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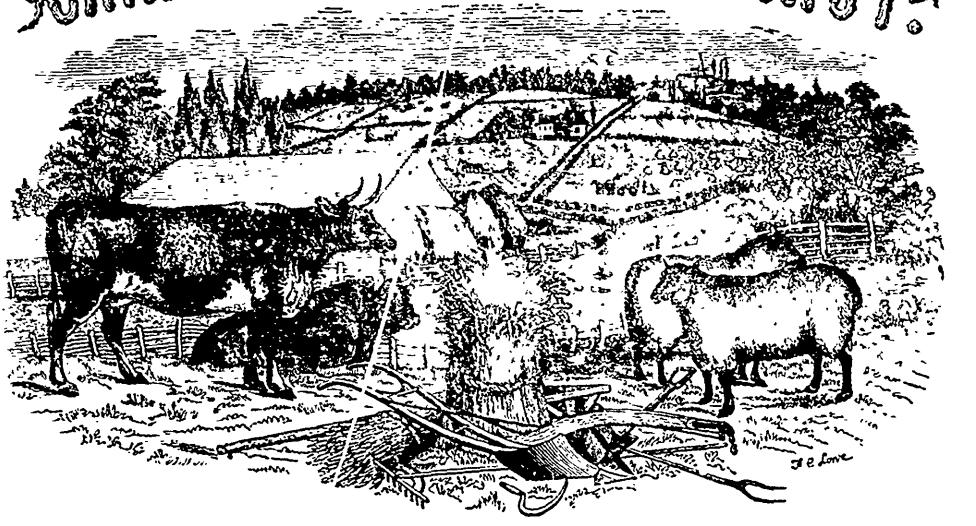

"The profit of the earth is for all; the King himself is served by the field."—Eccles. v. 9.

GEORGE BUCKLAND, WILLIAM McDOUGALL, } EDITOR, ASSISTANT EDITOR.

VOL. II. TORONTO, AUGUST 1850. No. 8.

The Canadian Agriculturist.

Published Monthly, at Toronto, C. W.

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PREPARING LAND FOR WHEAT—SELECTION OF SEED—MODE OF SOWING, &c.

Farmers are now busily engaged in harvest operations, and from the present, to the completion of wheat sowing, they will have no leisure for the perusal of lengthy disquisitions; our remarks, therefore, shall be brief and practical.

The present wheat crop may be pronounced a good one, upon the whole, throughout Upper Canada; and the accounts we have received from the Lower Provinces, as well as from various sections of the United States, must be considered favourable. A benignant Providence having crowned the husbandman's labours with success, we earnestly hope that those labours will be amply rewarded, by a remunerating price. No class of men are more deserving a liberal return for their toil, than the honest and industrious tillers of the soil.

No sooner are the golden fruits of autumn gathered in, the results of a year's expenditure of thought and toil safely stowed away, than active preparations have to be made for securing a similar result in the year which is to come. It being true in the natural, as in the moral world, that men reap what, and as they sow; we will proceed just to remind our readers of a few plain principles in regard to this very interesting and important portion of the agricultural year.

In the cultivation of wheat, as of any other crop, the first consideration is the state and composition of the soil. It should be remembered that plants can no more live and thrive without

their appropriate food, and that in proper quantity, than can animals. The soil too must be brought into the requisite *mechanical condition*, and possess all the necessary constituents of food, which the plant requires for its healthy growth, and which it imbibes through the agency of its roots. These two conditions of the soil—which may be termed the mechanical and the chemical—are in all successful practice intimately connected, and to a large extent, mutually dependent.

The first step then in the cultivation of wheat—and indeed of all other grain—is to obtain *a clean and deep seed bed*. This can, in most instances, be accomplished only by the *repeated application* of the plough, the roller, and the harrow. A certain proportion of fine earth, in what we may term the active soil, is essential to the germination of the seed; yet it is found in practice, that wheat sown in autumn, especially on adhesive soils, generally succeeds best in a tilth of moderate fineness: clods when not too large act beneficially, by rendering the soil pervious to air and moisture, and by crumbling down under the action of frost, during winter and spring, they form a useful protection and covering to the young plants.

Surface drainage by means of open furrows and ditches is a matter of essential importance in the cultivation of fall wheat. In cases where land is naturally dry, or rendered so by a sufficient number of underground drains, furrowing may, to a great extent, be dispensed with. But when it is considered how large a portion of our cultivated fields is rendered in part, or wholly unproductive by stagnant water, during portions of the year, the attention of farmers requires to be repeatedly called to so grievous an evil. We say then to all wheat growers, see that you effectually get rid of all surface water, either by narrow ridges and deep furrows, or what is infinitely better, whenever practicable, by efficient *under* drainage. No field where fall wheat is sown, ought to be left until this vital object has been, as far as practicable, secured.

A soil then deeply cultivated, free from noxious weeds, and rendered firm and dry, either by nature or art, is in a proper mechanical condition for the reception of the seed. But this is only a *first step*. The soil must contain all that the plant requires for healthy growth and maturity, which is not obtained from the atmosphere. And here we are directly led to the great and complicated subject of *manures*, upon which our space compels us to be very brief. Repeated cropping with wheat without manure, soon renders the generality of soils incapable of producing a remunerating return, by exhausting them of such necessary ingredients as the silicate of potash, phosphate of lime, &c. When land has not been exhausted by constant cropping, its productive powers may, in general, be easily retained by changing the kinds of crops cultivated, laying down to pasture, with now and then a judicious manuring. *Good*, well-preserved farm yard dung, especially when it is the product of animals highly fed on grain, linseed, &c., contains, in general, *all the ingredients, more or less, in relative* amount, that are required for the growth of plants. Upon most of the cultivated lands of this country, the application of lime, or bone dust, (the latter containing a large quantity of lime, in combination with phosphoric acid,) would be exceedingly beneficial to wheat, and indeed to all the cereals.

But one of the most important points of all—yet remains to be mentioned;—*the selection of pure seed*. This is a matter so sadly neglected, by a large number of farmers in this country, that the loss entailed thereby is incalculably great. What has a farmer a right to reap, but what he sows? If imperfectly ripened or diseased grain, or the seeds of various kinds of weeds be sown, what can he expect, when the harvest arrives but to reap the same? The plain truth is, that the gross neglect of the principles of good husbandry, or of the laws of nature, which in this instance are the same thing, is a sin which is certain to bring its own punishment the first year. It is an old adage, that what is worth doing at all, is worth doing well. Whatever pains the farmer bestows in procuring *pure and healthy grain, for seed*, will amply repay him in the first crop. We also strongly recommend the practice of *steeping*; a practice that comes to us recommended by an extensive experience, and the example of the best cultivators, in all parts of the world. A strong solution of salt, or of blue vitriol, or both mixed, in which the seed may be thoroughly soaked, and afterwards dried by the application of slaked lime, is an old practice strongly to be recommended. Our readers are, doubtless sufficiently informed, respecting the various steeps that have been recommended and practised, as to render it unnecessary for us to descend to particulars; our

object at present being simply to offer a few important, *seasonal hints;* just to remind farmers of what most of them already well know, however much they may neglect to practice it. Like moral conduct, this is an affair as much, or more, belonging to the will, as the understanding.

It is time to bring these remarks to a close. As to the mode of sowing wheat, whether drilling, ribbing or broadcasting, must, in some measure, depend upon the condition of the land, and the resources of the farmer. In well cleared up farms, free from large stones, we are advocates for drilling; believing that a less quantity of seed will suffice, by the regular manner in which it is deposited by this process, and the greater certainty of its germination. Besides in a climate like that of Canada, drilling has other advantages;—the plant being generally fixed at a uniform and sufficient depth below the surface, it is much less liable to be thrown out by the action of frost in spring. These and other matters, such as the quantity of seed per acre, require to receive more systematic attention, and careful record of results from the best practical farmers of Canada, before we are entitled to draw very positive general conclusions. And, after all, it will probably be found, in the most advanced state of our future agriculture, that farming, like other industrial arts, although governed by primary principles and general laws, will require ceaseless modifications, to meet the varying conditions of climate, &c., upon which it is more or less dependent, in its practical operations and results.

This, however, is certain, and within our present reach; that deep and clean cultivation, draining when necessary, proper manuring, &c., judicious rotation of crops; with the selection of clean grain for seed, and carefully deposited in the bosom of mother earth; will yield *in the long run*, an abundant return to the skilful and industrious cultivator. Under a compliance with the above simple conditions, we should very seldom hear of a miserable ten or dozen bushels of wheat per acre. Rust, weevil, smut, and the fly, even, would only be heard of *occasionally;* and as to those intolerable pests, which so frequently disfigure our fields and choke our grain plants—thistles, twitch grass, *and the whole catalogue of weeds*, why, they would be all but entirely banished from the fair surface of the earth.

Horses will often do more for a whistle than a whip; so some youths are best governed by a rod of love.

REGULATIONS OF THE PROVINCIAL AGRICULTURAL EXHIBITION,

TO BE HELD AT THE TOWN OF NIAGARA, SEPT., 18TH, 19TH AND 20TH, 1850.

1. The payment of 5s. constitutes a member for one year, or £2 10s, for life; and entitles him, his wife, and children, under 18 years, to *free* admission during the exhibition.

2. None but members can compete for Premiums, except in the Ladies' Foreign, and Indian departments.

3. Every article exhibited for competition, must be the growth, produce, or manufacture of Upper Canada, except the Foreign class. Live Stock for breeding, must be the property of persons residing in Upper Canada.

4. Each member can enter *three* articles for competition, free of charge; all above that numbers must pay 7½d., each.

5. Entries will be taken on *Monday* and *Tuesday* in the Show week, by the Secretary, at his office on the ground. *The Entry books will be closed on Tuesday evening, at 8 o'clock.* Entries made on *Wednesday Morning*, will be charged 2s. 6d., each; and the Books will be *finally closed at 9 o'clock*, A. M. *on that day.* Articles not entered according to this rule, will be admitted to compete for *discretionary premiums only.* Parties may make entries previous to the Show week, by enclosing the amount of subscription, and entry fees, in a letter, addressed to the Secretary in Toronto, *post-paid.*

6. The Judges will meet at the Secretary's office on *Wednesday morning, at 9 o'clock precisely*, to make arrangements for entering immediately upon their duties. All officers of the Society, Delegates and Judges, are earnestly requested to reach Niagara on *Tuesday.*

7. Delegates, Judges, and members of the Press, are requested to report themselves at the Secretary's office, on their arrival.

8. On *Wednesday* at 1 o'clock, P. M., the Exhibition will be opened to the *Public.* Admission to non-members 7½d.; Horsemen 1s. 3d.; Carriages, including drivers, 2s. 6d. passengers to pay 7½d. each.

