of igneous activity, have greater chance than the others of being thus affected.

Metamorphic rocks are of the greatest interest to the Mineralogist, from their connection with mineral veins. The molten igneous matter, in forcing its way through them towards the earth's surface, has rent them into innumerable cracks and fissures, which, by subsequent operations, of nature—concerning which there is much conflicting theory,—have become the bed of mineral veins. Gold is found in metamorphosed palœozoic rocks; and associated with, or thrusting through, formations of a tertiary epoch. Very frequently the assertion is made, that gold occurs, for the most part, in alluvial and diluvial deposits; and the assertion is strictly correct. The precious metal, by atmospheric agencies and some other disintegrating causes, gets dislodged from the rocks—where it was deposited by terrestrial operations; and rolling away, falls into river beds and torrent courses, being ultimately discovered in alluvial and deluvial drifts. This study has, for us, a peculiar relish, as our attention has been occupied lately in preparing a series of Lectures, containing much practical information, intended to be delivered before the public of Canada, on the recent gold discoveries in British Columbia—and dwelling, at length, on the mineral riches of these Provinces.

The views of Mr. Hunt are worthy of his well known popularity and ability, and were listened to with lively interest. And we shall take the liberty of extracting from his valuable and highly talented communication until we shall have exhausted every page of it. J. A.

Mr. Hunt opens with the remark :—

"In a note in the American Journal of Science for January, 1858, I have ventured to put forward some speculations upon the chemistry of a cooling globe, such as the igneous theory supposes our earth to have been at an early period. Considering only the crust with which geology makes us acquainted, and the liquid and gaseous elements which now surround it, I have endeavoured to show that we may attain to some idea of the chemical conditions of the cooling mass by conceiving these materials to again re-act upon each other under the influence of an intense heat. The quartz, which is present in such a great proportion in many rocks, would decompose the carbonates and sulphates, and aided by the presence of water, the chlorids both of the rocky strata and the sea, while the organic matters and the fossil carbon would be burned by the atmospheric oxygen. From these reactions would result a fused mass of silicates of alumina, alkalies, lime, magnesia, iron, etc., while all the carbon, sulphur and chlorine, in the form of acid gases, mixed with watery vapour, azote, and a probable excess of oxygen, would form an exceedingly dense atmosphere. When the cooling permitted condensation, an acid rain would fall upon the heated crust of the earth, decomposing the silicates, and giving rise to chlorids and sulphates of the various bases, while the separated silica would probably take the form of crystalline quartz.

In the next stage, the portions of the primitive crust not covered by the ocean, undergo a decomposition under the influence of the hot moist atmosphere charged with carbonic acid, and the feldspathic silicates are converted into clays with separation of an alkaline silicate, which, decomposed by the carbonic acid, finds its way to the sea in the form of alkaline bicarbonate, where, having first precipitated any dissolved sesquioxyds, it changes the dissolved lime-salts into bicarbonate, which

precipitated chemically or separated by organic agencies, gives rise to limestones, the chlorid of calcium being at the same time replaced by common salt. The separation from the water of the ocean, of gypsum and sea-salt, and of the salts of potash, by the agency of marine plants, and by the formation of glauconite, are considerations foreign to our present study.

In this way we obtain a notion of the processes by which, from a primitive fused mass, may be generated the silicious, calcareous and argillaceous rocks which make up the greater part of the earth's crust, and we also understand the source of the salts of the ocean. But the question here arises whether this primitive crystalline rock, which probably approached to dolerite in its composition, is now anywhere visible upon the earth's surface. It is certain that the oldest known rocks are stratified deposits of limestone, clay and sands, generally in a highly altered condition, but these, as well as more recent strata, are penetrated by various injected rocks, such as granites, trachytes, syenites, porphyries, dolerites, phonolites, etc. These offer, in their mode of occurrence, not less than their composition, so many analogies with the lavas of modern volcanos, that they are also universally supposed to be of igneous origin, and to owe their peculiarities to slow cooling under pressure. This conclusion being admitted, we proceed to inquire into the sources of these liquid masses, which, from the earliest known geological period up to the present day, have been from time to time ejected from below. They are generally regarded as evidences both of the igneous fusion of the interior of our planet, and of a direct communication between the surface and the fluid nucleus, which is supposed to be the source of the various ejected rocks.