In the evening, PROFESSOR CROFT of the University of Toronto, will deliver a lecture in the Court House, illustrated by experiments "on the nature of the constituents of soils and plants." Admission *free.*

9. The Exhibition will open on *Thursday* at 7 o'clock, and continue to dark. The *annual address* will be delivered on the ground, at 3 o'clock P. M.; afterwards the premiums will be declared.—A public *Dinner* will take place, in a capacious tent, in the evening.

10. Early on *Friday* morning the Treasurer will commence paying the premiums. A *Plough-*

ing Match will take place in the neighbourhood commencing at 9 o'clock, A. M.

GEORGE BUCKLAND,
Secretary.

Toronto, August, 1850.

N. B. Arrangements are being completed with the proprietors of Steamboats for carrying passengers to and from the Exhibition for *Half-Price.*—Hotel keepers, &c., at Niagara and its vicinity, will entertain visitors *at the usual rates of charge.* The Local Committee will make such arrangements as will afford visitors every facility for seeing the Falls and other places of interest in the neighbourhood. The site of the Exhibition is near the steamboat landing; the arrangements are upon an extensive scale, and every precaution will be taken for the safe keeping of articles. The premium list amounts to *Twelve Hundred Pounds!*

His Excellency the Governor General has signified his intention of being present; and the attendance of a large number of distinguished agriculturists from Lower Canada and the United States is expected.

A FEW WORDS ABOUT LIQUID MANURES.

We are indebted to the *Working Farmer* for the greater part of the following article.—[Ed.

The use of manures in liquid form, has only recently been properly understood. It is true that the Egyptians found their meadows fertilized by the overflowing of the Nile, but they evidently attributed all the good effects resulting, *to the water,* without reference to the soluble organic and inorganic constituents supplied by it. Mountain streams overflowing the meadows and valleys rendered them fertile, and produced results which could not have been obtained by the application of the same amount of spring water applied directly without first having taken up from the mountain side all the soluble results of vegetable decay. It is an error to suppose that pure water is food for plants—it is only the vehicle by which food in solution can enter the roots of plants.

It is true that bulbous roots will grow for a time in pure water, but unless they are placed in the earth every other year, they first cease to bloom and then refuse to vegetate altogether. Nor will all plants thrive well with an excess of fluids, however proper may be the combination of materials held in solution by the water; for the rice plant and meadow grasses will flourish when supplied with an amount of water which would destroy most of the grain crops. Indeed, an excess of most fertilizing materials in solution, is pernicious to all plants.

Every farmer should know that plants cannot receive manures in any other form than in solution in water, and that they are not soluble until after decomposition. It is for this reason, that those manures which are slightly soluble, last so much longer in the ground than those which are readily decomposed, and easily dissolved: thus the effect of bones can be seen for fifteen years. If, however, the bones be first treated with such fluids as will dissolve them, then one-fifteenth of the quantity may be used for the growing crop with equal effect; and the whole amount may thus be availed of in a single season.

The economyof manykinds of liquid manures cannot be too strongly urged, for those manures which last many years, do so at a cost to the farmers of the *compound interest on their cost, until used up;* whereas, when same constituents can be rendered soluble, and thus immediately transformable into vegetable products, no such loss by interest occurs. The only objections which could ever have been urged against the use of liquid manures are, their losses by filtration and evaporation. At this time, however, when it is well known how to render the soil capable of retaining all the resultant gases arising from decomposition, and of all those substances which pass into the soil in solution, permitting the water to percolate downward, but retaining the matters held in solution, no such argument as loss from evaporation or filtration can be urged by the practical farmer.

It has been clearly demonstrated that the fluid manures of barn-yards, if saved as fast as they occur, is worth one and a half as much as the solid manures; and still it is not unusual to find barn-yards without any provision for the saving of these fluids. Some farmers suppose that the litter, &c., will soak up and retain the urine, and this, too, after seeing that even the natural sap of grasses is parted with by evaporation during the process of hay-making, without once reflecting that the fluids of barn-yards by longer exposure, and continual disturbance from treading of cattle, &c., will the more surely evaporate; many of the valuable constituents of the fluids of barn-yards are more volatile than mere waters, and hence more easily lost by evaporation. Nor does the loss cease with the loss of the urine of the animals, for the solid portions of the dung by partial decomposition, are also rendered in part volatile, and thus lost. We have often illustrated the faults of barn-yard practice in saving manures, and therefore will resume our subject-proper.

Many farmers prefer using their manures

entirely in the fluid form, and when their premises are properly constructed for this purpose, it may be done with profit. For this purpose, the manures from the stables, pig pens, &c., are thrown into a *close covered building*, the floor of which is cemented, and at the lower corner outside, a cistern is placed containing a pump, so arranged as to throw the fluids from this cistern, on top the manure heap at pleasure. The stables, pens, &c., are so made, that their fluids may pass by gutters to this cistern, while the solid manures are thrown each day on top the heap through a window in the side or top, which may be afterwards closed—into this cistern may be thrown the soap-suds, urine, and other waste materials of the house, all of which will find their way to the manure heap.

The contents of this cistern is pumped up on top the manure each day, and by filtering downward through the manure, and returning to the cistern, it is highly charged with soluble matter. If the cistern is not filled, water must be added until each day will supply the full quantity.

The plentiful presence of water in the manure heap, causes rapid decomposition without *fire-fanging*, and consequently without material loss by evaporation—the heap of manure will continue to lessen in bulk so as to admit the addition of new quantities, until the mass ceases to *give down* materially. During all this time, the fluid manures which run into the cistern may be taken out in sprinkling carts and applied to the land, and a corresponding quantity of water pumped up, which, on its return the next day to the cistern, will be found fairly charged with soluble materials, and this process may be continued until nine-tenths of the whole bulk of manure will be transformed into fluids. At such seasons as manures are not wanted, these fluids may be composted with heaps of earth, and covered with carbonaceous matter and earth, ready to be distributed over the field as required. The base of the old manure heap may now be taken from the building in case a new portion of water will come away colourless, or if new portions of liquid manures are wanted, further decomposition may be secured by the addition of any alkaline solution which will encourage decomposition, and will increase the power of the water to act as a solvent.

When so treated, the remaining mass may be taken from the manure heap and used for garden or other purposes, where fully decomposed materials are required. The bulk, as before stated, will be less than one-tenth the original size, while the effective force of the manure on the farm will be materially increased. The advocates of this system claim that the expense of turning over manure heaps is saved—that loading carts, by pumping a fluid, is less laborious than by forking dung, while the distribution by the sprinkler is more even and less costly, than by spreading solid manures. The fluid manure passes readily into the earth before the sun and air can evaporate it, and its more intimate admixture with the soil, renders it sooner available for the use of plants. The chief gain claimed, however, is, that the whole value of the manure may be availed of with the growing crop, instead of losing interest on value in addition to loss by evaporation and other causes, before plants can appropriate all the constituents. When special manures are required for particular crops, such as super-phosphate of lime and the integrents of barn-yard manures for turnips, then a solution of bones in sulphuric acid may be thrown into the cistern, pumped on the heap, and on its return to the cistern the compound required can be had ready for use.

The fluids from this cistern, when not required for immediate use, may be thrown upon peat, turf, saw-dust, tanners' bark, and other organic substances placed under the sheds, and thus caused to undergo decomposition, as well as acting as a divisor for the too strong results of the manure heap. Not the least among the advantages claimed, is the perfect admixture of all fertilizing materials, so as to secure the presence of all the constituents of plants to every field. During cold weather, by adding a few gallons of boiling water to the cistern, and pumping immediately on the heap, the heat of the mass may be renewed.

A CYCLOPEDIA OF AGRICULTURE, PRACTICAL AND SCIENTIFIC; *in which the Theory, The Art, and the Business of Farming, in all their Departments, are thoroughly and practically treated by upwards of Fifty of the most Eminent Farmers, Land Agents, and Scientific men of the day: Edited by John C. Morton, Editor of "The Agricultural Gazette;" Blackie & Son, Glasgow.* 1850.

We announced in our last number the publication of this truly *original* and valuable work. The high opinion of its merits, which we then expressed, has been abundantly confirmed, by a subsequent and minute examination of the first two parts. The principle upon which this Cyclopedia has been prepared, of

distributing is several parts among a large number of the most eminent men in the walks of science and practical agriculture, in Great Britain, gives to it an originality and authority, possessed in the same degree by no other publication of the kind. The Editor, Mr. Morton, occupies an eminent position as a practical scientific farmer in England, and is well known in every portion of the civilized world as the Editor of the *Agricultural Gazette*; a weekly paper, combined with the *Gardeners' Chronicle*, under the superintendence of Dr. Lindley, who undertakes the Botanical department of the Cyclopedia. In Chemistry, it is sufficient to mention the names of Dr. Playfair and Professor Way, the consulting chemist of the Royal Agricultural Society of England. Entomology is supplied by John Curtis, F.L.S.; and Geology by John Morton, F.G.S., (father of the Editor), and Joshua Trimmer, F.G.S. In the *Art* of Agriculture, we notice the names of some of the most eminent practical farmers and breeders, both in Britain and on the Continent of Europe; while the business of farming is treated of in its various details, by well known writers of extensive experience, in their respective departments. The Engravings and Wood Cuts, of which there will be upwards of a Thousand interspersed through the work, are beautifully executed in the highest style of the art. The illustrations of the animals, plants, and insects of the farm, with the clear and minute descriptions accompanying them, cannot fail to impress and inform the most careless reader; while the engravings of implements and machines are so admirably executed, as to give any one a clear understanding of the principles of their construction. The first two parts contain, in addition to the numerous wood-cuts, beautiful steel engravings of three of the most approved English Chaff Cutters, Biddel's Scarifier, a Scotch Tilt Cart, an English Waggon, Stratton's Northampton Cart, also his celebrated Manure Cart, and Croskill's Clod Crusher, an implement of great power and utility.

We shall glean some useful information from the numbers of this publication as they appear, for the benefit of our readers; only observing further, at present, that Mr. MACLEAR, Bookseller of this City, who is the Canadian Agent for Messrs. Blackie's house, can supply the work as it appears, through his travelling agents, at the publishers' price, 3s. 1½d. each part. Twenty-four parts, it is expected, will complete the work. We should be glad to see a work of this high character accessible to the farmers of every township in Canada. Could not Agricultural Societies and Trustees of Schools adopt some combined plan for securing an object of this kind? The intelligence and wealth of the country would be thereby greatly promoted.

ACCLIMATION.

The Cyclopedia opens with a very interesting article, from the pen of Prof. Lindley, on the natural adaptation of plants to climatic influences and conditions. Our extracts will impart considerable information, and, at the same time, give the reader some idea of the execution of the work.

"Nothing seems to be more certainly made out, than that all plants demand a particular climate, that is to say, a peculiar combination of temperature, moisture, light, and atmospheric pressure, in order to arrive at perfection; and that all considerable disturbances of the proportion in which such combinations are naturally provided, are prejudicial and fatal to the health of plants. A particular temperature of the soil is required for germination; one seed will vegetate at 33°, and another requires 80°: a particular heat is requisite to healthy growth; the almond will expand its flowers at 40°, the horse-chestnut demands perhaps 60°: the temperature which is favourable to the growth of one plant is prejudicial to another, and fatal to a third; at 40° the cabbage thrives, the kidney bean and cucumber languish, the sugar-cane dies. These well-known facts lead to the conclusion, that plants have a specific constitution given them by nature; in order to adapt them to the places in which they are stationed; and it is believed, with reason, that such peculiarities explain the cause why plants have, in general, in so limited a degree, the power of extending into foreign regions. By these means it is imagined that the geographical limits of vegetation are determined, and an effectual natural barrier opposed to all migration of species. It must be obvious, that if this is so, (and no rational doubt can be entertained of the fact,) the power of man, in introducing the plants of one country into another, must be determined by the similarity of climate in the two countries, and that no reasonable hope can be entertained of introducing the field crops of the hotter parts of the world, into regions that are colder. Annual crops offer an apparent but not real exception to this; as when we find the gourds and melons of India cultivated in England, and the wheat of Europe producing a crop in countries where coffee and sugar-cane are staple products. But in such cases, the cold country crops are only grown in the cold season, or winter of the tropics, and the hot country crops in the height of summer, in northern regions. Our summer heat [in England] is high enough for the gourd, the melon, and the cucumber, which are Indian annuals; but they suffer as soon as the temperature falls to 40°."

"Such being the nature of the barriers opposed to the dispersion of species; and plants not possessing, like animals, the power of adapting themselves to circumstances, by artificial means, nothing would appear more hopeless than the attempt at overcoming

this obstacle on such a scale as can concern the agriculturist. Nevertheless, it has long been a favourite speculation with ingenious men, that it is possible, by art, so to change the constitution of plants, as to enable them to endure a climate essentially different from that to which they are naturally accustomed. This has been called acclimatizing, or naturalizing, is supposed to have already resulted in the cultivation of wheat in latitudes originally unsuited to it, and in the acquisition of other useful plants. It has been supposed that the sensibility of plants may be diminished by habit, by a gradation of climate, and by a succession of generations. It is certain that there is a great inequality of constitution among individuals of the same species, some being always more robust than others, and therefore more capable of resisting external influences; it is notorious that the quality of the products of plants is affected by raising them from seeds, wherefore there is much probability that their constitution will vary also under the influence of the same process; and hence continual raising from seeds has been recommended as a means of innuring plants to a climate originally uncongenial to them."

"If this doctrine were supported by sufficient evidence, it would be of the utmost importance to farmers, because it would point out to them a certain means of varying their resources by the introduction of crops now only cultivated in warmer climates; and there would be no reason why rice, or maize, or cotton, or yams, or indigo, or the sweet potatoe itself, should not be introduced into English agriculture."

"It happens, however, that cases in support of this view are not numerous, however plausible the theory may be; and it may be doubted whether in fact any one example of acclimation, in any considerable degree, if at all, can be produced."

The writer then adduces the case of the Canada rice plant, (*Zizania aquatica*), the seeds of which, many years ago, were procured from Canada, and sown in a pond near London, in England. The seeds grew, and produced strong plants; but the seeds from the latter, sown the following spring, produced only weak and slender stems, not half so stout and tall as those of the first generation. Afterwards the plants annually improved and thickened, till they occupied the deeper portions of the water. "This case, (it is argued), "was not one of naturalization, but of deterioration, succeeded by restoration, not improvement." That the Canada rice was not naturalized in England, is sufficiently proved by its having long since disappeared.

"But if no good evidence can be produced of plants having become acclimated by repeated sowings of their seed, the facts on the other side are numerous and conclusive. The Peruvian annual, called Marvel of Peru, the common Indian Cress, the scarlet running Kidney Bean, the Tomato, the Mignonette, an African plant, all natives of hot climates, have been annually raised from seeds ripened in this country, (England), some of them for two hundred generations; yet have in no appreciable degree acquired hardiness, but the earliest frost destroys them now as formerly. Potatoes, long as they have been cultivated from seed, are in no degree more hardy than those which are now brought to us from Peru and Mexico; indeed, some garden potatoes, imported in 1846 from Lima, and planted in November, stood the severity of the succeeding winter, when the thermometer fell to 3° Fahrenheit, rather better than the English varieties, which had been obtained from repeated seed-sowing during a century."

"While these facts compel us to withhold assent to the doctrine of acclimatizing, by means of seed-sowing for many successive generations, it by no means follows that therefore no other plants can be cultivated advantageously in the fields of this country, than those which now are found there. Although the constitution of plants may not itself be capable of much change, climate may certainly be improved within certain limits by raising the temperature of the soil, and removing superfluous moisture."

Although we have already extended this paper to an inconvenient length, nevertheless, the concluding remarks of the article are so lucid and important to every person that cultivates either a garden or a farm, that we cannot resist the temptation to quote them entire.

"The mere presence of superfluous water acts disadvantageously upon all plants, by causing them to form succulent, spongy shoots, which, in the case of annuals, refuse to flower, and thus remain extremely susceptible of cold. Nothing is more certain than that plants which ripen their shoots late or imperfectly suffer far more from a winter's cold than those in the opposite state; and hence it is that so little injury is sustained by exotic plants after a hot summer, however severe the following winter may become. A dry soil, in which no superfluous water remains, is therefore best adapted for tender plants, on that account alone; but it also acts beneficially because of its higher temperature. It is a great mistake to suppose that plants are affected only by the temperature of the air: they are perhaps more affected by that of the soil in which the roots are placed; and there can be no doubt that crops can bear with less inconvenience a warm soil and a cold air, than a cold soil and warm air. All experiment shows this to be so. And it would even seem that a small difference in the temperature of the soil produces the most essentially different effects upon vegetation, even although it be healthy. Gardeners know that although the common Nelumbium will grow in the winter at 65° or 70°, it will not flower and seed unless the temperature of the water rises to 85° or 90°; and yet the same temperature is prejudicial to kindred species. With ordinary field crops, a difference of a few degrees in the temperature of the soil causes a most material difference in the healthiness of vegetation, or the fitness of land for the cultivation of grain species. According to Mr. Ferguson's observations, the mean temperature of the soil near Edinburgh, at a foot below the surface, may be taken to be 52° during the summer months: but if it were to fall to 47°, it is doubtful whether wheat would ripen well, or at all."

"It is in this point of view that thorough drainage has most important bearings upon the question of acclimitation; because, although it appears impossible to adapt the constitution of a plant to the unfitness of climate, it does not seem impossible to improve climate till it suits a crop which, in its unimproved condition, it would refuse to sustain. By attention to this important fact, a variety of plants have been cultivated in the open air at Biel, in East Lothian, although, in the absence of such precautions, they could not be preserved without protection, even as far to the south as the neighbourhood of London."

"To what extent exotic field crops can be introduced into English cultivation, depends entirely upon such considerations as these. So far as climate is capable of amelioration by thorough drainage, success may be looked for; but all the plans for acclimating plants by mere seed-sowing must, we fear, result in failure. The amount to which climate may be so improved will serve as a guide to the probability of cultivating advantageously a new crop; and may show how little probability there is of any advantage following the introduction of the products of countries much warmer than this. Our summer temperature may be made high enough for certain annual crops which come quickly to hand, such as millet, chick peas, and sulla or French honey-suckle; but the small extent to which our climate can be improved, entirely forbids the hope of ever cultivating such plants as yams, arracacha, tuberous cannas, or the like."

We may just observe, in conclusion, that the first part of this Cyclopœdia, in addition to a number of articles on plants, insects, and subjects of a practical nature in the business of agriculture, contains a simple and lucid treatise on Farm Accounts, a matter too much neglected, we fear, by many farmers; and another on Chemical Analysis, by Dr. Lyon Playfair. We like the latter, because it is concise and does not mislead farmers, by holding out to them expectations of advantages from the study and practice of chemistry, which they have, as yet, but a very slender probability of realizing. This part contains an Introductory Essay, on the history and progress of agriculture, from the earliest ages to the present time; a piece of writing, which we do not recollect having seen equalled in the happily increasing range of agricultural literature.

WHEAT CULTURE.

We copy the following report of a discussion on wheat, which will be found highly interesting.—[Ed.

The discussion in relation to the culture of wheat, which took place at Albany, at one of the weekly meetings held during the past winter, brought out some useful facts which we think are not generally known, and their insertion in our pages may interest and benefit our readers.

Mr. Brewer, of Tomkins county, said he had cultivated wheat for more than twenty years, and would give some of the results of his experience. A part of his farm, which in 1830 was an open common, has been wholly devoted to wheat and clover since that time—having produced thirteen crops of wheat and eight of clover. The soil is rather a gravelly loam. His farm is on one of the hills, towards the head of Cayuga Lake, which it is said were burned over by the Indians every year. He had made various experiments in ploughing at different depths—from three inches to seven inches—and has always had the best crops where the furrows have been the shallowest. Usually ploughs but once for wheat; has sometimes ploughed in May, but had no better crops than when he ploughed in September, just before sowing. The yields he had obtained were from sixteen to twenty-six bushels per acre. On new lands—stiff soils for instance, it might be necessary to plough more than once for a wheat crop, and in such cases it might be better to plough deep the first time.

Mr. I stated that he had made some trials with various quantities of seed per acre, as 1½, 1¾, 2 and 2½ bushels, and had usually got the best returns from the latter quantity; that is 2½ bushels of seed had given from two to three bushels more yield per acre than two bushels of seed, and six bushels more than 1½ bushels seed. He had not been plagued with rust but once in twenty years. Was seldom annoyed with the Hessian fly or with the wheat midge; but the wheat has often been much injured by these insects in valleys, when it was not noticed on the hills. Has commenced sowing wheat in drills; sowed a part of his crop in this way last fall; the drilled portion looked much the best at the setting in of winter. Saw two fields of wheat last year, adjoining each other, on one of which the seed was drilled in, and on the other sown broadcast; the drilled yielded much the best. Drilled wheat stands the winter best; the small ridges between the rows are constantly working down, and keep the roots of the wheat covered.