These intrusive masses, however, offer very great diversities in their composition, from the highly silicious and felspathic granites, eurites, and trachytes, in which lime, magnesia and iron are present in very small quantities, and in which potash is the predominant alkali, to those denser rocks, dolorite, dierite, hyperite, melaphyre, euphotide, trap and basalt; in these, lime, magnesia and iron-oxyd are abundant, and soda prevails over the potash. To account for these differences in the composition of the injected rocks, Phillips, and after him Durocher, suppose the interior fluid mass to have separated into a denser stratum of the basic silicates, upon which a lighter and more silicious portion floats like oil upon water, and that these two liquids, occasionally more or less modified by a partial crystalization and eliquation, or by a refusion, give rise to the principal varieties of silicious and basic rocks, while from the mingling of the two zones of liquid matter, intermediate rocks are formed. (Phillips' *Manual of Geology*, p. 556, and Durocher, *Annales des Mines*, 1857, vol. 1, p. 217.)

An analogous view was suggested by Bunsen in his researches on the volcanic rocks of Iceland, and extended by Streng to similar rocks in Hungary and Armenia. These investigators suppose a trachytic and a pyroxenic magma of constant composition, representing respectively the two great divisions of rocks which we have just distinguished; and have endeavoured to calculate from the amount of silica in any intermediate variety, the proportions in which these compounds must have been mingled to produce it, and consequently the proportions of alumina, lime, magnesia, iron-oxyd and alkalies which such a rock may be expected to contain. But the amounts thus calculated, as may be seen from Dr. Streng's results, do not always correspond with the results of analysis. (Streng, *Annales de Chimie et de Physique*, 3rd. series, vol. 39, p. 52.) Besides there are varieties of intrusive rocks, such as phonolites, which are highly basic, and yet contain but very small quantities of lime, magnesia and iron oxyd, being essentially silicates of alumina and alkalies in part hydrated."

Horticultural Journal.

REMARKS ON OCTOBER.

In the garden the seeds should be carefully gathered as they ripen, labelled and deposited in a dry place. In cases where they do not ripen simultaneously,

the ripe seed should be collected, and the whole plant taken up by the roots and dried in the house, which will ripen many of the imperfect seeds. All hardy aromatic and medicinal perennial herbs may be transplanted—strawberry plants removed for forming new beds. Onions intended to bear seed next year, should now be set out, selecting the hardest and best adapted roots, and placing them in a foot apart and six or eight inches in the drill. Asparagus beds should be cleaned when the stocks turn yellow and begin to die. All weeds ripening their seeds must be carefully removed to permit their seeding, and all vacant spaces from which crops have been removed, dug over that the soil may be exposed to the ameliorating influences of the winter, and for the destruction of grubs,—of weeds and the seeds of weeds. J. A.

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RHUBARB.—The next great improvement was in a variety originated by Mr. Charles Downing at Newburgh. It was named Downing's colossal; and in addition to its great size, and much less degree of acidity, it had a fine, rich, aromatic flavor, in which it greatly surpassed its predecessors. This, too, has been surpassed by Mr. Myatt, in the "Linnæus," whose excellence in every important characteristic has placed it for the last four or five years in rank before any other variety—Mr. Downing himself greatly preferring it to the colossal, which is its nearest competitor, and to which it has a strong resemblance. Besides being the earliest of all, and most productive, as well as finest flavored and least acid, it has a skin so thin that removing it is quite unnecessary, and its pulp when stewed has the uniform consistence of baked Rhode Island Greening, and it continues equally crisp and tender throughout summer and early autumn.