Mr. B. spoke of the Etrurian wheat, which had lately been introduced, and had so far done well—it weighed sixty-four pounds to the bushel.

Mr. Lawrence, of Yates county, differed from the preceding speaker in regard to the proper depth of ploughing. The remarks in favour of shallow ploughing, seemed strange to his ear. The farmers of Yates *improve* their land by deep ploughing. The farm which he occupied had been rented for many years previously to its coming into his possession, and had been ploughed about four inches deep, and produced twelve to fifteen bushels of wheat per acre. He at once ploughed it six to seven inches deep, and raised the first season thirty bushels of wheat to the acre. It was the general expression, in his county, that deep tillage was the best for all crops.

He had *tried* sub-soiling, first ploughed with a common plough, seven inches, then run the sub-soil plough the same depth—cross-ploughed before sowing wheat; has invariably had the best crops where he has sub-soiled; has sometimes sub-soiled a portion of a field and left the remainder ploughed only in the ordinary way, and the yield is always in favor of the sub-soiled part. His is a strong lime-stone

soil, and he intends to sub-soil his whole farm, being satisfied that it will pay. He makes great use of clover as a fertilizer, and uses plaster to benefit the clover. Never could perceive that plaster benefited the wheat much, but it greatly increases the growth of clover. He attributes the improvement of the soil by clover mostly to the roots; they penetrate the earth to the depth of two to two and a half feet, and raise the soluble substances on which the plant feeds, to the surface, where, by decomposition, they supply food to the wheat crop.

Mr. L. said wheat was formerly raised in Yates county chiefly on fallows; but latterly, the more common course is to take first corn, then barley, then wheat—the corn generally manured—but it must be remembered that this cannot be done on a poor soil. He had tried wheat after various kinds of grain, but it does best after barley. The system of drilling wheat is beginning to be practiced in Yates county, and Mr. L. concurred with what had been before said in regard to the advantages of this mode of sowing. Palmer's is the kind of drill most in use in his neighbourhood, and it gives good satisfaction. The quantity of seed sown can be regulated to a quart to the acre. It covers the seed one and a half to two inches deep. The rows are nine inches apart. The cost of the machine is $55. The best varieties of wheat in Yates county, are the Hutchinson, Soule's, and Flint. Many preferred the Hutchinson on account of its earliness and freedom from rust. It would ripen two weeks earlier than the red chaff. Mr. L. thought they raised as good crops of wheat in Yates as in any county in the state. He had himself raised forty-four bushels per acre on sixteen acres, in 1846.

Lieut. Gov. Patterson said his experience was in favour of deep ploughing. The wheat lands in the Genesee valley, when new, produced about fifteen bushels of wheat per acre. They were ploughed shallow—the farmers generally had not then sufficient strength of team to plough deep; now they plough much deeper than formerly, and obtain from twenty-five to thirty bushels per acre. In Livingston county, thirty-five bushels per acre were obtained on some farms. Some farmers there, now plough ten inches deep. Deep tillage has many advantages; an important one is this, that it enables crops to stand drouth. As to varieties of wheat, the old red chaff bald had done best with him, and he had tried many kinds. The Soule's variety had done better than the flint; but two crops of the red chaff are better than three of the flint. The blue-stem is being introduced, and meets with favour. The proper time to sow wheat in the Genesee valley, is from the 15th to the 25th of September. If sown earlier than this, it is very liable to be injured by the Hessian fly. As to the quantity of seed per acre, he thought a bushel and a half, if thrashed with a flail or trodden out by horses, was about right; if the seed was thrashed with a machine, two bushels per acre were necessary. The difference was owning to the wheat being broken in passing through a machine, so that many of the grains would not germinate. In regard to summer fallowing, he had better success with it on ground so prepared than in any other way, and thought he could raise wheat in that way cheaper than he could raise corn or oats. As a crop to precede wheat, he considers peas preferable to any kind of grain, or any crop, except flax. The cheapest manure for wheat is clover, though he would use all the manure from the barn-yard; considers a good crop of clover equal to twenty loads of ordinary yard manure per acre. His practice is to sow six to eight pounds of clover seed per acre—seed costs about ten cents per pound—in spring sows 100 pounds of plaster per acre—pastures the clover till latter part of May, and ploughs it under in June—could never see that plaster benefited the wheat, but it makes the clover, and the clover makes the wheat. He is much in favour of the system of drilling wheat. Wheat put in by this method is less likely to be winter killed. The roots of grain that is sown broadcast, are often injured by the earth being blown off from them; by the drill system, this is prevented—the earth which forms the ridges between the rows being blown over the wheat, keeping the roots covered. His wheat crops have sometimes been forty bushels per acre—has raised thirty bushels per acre on sixty acres.

Mr. Cowles, of Onondaga county, said there was great variety of soil in that county—that on which oak and chestnut constituted the chief timber growth, was best for wheat; but thirty years ago this kind of land was generally thought good for nothing. When it was first tilled, it was ploughed about four inches deep, and it did not produce very well; now it is ploughed from seven to ten inches deep, and the crops are good and the land is growing better. On this kind of land, plaster benefits all crops; but on some other soils plaster has no apparent effect. On the chestnut and oaklands, the best crops of wheat are obtained by sowing about the 1st of September. He had noticed the effect of different crops on wheat. A field was sown as follows:—one-third with peas, one-third with barley, one-third with oats; the next crop was wheat; it was best after the peas, next best after barley, and poorest after oats. So far as his observation had gone, wheat was generally poorer after oats than after any other crops. On his land, wheat was generally best after a summer fallow. As to varieties, the old-fashioned flint were best—the Canada flint next best. He related an experiment: a neighbour of his took some winter wheat—a white variety—put it into tubs, wet it, and left it to freeze—it being in the winter season. It remained frozen till spring, when it was sown; the produce was a *red spring* wheat, which had continued in his neighbourhood until this day. This experiment convinced him that all wheat was of one species, and that varieties might be originated by causes unusually affecting the germ or the plant.

Lieut. Gov. Patterson had no reason to doubt the result of the experiment just cited; it brought to his mind the long-contested point of the transmutation of wheat into chess. He had known chess produced under circumstances which seemed to favour that hypothesis. He knew a piece of new land, just cleared from the forest, at a considerable distance from any other cleared land, sown to wheat, and on

a swale, in the middle of the piece, there was scarcely anything grown but chess.

Mr. Lawrence said he could not believe that a grain of wheat ever produced chess. All the cases of supposed transmutation that he had ever heard of, could be explained without resorting to such an unnatural idea It was sometimes said that *clean* wheat was sown, and it produced chess. He had often examined wheat that was called clean, and found chess enough among it to produce all that was grown among the wheat. In wet places the wheat would die out, but the chess would grow all the better, and people were astonished at the quantity.

Mr. ——, (whose name we did not learn,) made some remarks in regard to smut. He had sown a piece of ground with seed wheat that was a little smutty, but scarcely enough to be noticed—did not apply lime or any thing to prevent smut, and the crop was two-thirds smut. His son sowed some of the same seed, prepared by soaking in brine, and then limed, and the crop had hardly any smut in it. He inquired whether this accorded with general experience. Several gentlemen replied that they had never been troubled with smut when the seed was treated with lime, alkali, or vitriol.—*Working Farmer.*

BUCKWHEAT.

In the United States, buckwheat is sown immediately after the crops of wheat, rye, and oats are taken off, the stubble being turned under. The plants are very tender, and suffer from the least frost, and also from the scorching rays of the sun. The growth is very rapid, and even upon poor sandy soils tolerable crops are often obtained in little more than two months after sowing. The soils best adapted, are the loose, mellow, sandy, and dry. In the state of New York buckwheat is frequently sown about the first of August, along with winter wheat, affording a ripe crop in the fall, and taken off without material injury to the wheat that succeeds it. When broadcast, about one bushel is sufficient for an acre; half of this quantity will answer when drilled. In harvesting, it is either pulled up by the roots, which saves much loss of seed, or mown with a scythe. In either case it is bound up in sheaves, and left a considerable time in the field, to secure its drying, and prevent heating, to which it is very liable, especially if put into large stacks and closely housed. From thirty to forty bushels per acre is considered a good crop. But this amount is, under favourable circumstances, sometimes doubled. The buckwheat flour of Pennsylvania and New Jersey is in high repute, especially in the middle and southern States. That from New Jersey is much the lightest colour—a quality derived from an admixture of corn ground with it, in the proportion of a fifth or sixth part. This corn is raised for the especial purpose, being very soft and extremely white.

In some parts of Italy they mix buckwheat with a certain portion of barley, and grind it into flour, the bread made from which retains its moisture and freshness much longer than the common bread made from wheat flour. Though dark coloured, this bread is much relished by the natives. In Germany a coarse grained meal, or grits, is made of buckwheat, much used in thickening soups, making puddings, &c. The Germans also mix it with malt, and brew a kind of beer or ale from it. By distillation a very excellent spirit is obtained, which though of a bluish tint, much resembles French brandy in flavour. A great deal of the liquor distilled in England is from this grain.

Buckwheat is excellent for cows, pigs, and poultry. When fed to pigs, it is best to mix with potatoes, or some other kind of food, otherwise they are apt to be affected with eruptions. Cows yield an abundant supply of milk, when fed on buckwheat hay, provided this has been cut during the tender and succulent state of the plant, and properly cured. Some farmers have thought it even superior to timothy hay, for milch cows. Sheep, when fed on buckwheat in blossom, become intoxicated, so as to tumble and stumble about.

Buckwheat is often sown on exhausted land, for the ploughing under of a green manure. "We cannot, "says the editor of the *Theatre of Agriculture*, "too much recommend, after our old and constant practice, the employment of this precious plant as a manure. It is certainly the most economical and convenient the farmer can employ. A small quantity of seed, costing a mere trifle, sows a large surface, and gives a great crop. When in flowers, first roll, then plow in, and it is soon converted into manure."

Another purpose to which this plant has been applied, is in the art of dying wool, etc. An infusion made from the succulent stems and blossoms, with the addition of preparation of bismuth of tin, is made to produce a beautiful brown colour. From the dried flowers different shades of green are obtained. The Siberian buckwheat yields a fine yellow, which upon boiling the wool still longer in the dye, changes into a golden tint, and at length becomes a beautiful yellow.—*Model Courier.*

CULTURE OF TURNIPS.

The time for sowing turnips is close at hand, and we think a larger number than usual of our readers will desire to grow an acre or two of turnips the present year, owing to the short crop of grass, and the partial failure of many fields of corn. Where corn is thin and uneven, and the ground is in good order, quite a fair crop of turnips can be raised by sowing among the corn at the time of the last working. The partial shading of the plants by the corn seems to be an advantage, especially if frequent rains occur.

Where corn or potatoes have failed, if the ground is suitable, it can now be ploughed, harrowed fine, and sowed with turnips. Or a piece of wheat stubble may be ploughed for the same purpose, if there should chance to be any portion rich and mellow enough.

The soil for turnips should be rich, (but not too highly manured), mellow, free from weeds or grass, and not too dry. Newly cleared land, abounding with vegetable mould, is very suitable, when not too weedy.

The time for sowing is from the 20th of July to the middle of August. About the first of August for this climate may be considered the proper time. Advantage should be taken of the chance for rain, in order to bring up the seeds speedily. About half a pound of seed is the usual rate per acre.

A dressing of wood ashes sprinkled over the ground will greatly promote the growth of turnips.

The following article is just in time, and gives sound advice; but we presume most farmers will object to the amount of labour bestowed.—*Ohio Cult.*

PARSNIPS.

A correspondent has written to inquire, "whether we know, by our own experience, the quality of the parsnip for feeding and fattening pigs?" In answer, we beg to state, that, at our farm at Catlands Bingmen, we have been in the habit of employing parsnips for that purpose, for some time. Upon reference to our books, we find that on the 11th of October, 1847, we put up two shoats of eleven weeks old, and fed them on skim milk and parsnips, for three months, when they were killed, weighing two hundred and thirty-one pounds. They were well fattened, firm in flesh, and the meat of excellent flavor. The quantity of parsnips consumed by them was nine bushels each.—*Sussex (English) Express.*

We have often wondered that no account is made of this valuable root. All the world is alive to the value of the carrot, while this esculent is entirely overlooked. That the parsnip contains more saccharine matter than the carrot, or even any of the beets, we are satisfied. A very excellent wine is made of it, which we venture to assert cannot be made from any other of the whole root crop. Its estimation as an edible for the table also, tells in its favour. And a herd of hogs turned into a field containing bagas, beets, carrots, and parsnips, would not be long in settling the question which they like the best; and as they cannot read the *Genesee Farmer*, and are not influenced by any of our blundering theories, and trust alone to experience, and that unerring guide we are disposed to give them in the place of reason, we are disposed to give them the credit of being very capable judges—very.—*Genesee Farmer.*

PARSNIPS SOWN IN THE FALL.

Although it is out of season for growing this crop now, it may not be amiss to suggest a few hints in regard to its culture. We believe the time is coming when much more attention will be given to this root than at present. We believe it will be found advantageous to sow it late in the fall, so that its seeds may be among the first to start in the spring. The work will not only then be out of the way in the spring, but the crop itself will be much better in every respect. They require, when sown in the spring, to be put in early, as they are a long time vegetating; but if put into the earth in the fall, they will become prepared by the frosts to start early.—The winter, instead of injuring the seed, is an advantage to them. They should be sowed in rows wide apart so as to cultivate deeply and break up the soil that has been pressed down by snows and rains.

Stevens, in his Book of the Farm, says that according to Col. Le Couteur, the weight of a good crop varies from thirteen to twenty-seven tons per acre, (in the Island of Jersey, in the Channel,) the latter quantity being sufficient to support twelve Jersey cows for six months.

In this Island they have been found to yield a heavier crop than the Altringham carrot, in the ratio of eight hundred and forty to two hundred and sixty-one. As the parsnip contains six per cent more mucilage than the carrot, the Colonel conceives that the difference is sufficient to account for the superior fattening as well as butyraceous quality of the parsnip. The result of experiment there has shown that not only in neat cattle, but in the fattening of hogs and poultry the animals become fat much sooner, and are more healthy, than when fed on any other root or vegetable, and that, besides, the meat is more sweet and delicious.

In our country there is an advantage in the parsnip: a part of them may be left in the ground all winter, and be dug in the spring. If they are in a place where the water will not stand upon them, the root is improved rather than injured by remaining in the ground all winter.—*Maine Farmer.*

ON RAISING TURNIPS.

Ed. Ohio Cult,—For five years past we have not failed of raising a good crop of turnips, averaging at least 200 bushels to the acre. Our mode of culture for this crop is as follows: As a general thing, we begin to prepare our ground for a turnip crop early in the spring, by turning under a good piece of sward and harrowing it down the same way as ploughed. Let it remain thus until about the middle of May, or until the weeds and grass get so high as to need destroying. We then go over it with a cultivator, or plough it again. The cultivator will generally kill the weeds, and the plough is not needed. Let it lay again until about the middle of July, and then give it a thorough ploughing. Let it rest then until we wish to prepare for planting, which is with us, the last of July or first of August.

One great object is, to get the seed in the *right* way. The mode we adopt [and we consider it about the best] is, after harrowing well, to throw the land into ridges from 18 inches to 2 feet apart, by taking one horse and plough and strike a furrow across one side of the piece, or "land," and back on the other

turning the furrow *in*. The next round, turn the furrow in and *from* the previous ones, letting the plough run as near them as convenient, and keep doing so until it is all ridged to the centre from each side.

The next thing in order is, to pass over these ridges with a common rake, and rake off all weeds and large lumps, leveling down the tops of the ridges a little, so as to hold the seed better when sown. After this raking, we put all the wood ashes saved the past year, on the ridges, at the rate of 20 or 30 bushels per acre, scattering on the tops of the ridges with the hand or a wooden paddle. There is some work in this, but it pays well. It keeps off insects, and increases the crop, and produces a better quality. The seed is then sown, or drilled on the top of it all. The way we have accomplished this, is to take the nose of a garden watering-pot, (any other tin dish will do with a small hole punched in the bottom), and paste a paper over all the holes but one in the centre—put the seed in it at the other end, and stop it up with a stick long enough for a handle, so that when hold of it I can stand straight and the seed be close to the ridge. Shaking this over the ridge while walking in the space between, I can sow two acres in a day, when the ground is prepared. You will need to see that the hole is not so large as to let out too much seed and thereby waste. After sowing the seed, the ridges are passed over with a fine toothed light rake, and the seed thereby slightly raked in.

The next thing is, when the plants are up and have leaves two or three inches long, to go through with light, narrow hoes and loosen the ground, cut what weeds there are, and thin the plants to six or eight inches apart in the row. This is all that has to be done until gathering; and if they are managed in this way, with favourable soil and season, there will be two hundred or more bushels per acre.

We marketed 300 bushels last season, at 25 cents per bushel. The seed we use is of our own raising —an amalgamation between the large Dutch and Scotch Red Top turnip, which produces an excellent article for table use.

As it is now too late to prepare the ground through the summer as I have mentioned, I will add that a good crop can be had yet, by now breaking up grain or flax stubble and ridging and sowing as before mentioned, if the ground is rich enough. A given quantity of turnips may be raised by this mode of culture much easier than by sowing broad cast.

FOURTH ANNUAL REPORT OF THE BOARD OF AGRICULTURE OF THE STATE OF OHIO.

We have received this Report, which makes a good volume, of nearly 300 pages. It is truly gratifying to see how rapidly agricultural improvement is progressing in Ohio. Nothing shows it better than the increased size of these reports, coming, as a great bulk of its contents do, from the several counties, and giving a good history of the leading crops in each, by actual residents. For accurate information as to the real condition of Agriculture through the State, we consider the volume entirely another of our own more bulky transactions. The State of Ohio will owe an immense debt to *a few men*, who have stuck to the Board of Agriculture, until they have succeeded in arousing a feeling among the farmers that will make them second to those of no other State. We predict for their great fair at Cincinnati, on the 11th, 12th, and 13th of September next, an exhibition that New York might be proud of.

And why should not Ohio be foremost among the first? There is no State in the Union that possesses to so great an extent all the elements of boundless prosperity than she does; and we hope her citizens will not allow her resources to remain long undeveloped. The first great step towards it is to build up her agriculture. The real wealth of this world lies within a foot of the surface of the earth. If any man doubts, let him dig.—*Wool Grower.*

EARLY THRESHING.

Farmers who thresh their wheat and other grain early, can take advantage of the market at any time. They are always ready for a good price. Not so with the dilatory man, who thinks it's time enough, and is never ready. His success, if he have any, is of course accidental. Therefore, the shrewd farmer will thresh his grain at the earliest period, and he will be prepared to sell whenever the price is the best.

PROFESSOR JOHNSTON—AMERICAN AGRICULTURE.

This distinguished Agriculturist, who lately visited the United States and the Lower Provinces, has returned to England. Although present at our Provincial Show at Kingston, he saw very little of Upper Canada, and therefore his opinions are based upon what he saw in the Lower Provinces and in the State of New York. Professor Johnston at a meeting of the Farmer's Club, in Berwick, made the following among other remarks, on agriculture in America:—

"The Professor mentioned that the state of Agriculture in the northern parts of America, in our own Provinces, and in New England, is generally what the state of agriculture in Scotland probably was 80 or 90 years ago. In some parts of New Brunswick they are very nearly in the precise condition in which Scotland was 120 years ago. Go as far west as you like, and as far south as you like, the same general description applies to the whole. In regard to the cultivation of land in America, its condition arises from a variety of causes, and a very few considerations would enable them to understand how it had come about. In speaking of the exhausted soil, he did not refer to the virgin soil which had never received the plough or the spade, but to the soil under their cultivation and which they were now exhausting. The forest was in the first place cut down and burned, after which the ashes were scattered and a crop of wheat and oats was sown. When this crop was cut down,

another was sown; but they did not always remove the straw—they do not trouble themselves with any manure. The second year they sow it again and harrow it, and generally took three crops in succession. When they can take no more out of it, they either sow grass seeds or, as frequently, let it seed itself. They will then sometimes cut hay for 12, 14, 16, 18, or 20 years in succession, in fact so long as they can even get half-a-ton an acre from it. The land was then broken up, and a crop of wheat—and then hay for 12 years again, and so the same course was repeated. Now this was the way in which this land was treated; this was the way in which the exhaustion is brought about. This exhaustion existed in Nova Scotia, New Brunswick, Lower Canada, in Upper Canada to a considerable extent, over the whole of New England, and extended even to the State of New York. Well, were they doing anything to bring back the land to a productive condition? On this point he could speak very favourably * * * * * * All the new States—all the virgin land where wheat was cultivated yielded a crop for little or nothing, but it could not yield by any means a large crop. In the State of Michigan, between Lakes Superior and Erie, the average produce was not twelve bushels an acre; but it was got for nothing. In New Brunswick, which was very thinly populated, he was told that 10 bushels per acre paid well—but the produce was not large. In the Western States they were enabled to produce it very cheaply. As regards its value, the time he was there the prices varied from 60 to 80 cents a bushel, *i. e.*, 100 cents being 4s. 4d. In the extensive Western States, and part of New York where it was shipped to England, the price varied according to the distance. The condition of the farmers in Maine is exceedingly bad. The land was all mortgaged which hung like a mill stone round their necks, and was worse even than the state of the farmers in this country. They were thus unable to compete with the western parts of New York or Lake Ontario.—They had all heard of the famous wheat of Genesee, where the land was more fertile than any part of Great Britain, and he learned there, that they were laying the land down to grass, because they could not afford to grow wheat. As a remedy for this state of things, they were establishing agricultural societies in the different States, and the Legislature was providing funds to support these societies and for the diffusion of knowledge. In New Brunswick, New England, Vermont, New Hampshire, Connecticut, and New York, the growth of wheat has almost ceased; and it is now gradually receding farther and farther westward. He believed it would not be very long before America would be unable—in fact the United States were unable now—to supply Britain with wheat in any large quantity.—If we could bring Indian corn into general use, we might get plenty of it; but he did not think that the United States need be made any bugbear to them. He believed the great source of competition they would have to contend with was the Baltic and the countries on the borders of the Black Sea."