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THE FASTOLFF RASPBERRY.—So far as our experience goes, this is one of the best raspberries for *home use*. It is too tender for distant marketing. The berry is of large size and excellent flavor, and very prolific. We will give an example. Seven plants were set four feet apart against a board fence on the west side of the garden, late in the Spring of 1856. They grew fairly and produced some fruit. The thrifty new canes bore well in 1857. Only 14 new canes, two in a hill, were saved for this year. They were trained against the board fence by nailing strips of leather around them, and during last Summer they were shortened at the top to four feet in hight, which induced numerous short side shoots. Now for the result. This year, in four weeks, we picked from the fourteen canes over *twenty* quarts of superior large berries for the table, besides what was eaten in the garden. As these stood close to the fence and are trained against it, and no sraggling branches were allowed, they occupy very little room. Indeed, radishes and lettuce were raised on the ground around the canes. Here, then, is over half a bushel of fine berries produced without any expense. One dollar will amply cover the entire outlay for the original plants and all the time spent upon them, and the entire yield has been over a bushel of fruit. Comment is unnecessary. It should be stated that the soil is a good one, was deeply trenched, and it has been well enriched, first by a little bone sawings in the hill, and afterwards by frequent waterings with sink slops.—*Cor. Agriculturist.*

Grazier and Breeder.

MEGRIMS IN HORSES.—"The Field" has contained articles against the use of the bearing rein, and this case is an other item of evil against its use. On megrims he remarks:

"Megrims generally considered a nervous disease, is more often due to impeded circulation, brought about by pressure exerted on the veins at the root of the neck by the collar, when the vessels of the brain become congested, and megrims is the result."

We do not know of a case where a saddle horse has been affected with megrims. Mr. Huntings says:

"All horses subject to megrims may be relieved if worked with pipe collars. Dealers and others have put this fact to the test, and have proved that horses when so diseased where unable to work with collars on, whereas with a simple breast-plate on they were able to work freely and with comfort."

The following concluding sentence from our author displays much sound sense, we therefore give it in full:

"I beg to ask, if we find so much interference resulting from tight reining, and confining a horse's head in an elevated position, on what principle can we defend the use of high racks? Our animals show their preference to a more natural method of picking their food, by pulling the hay out of the lofty recess, and when on the ground they leisurely partake of it. This should never be lost sight of in the construction of stables.—*Vet: Edinr.*

To kill Lice on Cattle.—If warm weather, apply soft soap, rubbing it to a lather, and let it remain until there is danger that the hide is to much irritated — a few hours will generally suffice, or sometimes a day. In cold weather hog's lard will prove an effectual application.

In answer to some enquiries as to whether corps were maintaining the average of twenty or thirty years ago. I was told that through Lower Ohio and Kentucky the wheat was undoubtedly *increasing* in yeild. Much of this effect I understood to be due to the practice of rotation with clover, and plowing it in as a manure. A twenty acre lot that after a recent turning in of a clover crop produced thirty bushels of wheat per acre, was referred to as having been improved in this way at least twenty-five per cent, during the past twenty-five years.

I heard great complaint of the curculio among the fruit—its ravage having extended to the apple. Where is M. Mathews?—*Cor. Country Gentlemen.*

Warts on Horses.—The following recipe appeared in *The Field*:—"One part of arsenious acid, in a state of fine powder, intimitaly mixed with four parts of lard, may be applied over and around the excrescences every other day. This will excite sloughing action, and in about a forthnight the warts will be thrown off." I have used it with perfect success on a valuable young thorough-bred stallion, which had upwards of a scorce of large warts upon him. Its operation was not quite so rapid as stated in the recipe, as it was five or six weeks from the first application before the last of the warts dropped out. The wounds are now healing fast. The warts had previously been rubbed with iodine, under the advice of a local veterinary surgeon, but without effect.—Carlisle, *in Field.*

Export of valuable Breeding Stock.—A valuable consignment of live stock for breeding purposes has just been placed in the hands of Mr. Bell, of the Adelphi stables here, for shipment to America and Australia. The larger and by no means the less valuable portion of the collection consists of twenty-four fine animals, including six bulls, 14 heifers and yearlings, and 4 cows of the Ayrshire breed purchased in Ayrshire, from the most celebrated breeders, by Mr. Sanford Howard, editor of the *Boston Cultivator*, for the Massachussetts Agricultural Society; several fine Southdown rams from the flock of M. Jonas Webb, Babraham, Cambridgeshire, purchased for Colonel Morris, and two splendid bulls of the Durham shorthorn breed. These two latter are for Adelaide, in Australia.