CULTIVATE A VARIETY OF CROPS.

This principle is inculcated by several considerations; variety of soils and situations; use of the products for various purposes, feeding to stock, selling in market, &c.; time of planting cultivating and harvesting; variableness of climate; the necessity for rotation of crops or change on the same fields; the eradication of weeds, &c.

Some fields may bear remunerative crops of one plant, yet leave deficiency from the cultivation of another; and not only are particular soils adapted to one species of vegetation, but also, are particular manures, some of which are much more convenient or economical for one locality than another.

So, too, of planting and cultivating. When one species of seeds are put in the ground, and the farmer is waiting to till them, it may be just time to sow others. When they have sprouted and require to be looked after one may need attention at one moment, and one at another; while a third, as of the small grains, grasses and clover, require no subsequent attention except harvesting.

A season that is very cold and wet may be beneficial to one crop, as of grass, and some of the grains, while such as are hot and comparatively dry, are better for others, as Indian and broom corn, and various other products and fruits. The multiplicity of crops in the ground at the same time, is thus equivalent to an insurance on the weather; in which the proprietor gives up a very large possible yield for one crop, while he secures a fair return for his general labor.

Again, various species of animals require different food, and each requires a variety—sometimes hay and straw, at others, grain, meal, or roots. Occasionally, too, the market may be high for particular products, of which the farmer may have good store, and which he may sell to much better advantage than to feed to his stock, a purpose for which, perhaps, it was originally designed.

The necessity for rotation with all its advantages, has been elsewhere specified, and we have not time now to enumerate them.

Various crops may require different kinds of labor. The old and young, and females, too, may frequently be as advantagously employed by one occupation, as in the dairy or garden, or poultry yard, as the hardy and strong, by others in the field. Some may require more or less asistance from the horse or ox, while others are adapted soley to manual labor; and certain articles, as flax and wool, may be raised to eke out employment for the inmates of the house during our long winter evenings.

Thus a thousand economical considerations may justly induce us to give variety to our occupations and the various objects of our agricultural pursuits.—*Am. Ag.*

F. G. WILLSON'S PATENT DUPLEX FAN-MILL.

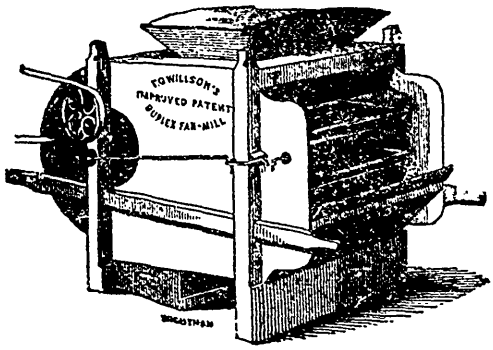

FIG. 1, PERSPECTIVE VIEW.

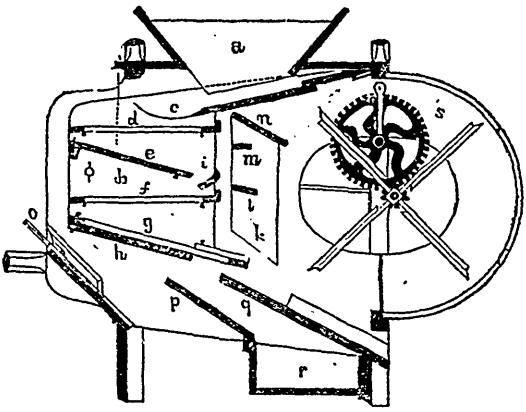

FIG. 2, LONGITUDINAL VIEW.

Saltfleet, 22nd July, 1850.

MR. EDITOR,—As you promised, in your first number, to take notice of any new and useful inventions in Agricultural Implements and Machines, I send you the following description of my "PATENT DUPLEX FAN-MILL." It has been much improved in construction since it first appeared in the *Cultivator*. The above engravings have some few errors: the bracket should extend over the wheel, and only one handle is shown in the section. The mill is now still more improved in construction: the top is made even, and sunk, which forms the hopper. It is now as perfect as can be desired, every part being adjusted according to practical experience; and it has been well tested by numbers of farmers, who have expressed their entire satisfaction.

Fig. 1, perspective view; fig. 2, longitudinal section, showing the inside arrangements; a, represents the hopper; b, the shoe; c, wire rake; d, riddle; e, shoe slide; i, return; f, fine sieve; g, screen; h, bottom apron; o, tail slide; p, screen slide; q, head slide; r, screen drawer; s, wheels and fans; k, side wind conductor; l, m, n, three conductors, for producing as many distinct currents of wind.

Operation.—The grain thrown in at the top falls on the top apron of the shoe, runs on the rake c, where a sharp current of wind, thrown from the conductor n, takes out most of the chaff; it then drops through the riddle d, runs down the slide e, while a second current meets it from the conductor m, taking off the remaining chaff; it is then returned on the fine sieve, by the return i, and has the advantage of its whole surface, and falls through on the chess screen g, which is an excellent and peculiar one, and runs down, being thoroughly cleansed for market. The screenings fall off the bottom apron n, on the slide p, into the drawer r. A variety of sieves may be used, according to the grain. They are all woven in a peculiar manner, being better than wrought ones, and less liable to sag down. This mill makes less offal and less wastage than other mills.

The shoe is made of half-inch baswood, battoned at both edges, without grooves. The sieves, resting on wire pins and hooks, can be raised or depressed, as wanted. The screen may be placed more or less level, by pins in the shoe. Should wheat be half chess, the slide e may be taken out; the grain falling the whole distance, and the three currents of wind acting upon it, sweeps the chess overboard.

The largest size, No. 1, is three feet inside; the frames and the sieves 26 inches. A cast-iron pulley is made to attach the mill to a threshing machine. We have had one in operation some three or four years attached to a machine, which has invariably cleaned the various kinds of grain at one operation, since it has been erected. It will clean by hand, fit for market, at once through, as fast as two men will throw in by shovels.

Farmers will find it much to their advantage to purchase these mills, in preference to any other whatsoever; and in order that they may have an opportunity of being supplied soon, *County Rights* will be sold to manufacturers in Western Canada, upon reasonable terms. Let them invariably inquire for these mills, and their wants will soon be supplied. Fifteen minutes' trial will convince the most sceptical.

An opportunity is now offered to manufacturers and mechanics to engage in a very profitable business, as I shall dispose of *County Rights* for these Mills, upon reasonable terms, on furnishing good, approved notes. As the patent secures a new and valuable principle of double action, &c., it cannot be superceded. The patent is recorded 15th March, 1850.

In some old settlements, where a farmer has two or three common mills, a good cash business can be done, in altering such mills, by putting in a new shoe and wind conductors, when they may be war-

ranted to do at least double the business they formerly did. The farmer would be materially benefited, without the expense of getting a new mill. Should a mill be too inferior, it would be better for him to purchase a new one, improved throughout, the selling price of which is from $25 to $28, more or less, according to the amount of furnishing. Two or three screens may be used at once, but they are totally unnecessary. They can be made as easy as other mills.

Shortly there will be combined with this mill a simple contrivance to separate the straw, as well as clean at once from a thresher.

A visit from manufacturers and others is solicited, when full information will be given.

The whole Right for Lower Canada will be sold at a moderate price.

Application has been made to secure the Patent in the United States.

All communications (post-paid) sent to my address, Grimsby Post-Office, in regard to the above, will meet with prompt attention.

Yours truly,

F. G. WILLSON.

—

The following certificate, out of a number of other respectable ones, speaks for itself:—

Grimsby, 29th June, 1850.

DEAR SIR,—Having had a good common Fanning Mill altered by you, on your new principle of double action, I truly certify that my mill will do more than double the quantity of work it formerly did, and cleans fit for market at one operation. I am confident that this principle for a shoe will supercede that of all other mills in use.

Yours truly, WILLIAM NIXON.

WHAT KIND OF COWS SHOULD FARMERS KEEP.

What are the qualities necessary to constitute a good cow? A good milker alone does not in our judgment, constitute a *good* cow; neither does a good breeder nor a good feeder. It is these three qualities, combined, that make *the cow*. Give us a cow that is good for milk, quality as well as quantity considered—that when properly bred to good bulls will invariably produce good calves, and one that when dried of her milk, will, with proper care and attention, take on flesh rapidly and evenly—and for one we rest, for a while, at least satisfied. And till we can raise up an entire herd of cows, each one of which shall possess these excellencies, our aim shall be to advance in improvement till we can accomplish our object.

To possess the first of these qualities a cow should have a fine head, a little wide above the eyes, but quite small below, and appear somewhat long. Her nose should be of a rich yellow color, or at all events not black; (we do not know of any full blooded stock, of any breed, with black noses, but they frequently appear on stock as high bred as fifteen sixteenths.) Her neck should be very small where it joins the head, but widening and deepening as it approaches the shoulders and briskets. Her udder should be of a good size, well covered with long, soft hair, and not inclined to fleshiness; large milk veins, and small, delicate horns—they may be long in some breeds, but they should be fine, and she should have yellow skin.

To be a good breeder, she should in the first place, be descended from good stock, and the farther back you can trace her from good stock the better. She should possess all the before mentioned milking qualities, with a broad, straight back, wide loins and hips, long deep quarters, round ribs, bones small in proportion to her size deep and full brisket, fore legs wide apart, and lastly, she should be a good *handler*. A cow that is a good handler will also, almost invariably, produce rich milk; and if a first rate handler, and posessing the before mentioned qualities, she will invariably be a good feeder. This handleing quality is, or has been overlooked by breeders and judges of cattle shows. Judges that will give in their decisions for premiums on stock, without even touching an animal, are, in our opinion, unfit for that office. We should not think of purchasing a cow for milk, stock and beef, without knowing her to be a good handler.—*Bowen's N. A. Farmer.*

CHEMICAL PRINCIPLES OF CHEESE AND BUTTER MAKING.

The following Lecture was delivered by Prof. Way, consulting Chemist to the Royal Agricultural Society, and may be classed among the best papers on this subject.—[ED.

Mr. Way commenced his lecture by stating that on two different previous occasions he had had the pleasure of bringing before the Society subjects upon which he had been personally engaged, and to which, he hoped, his investigations had brought some additional knowledge. The lectures he alluded to were those on guano, and on the absorptive powers of soils. But it was not in the nature of things, however desirable it might be, that he should be able to bring before them on each occasion some subject new to the agricultural world. In the present lecture he should merely embody in a condensed form that information which his hearers could, if they sought it, find equally well, or better, given in books. There was, however, good reason to believe that truths, when orally enunciated, possessed ten times more penetrative power (if he might so say) than any power of written language could infuse into them. To this circumstance, and to the obvious importance of recalling to our minds, from time to time, the great principles involved in the practice of agriculture, he must trust for the success of the present lecture. He must be excused for once more remarking that a fundamental part of the plan of these monthly lectures was, in his mind, the opportunity for subsequent remarks by the members present, and he hoped they would freely offer such observations as might occur to them. The lecturer went on to say that, to understand the circumstances affecting cheese and butter, they must first of all examine the composition of milk. The popular knowledge of milk was that it consisted of butter cheese, and whey—at least, these were the three parts into which it was usually seen to be capable of separation; but this division of the ingredients of milk left out of the ques-

tion a substance of whose existence in milk many people were entirely ignorant, but to which, in a philosophical point of view, the greatest amount or attention was due—he meant the sugar of milk. In a chemical point of view, milk consisted of five parts—butter, curd, milk, sugar, water, and saline matter. The diagram on the wall gave the relative quantities of these ingredients in different kinds of milk.

COMPOSITION OF MILK.

	Woman.	Cow.	Ass.	Goat.
Casein (pure curd)	1·52	4·48	1·82	4·08
Butter, ...	3·55	3·13	0·11	3·32
Milk sugar.	6 50	4 77	6 08	5·28
Saline matter, ...	0 45	0 60	0·34	0·58
Water, ...	87 98	87 02	91 65	88 60
	100·00	100 00	100 00	100 00

The sugar of milk, it would seem, existed in considerable quantity in it, equalling in the cow the weight of the curd. In England, he believed it was never prepared for domestic or other purposes; but in Switzerland, it formed a considerable article of commerce. Mr. Way exhibited a specimen of milk sugar, and observed that it would be found to possess only a slightly sweet taste, which was due to its very limited solubility. This circumstance prevented its extensive use as a substitute for ordinary sugar, because it could only be employed in the form of a syrup, and required so much water to dissolve it as greatly to reduce the strength of any liquid to which it is added. Now, milk sugar, although by itself, or solution in pure water, it would keep well, was very likely to change when in contact with bodies having the nature of ferments. Milk was, when drawn from the cow, slightly alkaline to test paper; but in a short time it became sour and curdled. This souring was due to the production of an acid from the sugar, which had, from this circumstance, been called the *lactic acid*, or the acid of milk. The same compound was formed in many other circumstances, and its production was not confined to milk sugar, but occurred in the other forms of sugar. Thus lactic acid was produced when cabbage was cut up and allowed to become sour, forming the sour-krout of the Continent. The sourness of brewers' grains is due to the same acid. Mr. Way exhibited a diagram which showed how easily the sugars could pass into lactic acid.

RELATION OF SUGAR TO LACTIC ACID.

	Carbon.	Hydrogen.	Oxygen.
Cane Sugar, ...	12 equi	12 equi.	12 equi.
Grape Sugar, ...	12	14	14
Milk Sugar, ...	24	24	24
Lactic Acid.	6	6	6

Thus milk sugar was in relation to the acid in question of such composition that one equivalent or combining proportion of it could, without adding to or subtracting from its component parts, produce four equivalents of lactic acid. Now in the natural souring of the milk this transformation occurs; but the question arises, how is it brought about? Mr. Way had before stated that ferments in general had this power of acidifying milk sugar It was an axiom with chemists that ferments are substances in a state of decay, and in virtue of that state capable of imparting it to the other substances. The difference between a ferment and a fermentable substance was in general this:—The body producing a ferment was liable to change by simple exposure to air. The body in which the fermenting process can be induced, is not liable to change by exposure to the air, but in the presence of the ferment is capable of ready conversion. The class of ferments generally contain nitrogen; the bodies liable to fermentation do not. Mr. way had collected in a table some of the more important of the proximate principles containing nitrogen, and also some of those which do not contain this element.

NITROGENOUS PROXIMATE PRINCIPLES (MULDER).

	Gluten of Wheat.	Casein from Milk.	Fibrin from Blood.	Albumen From Eggs.	Albumen From Blood.
Carbon, ...	54·75	44 96	54 56	54 48	54 84
Hydrogen, ...	6 99	7 15	6 90	7·01	7·09
Nitrogen, ...	15 71	15 80	15 72	15 70	15·83
Oxygen, ...	21·93	21 73	22·13	22 00	21·23
Phosphorus, . . .	. . . .	. . .	0·33	0 43	0 33
Sulphur, ...	0·62	0 36	0 36	0 38	0 68
	100·00	100·00	100 00	100 00	100 00

NON-NITROGENOUS PROXIMATE PRINCIPLES.

	Starch.	Gum.	Cane & beet root Sugar.	Grape Sugar.	Milk Sugar.
Carbon, ...	44·47	45 10	44 92	40·47	42 57
Hydrogen, ...	6 28	6·10	6·11	6 59	6·44
Oxygen, ...	49 25	48 80	48 97	52 94	50 99
	100 00	100 00	100 00	100 00	100·00

Amongst the former would be found *Casein*, the name given by chemists to the principle which is found in the curd or cheese of milk. Casein, as it existed in milk, was in a fluid or semi-fluid state, but most people were familiar with it in the form of curd. If the curd of milk, carefully separated by pressure from the whey, was exposed to the air, it soon began to acquire a putrid smell; in this state it would, if mixed with sweet milk, rapidly cause it to turn sour. The same thing happened in the case of the natural souring of milk; by the exposure of the casein to the air it underwent a change which enabled it to act on the milk sugar, converting it into lactic acid. This souring of milk was influenced by a variety of circumstances, to some of which Mr. Way would allude presently; but his present object is to explain and to enforce upon their attention the consecutive changes occurring—first, by the action of the air on the curd, and secondly by the influence of the ferment so produced upon the sugar of the milk. A right understanding of these changes would simplify and explain the greater part of the phenomena which presented themselves in the operations of the dairy.

It was well known that the most minute precautions were necessary in the management of a dairy. One of the most important of these was temperature. The action of the air upon nitrogenous substances was in all cases, favoured by a moderate elevation of temperature. Practically this circumstance was well understood and applied in the construction of dairies, which were usually sunk below the level of the earth, and were as far as possible shaded from the direct rays of the summer's sun. The use of water as a means of regulating temperature was also known; the plentiful sprinkling of the walls, the floor and the benches, being intended to reduce the temperature by the cold produced in the evaporation. But Mr. Way thought that, by a little ingenuity much greater advantage might be taken of this well-known law of evaporation; thus, for instance, it seemed to him perfectly practicable to imitate in dairies the methods of producing cold which were practiced in hot climates. One of these was to cover the opening of communication with the external air by mats kept constantly wet, which insured a cool and refreshing breeze. In many instances where the command of

water existed, this practice might be worthy of imitation in dairies. The colour of the wall was another not unimportant circumstance in the formation of dairies. In one instance he had known of a large dairy constructed of wood being painted black, or rather being covered with tar. As black is the colour of all others the most absorbent of heat, the results may be guessed. Scrupulous cleanliness is another of the essentials of dairy management—the scalding, and cleansing, and airing of the milk-pans and other untensils being of the first consequence. The reason of this was also obvious; any minute portion of milk left from one operation would necessarily become so changed by the next as greatly to hasten the internal chemical changes in the milk. Another class of phenomonea was connected with the extraordinary power of minute and inappreciable quantities of animal effluvia to produce change in such a delicately compounded flûid as milk. Thus, it was a rule never to have a dairy near a stable or other bad smell; there must be no drain near it, no meat kept in it, and the cheese itself should, where possible, be separated as far as possible. In these cases, as indeed in all cases of noxious effluvia, it was believed that excessively minute quantities of decomposing animal matter were carried in the air, rapidly inducing a change of a chemical nature in substances susceptible of such changes. In the case of milk, the phenomena were all referable to the tendency of casein to undergo change, which was much enhanced by exposure to impure air.

Mr. Way said that he had now shortly to call attention to the curdling of milk. It was seen that the natural souring was due to production of lactic acid; but in what way did this bring about a separation of the curd? This question was best answered by examining the properties af casein. Casein, or the curd of milk, was but slightly soluble in water, but very soluble in a weak solution of an alkali. In milk casein was kept in solution by a small quantity of soda, which accounted for the alkalinity of the milk when first drawn. Upon the formation of the acid this latter seizes the soda, thus depriving the curd of its solvents, and the consequence was that the curd was immediately set free. The separation of the curd from the whey was assisted by warming the milk; this was the reason why milk, slightly sour, but not curdled, became so when added to hot tea. If this explanation of the curdling of milk was correct, the same result would be obtained by the use of vinegar or muriatic acid; and Mr. Way showed that these acids would curdle fresh milk. The lecturer then went on to say that he would make a very short sketch of the different operations of butter and cheese-making.

Cream.—Cream, he stated, was merely a concentration of milk; the butter, by its lightness, rising and carrying with it a certain quantity of casein; it was therefore merely a mechanical separation. Clouted or Devonshire cream was butter with a larger quantity of cheesy matter, and therefore less wholesome than ordinary cream. Cream cheese was one step further than Devonshire cream, being a mixture of casein and butter with a considerable quantity of whey not pressed out. To this circumstance was attributable the impossibility of keeping cream cheese sweet more than a few days. There was a method of preserving cream and milk sweet for some time, which was interesting in a chemical point of view. It consisted in the periodical heating of the milk or cream to the boiling point. If this were done every morning or second morning, the milk may be preserved for several weeks. In the same way fresh cream be bottled and well corked, the bottles then placed in cold water gradually raised to the boiling point, it will be preserved for months. The explanation in these cases is that, by a temperature of 211° Fahrenheit, the quantity of ferment produced by the action of the air on the casein is destroyed; if no further contact of air takes place, the change of milk sugar into lactic acid is suspended; but if the milk is exposed to the air after boiling, a further quantity of ferment is produced, to destroy which, before it greatly accumulates, recourse must be again had to the process of heating.