They were purchased at the Royal Agricultural Society's Show at Chester; one from the herd of M. J. K. Farnworth, Cheshire; the other from that of Mr. Jonas Webb. They are both exceedingly fine animals, and though young give unmistakable evidence of fine breeding. Of the Ayrshires it is only fair to say they are all an exceedingly fine and justly celebrated breed of dairy stock. Twelve of the Ayrshire were shipped on board the Agnes on Wednesday last, for Boston; the other twelve will be shipped for the same destination in the course of the ensuing week. The two shorthorn bulls will be put on board the Bristow in the beginning of the week, for Adelaide.— *Liverpool Daily Post.*

Ladies Department.

Apple Jelly.—Apples make an excellent jelly. The process is as follows: They are pared, quartered, and the core completely removed, and put into a pot without water, closely covered, and put into an oven or over a fire. When pretty well stewed, the juice is to be squeezed out through a cloth, to which a little white of an egg is added, and then the sugar; skin it previous to boiling, then reduce it to a proper consistency, and an excellent jelly will be the product.

Tomato Pickle.—Cleanse your tomatoes, and puncture them slighly. Then fill your layers of tomatoes and salt, using as much water as will dissolve the salt: let them remain thus for eight or ten days, and then to every gallon of tomatoes add two bottlefuls of ground mustard, four ounces of ground ginger, four ounces of pepper—lightly bruised,one ounce of cloves, one dozen of onions—sliced. Cover the whole with vinegar.

Blackberry Wine.—Measure your berries and bruise them; to every gallon add one quart of boiling water, and let the mixture stand twenty-four hours, stirring occasionnally; then strain the liquor into a cask, and to every gallon add two pounds of sugar. Cork tight, and let it remain until the following October, when your wine will be ready for use.

To preserve Fruit Jellies from Mould.—Cover the surface one-fourth of an inch deep with fine pulverised loaf sugar. When thus protected, the jellies will keep for years in good condition, and free from mouldiness.

THE SUMMER SHOWER.

BY ALBERT LAIGHTON.

A white haze glimmered on the hills,
The vales were parched and dry,
And glaringly the beaming sun
Coursed in the summer sky.

The cattle in the distant woods,
Sought shelter from its beams;
Or, motionless and patient, stood
Knee-deep amid the streams.

The house dog lay, with panting breath,
Close where the elm tree grew:
The blue-bird and the oriole
To shady coverts flew.

Day after day, the thirsty earth
Lookep up to heaven for rain ;
The gardens held their flower-cups,
The fields their lips of grain.

With doubting hearts, men, murmurnig said—
" Our toils have been in vain,
We sowed in spring, but shall not reap
When autumn comes again."

But while they spoke—within the west,
At sun set's glowing hour,
God's voice proclaimed, in thunder tones,
The coming of the shower.

The deepening shadows slowly crept
O'er mountain and o'er plain,
Until in cool and copious floods
Came down the blessed rain.

All nature smiled ; and when at last
The cloudy-wings were furled,
The evening star shone regally
Above a thankful world.

O love of heaven ! O fear of man !
O faith so cold and dim !
When shall we own the ways of God,
And learn to trust in him.

Meteorology.

MONTHLY METEOROLOGICAL REPORT FOR AUGUST 1858.

BAROMETER.

Mean reading of the barometer corrected and reduced to	F 32°	inches 29.771
Highest reading of the barometer	30°	002
Lowest reading of the barometer	29°	342
Monthly range	0	660

THERMOMETER.

Mean reading of the standard thermometer	62°	21
Hightest reading of the maximum do	97°	4
Lowest reading of the minimum do	44°	4
Monthly Range	53°	0
Mean of humidity	0°	756

Greatest intensity of the suns rays	108°	4
Lowest point of terrestrial radiation	48°	2
Amount of evaporation in inches	3	69
Rain fell on 13 days amounting to 8.656 inches it was raining 49 hours 51 minutes, accompanied by Thunder on 4 days.		
Most prevalent wind S. E.		
Least prevalent wind N.		
Most windy day the 5th, mean miles per hour	12	74
Least do do the 23 day do	0	00
Ozone was present in moderate quantity		
Aurora borealis visible on 1 night		

MONTREAL RETAIL MARKETS.

FRIDAY, October 1st, 1858.

	BONSECOURS.						ST. ANN'S.					
FLOUR.	s.	d.		s.	d.		s.	d.		s.	d.	
Country Flour, per quintal	14	0	a	15	0		0	0	a	0	0	
Oatmeal, per quintal	11	6	a	12	0		0	0	a	0	0	
Indian Meal, per quintal	0	0	a	0	0		0	0	a	0	0	
GRAIN.												
Wheat, per minot	0	0	a	0	0		0	0	a	0	0	
Oats, per minot	2	2	a	2	3		2	3	a	2	6	
Barley, per minot	3	9	a	4	0		0	0	a	0	0	
Pease, per minot	5	0	a	5	3		0	0	a	0	0	
Buckwheat, per minot	3	6	a	3	9		0	0	a	0	0	
Indian Corn, yellow	4	0	a	4	6		0	0	a	0	0	
Rye, per minot	0	0	a	0	0		0	0	a	0	0	
Flax Seed, per minot	0	0	a	0	0		0	0	a	0	0	
Timothy, per minot	0	0	a	0	0		0	0	a	0	0	
FOWLS AND GAME.												
Turkeys, (old) per couple	7	0	a	7	6		10	0	a	12	0	
Turkeys, (young) per couple	0	0	a	0	0		6	0	a	8	0	
Geese, (young) per couple	4	0	a	4	6		3	6	a	4	6	
Ducks, per couple	1	8	a	3	0		2	6	a	3	0	
Ducks, (wild) per couple	0	0	a	0	0		0	0	a	2	6	
Fowls, per couple	2	0	a	2	6		2	0	a	3	0	
Chickens, per couple	1	3	a	1	8		1	3	a	1	6	
Pigeons, (tame) per couple	1	3	a	1	6		0	0	a	0	0	
Pigeons, (wild) per dozen	3	6	a	4	0		3	6	a	4	0	
Partridges, per couple	0	0	a	0	0		0	0	a	0	0	
Woodcock, per brace	0	0	a	0	0		0	0	a	0	0	
Hares, per couple	0	0	a	0	0		0	0	a	0	0	
MEATS.												
Beef, per lb	0	4	a	0	9		0	4	a	0	8	
Pork, per lb	0	5½	a	0	6		0	6	a	0	6½	
Mutton, per quarter	6	0	a	12	0		7	0	a	12	0	
Lamb, per quarter	2	6	a	4	0		2	0	a	3	9	
Veal, per quarter	5	0	a	15	0		5	0	a	15	0	
Beef, per 100 lbs	30	0	a	45	0		30	0	a	40	0	
Pork, (fresh) per 100 lbs	30	0	a	35	0		27	6	a	30	0	
DAIRY PRODUCE.												
Butter, (fresh) per lb	0	11	a	1	0		0	11	a	1	0	
Butter, (salt) per lb	0	7½	a	0	8		0	8	a	0	9	
Cheese, per lb, skim milk	0	0	a	0	0		0	0	a	0	0	
Cheese, per lb, sweet do	0	0	a	0	0		0	0	a	0	0	
VEGETABLES.												
Beans, (American,) per minot	0	0	a	0	0		0	0	a	0	0	
Beans, (Canadian) per minot	7	6	a	8	0		0	0	a	0	0	
Potatoes, (new) per bag	3	0	a	3	9		4	0	a	5	0	
Turnips, per bag	0	0	a	0	0		0	0	a	0	0	
Onions, per bushel	0	0	a	0	0		0	0	a	0	0	
SUGAR AND HONEY.												
Sugar, Maple, per lb, (new)	0	4½	a	0	5		0	4	a	0	4½	
Honey, per lb	0	7½	a	0	0		0	7½	a	0	8	
MISCELLANEOUS.												
Lard, per lb	0	8	a	0	9		0	8	a	0	9	
Eggs, per dozen	0	8	a	0	9		0	8	a	0	9	
Halibut, per lb	0	0	a	0	0		0	0	a	0	0	
Haddock, per lb	0	4	a	0	0		0	0	a	0	0	
Apples, per barrel	10	0	a	20	0		15	0	a	20	0	
Oranges, per box	30	0	a	35	0		0	0	a	0	0	
Hides, per 100 lbs	0	0	a	0	0		0	0	a	0	0	
Tallow, per lb	0	4½	a	0	5		0	0	a	0	0	
BREAD.												
Brown Loaf	0	11	a	0	0		0	9	a	1	0	
White Loaf	0	0	a	0	0		0	9	a	0	0	