Mr. Way thought it possible that the bisulphate of lime, the use of which had excited so much attention as a means of retarding the fermentation of the juice of the cane and the beet-root, in the preparation of sugar, might be advantageously employed in the preservation of milk; but possibly the inventor had contemplated this application of his process.

Butter.—The separation of butter in churning was considered a mechanical process, but there were one or two circumstances which seemed to favour the notion that chemical action of some kind occurred during the operation. The circumstances affecting the butter were the same as those affecting the milk. Butter was never entirely free from casein and milk sugar. The casein, although it did not exceed one-half per cent of the weight of the butter, yet was sufficient to make the preservation of butter difficult. The method of preserving by salting and pressure were intended to meet this tendency of butter to become rancid—here, again, possibly the bisulphate of lime might be useful. There was a method of preserving butter for domestic purposes described in Mr. Rham's "Dictionary of the Farm," (p. 113), and which was founded on the separation of the casein and buttermilk. It consisted in melting the butter, and allowing the casein and water to separate and fall to the bottom. The solid butter thus obtained was less finely-flavoured; but it kept better, and was much preferable to salt butter for pastry and other such purposes. To remove the turnipy taste in butter, Mr. Way recommenced stirring the milk as it is drawn, or the addition of a little saltpetre; or the adoption of Mr. Huxtable's plan, adding to each gallon of milk a tablespoonful of the clear solution of half an ounce of chloride of lime (or bleaching powder) in a gallon of water. In respect to the theory of the formation of butter in the cow, Mr. Way remarked that it was believed that although fat (and by a parity of reasoning butter) could be formed from the starch and mucilage of the food, and that in the presence of sufficient oily matter it was not likely that such production of fat should take place; then came the question how far oily foods would increase the yield of butter. It must not be lost sight of, however, that butter consisted of two fats—a solid and a liquid; and that, according as the one or the other predominate, the butter was firm or soft; the oils might possibly increase the quantity, but would the quality be good? He would suggest, as an experiment of physiological interest, an attempt to feed a cow with a mash in which suet as a solid fat should be introduced. By proper measures, best known to dairy farmers, a cow might be made to eat this perhaps, and it would be interesting to know the results on the quantity and quality of the butter.

Cheese.—Mr. Way remarked that the curdling of milk was due as before explained to acids, which combined with the soda of the soluble curd. In general, the production of acid in the milk was brought about by the use of rennet, which was a ferment produced by the exposure of the lining membrane of the stomach of a calf to the air. The use of rennet presupposed, of course, the destruction of the milk sugar, and therefore

the whey was sour. In Germany and Switzerland, and particularly in Holland, the acetic and muriatic acids were used to curdle milk for cheese. Mr. Way exhibited a diagram of the composition of cheese, which would show that, although we believed cheese to be dry, it still retained a large quantity of water,

COMPOSITION OF CHEESE (JOHNSTON).

	Skim Milk Cheese	Double Gloucester.	Cheddar.	North Wilts.	North Wilts, 2d specimen	Dunlop.
Water, ...	43 82	35 81	36 94	35·38	44 80	38·46
Casein, ...	55·04	37·96	28 98	25 00	28 16	25 87
Butter, ...	5·58	21 97	30·40	30·11	23 04	31 86
Saline matter, . .	5·18	4·25	4 58	6 29	3 99	8·81
	100·02	99 99	100 00	99 99	99 98	100 00

The relative richness of cheeses was due to the quantity of butter in them. The rich cheeses were those which it was most difficult to keep. The thorough salting and perfect washing of the curd also rendered cheese liable to change, although, as in the case of butter, every precaution in this direction was unfortunately opposed to the production of cheese of good flavour; those cheeses that keep best, as the Dutch and Suffolk cheeses, being far less agreeable to eat.

Before he sat down, Mr. Way wished to make one or two observations upon the effect of dairy cultivation on the land. Obviously by exporting butter and cheese from a farm, we export the same elements as in ordinary wheat, beef, and mutton farming. In addition, however, to the carbonaceous and nitrogenous elements so exported, a quantity of mineral matter, chiefly phosphate of lime, is removed by the cheese and in the bones of the calves. In old pastures this was never replaced, until the practice of manuring with bones came into use.

DRAINING.

The following suggestions on this important subject, are taken from one of the Foreign Journals lately received:—

As regards the practical execution of drainage, there are three essential points to be regarded—*efficiency, durability* and *cost;* and where works are systematically conducted, there are at least two subordinate objects to be attended to, viz: the providing for the application of the draining-water to the irrigation of the lower land, and the conservation of it for purposes of power at the several homesteads of an estate, both of which have hitherto been, in too many instances, overlooked. Perfect completeness of effect can only be secured by a practical knowledge of the object to be obtained, and fitting application of means to an end; in other words, the man who undertakes drainage operations must not only be thoroughly conversant with the most suitable state of dryness for land to be in, that its cultivation may be brought to the highest state, but he must possess corresponding skill to produce this at the least cost. The Sangrade doctrine of one remedy for all complaints, is as certain to lead to many adverse results in the bleeding of land, as in the human frame. Each case must be treated according to the different circumstance of locality, stratification, contour, &c. In the drainage of arable land, every district and every formation will afford, in the *naturally* dry soils of the locality, the best example for that completeness which is sought to be obtained by artificial means; and the more nearly we approach this standard, the more complete will the work be. Where land is intended to remain permanently in grass, some difference in the system may be properly made; for, if the excess or moisture be removed so as thoroughly to eradicate all aquatic plants, experience shows that in our climate, subject to occasional droughts, grass land is retained in better condition by having some reserve of moisture for these seasons, derivable from below by capilliary attraction. *It is very different, however, in arable land,* where a uniformity of dryness is so necessary to the growth of plants, most of which are of one year's duration only, and for the production of which the constant preparation of the land is required; and to effect this economically, depends on the mechanical condition of the soil.

Under ordinary circumstances, and to illustrate in point of time, the efficiency of drainage on arable land, it is desirable that it should admit of the usual operations being proceeded in upon it, in not exceeding twenty-four hours after a saturating rain, and that the entire surface of the land should present a *uniform* dryness. I know that many, if not most occupiers, as well as owners, will not allow that it is practicable to render clay lands thus dry by artificial drains, at a compensating cost; but my own observations have convinced me to the contrary, over many varieties of strong soils. It may be readily conceived that opinions may differ as to what is strong land; and no doubt, both as to the active soil and the subsoil of what are ordinarly designated clay lands, much misconception does really exist; but nevertheless, assuming Mr. Arbuthnot's description to be sufficiently accurate as to the mechanical texture of the land, it is ample evidence of that altered condition which drainage is certain to realize in such soils, if effectually performed. It is within the recollection of most of us, that these were at one time the description of farms most sought after, as possessing more stamina for cereal crops, than the lighter lands; experience, and better farming however, showed that grain crops could be produced at less cost on the naturally dry soils, and *they in their turn were regarded as the most desirable.* But let the strong lands of the country be once perfectly drained, and there is not a doubt but that they possess naturally far greater capabilities for cultivation. They are much less susceptible of excessive changes, less liable to weeds, retain and impart the fertilizing effects of the manures applied to them, much longer than the thinner soils, and for the most part produce a heavier quality of grain. In fact, they need only that mechanical condition which effective drainage gives.

One great hinderance to vegetation on these soils, which can only be removed by good drainage, is that excess of evaporation consequent upon a constant excess of moisture, which keeps the land always at a low temperature, when, in fact, an ordinary observer would suppose from the sun's heat it was the warmest, and when vegetation should be progressing. The contrary, however, of this is really the case; for, except during frost, all wet land is absolutely the warmest when there is the least heat from the sun; and, *vice versa,* when the sun is most powerful, and exercising his beneficient influence on other more favoured lands, this clay soil becomes so torpid as to stop the progress of the crop *until the sun's rays have converted into* the atmosphere a portion of that excess of moisture which leaves the soil, after a time, dried to a certain depth from the surface. The depth and distance at which drainage should be executed to secure a perfect result, must depend entirely on the character of the subsoil. No general rule can be laid down, except that in every case the depth should not be less than three feet to ensure permanency.

and the distance such as will produce uniformity of dryness over the entire surface. In compact clays, where the thickness of bed is considerable, and consequently where only the stagnation of the rain water has to be prevented, a depth of 3 feet, with a distance between the drains of from 16 to 21 feet, according to the retentiveness of the clay, will be effective. If the subsoil contains a greater proportion of sand, and the bed of clay is not so thick, it is more than probable that bottom water will be found, which must be carried off, and in this case the depth must be such as to pass through the clay, and the interval of drains may be extended to 21, 24, and up to 38 feet, as may be considered requisite. In sandy and gravelly subsoils, it is always necessary to cut the drains a sufficient depth to reach the source of the soil, and at distances from 38 to 60 feet, and even up to 150 yards apart, as circumstances may warrant. These subsoils usually exist in districts either of an undulating contour, or on the flat; if in the former, the depth of the drain must be such, as it proceeds up the rise, to reach the spring which will issue from the highest ground; and in the latter, it will frequently occur that the porous strata lies in a dish-like form, surrounded by a clay bed which holds in the water, and through which the outfalls being made, at once converts almost the entire area into an effective natural drain. With regard to the most suitable material and its form, there cannot longer be a doubt but that the plain cylindrical pipe-tile is the best that can be used. For the strong-lands, where the drains are more frequent, a size of 2 inches internal diameter for the parallel, and about 4 to 6 inches for the main drains, will be requisite; whilst in the more open subsoils, with deeper and more distant drains, 3 to 3½ inches, and 6 inch mains, may be necessary. Where the length of either the parallel or the main drains is considerable, the size of the pipes may be increased by degrees, as the drains descend to the outfall, so as to allow of an increasing volume of water passing off. This is a much more efficient and economical plan than putting in a main drain at the half-way length, as many too often think it necessary to do. In all cases where much fine sand prevails with springs, it will be necessary that the pipes should be collared, and not unfrequently to lay two pipes one within the other cross-jointed, to ensure safety. Where the foundation is good, and no necessity exists for such precautions, I am of opinion that a little non-adhesive material, as straw, &c., is desirable immediately over the pipe; in the first instance, to prevent any particles of earth from getting between the joints when filling up the drain, and subsequently to prevent too quick and close a cohesion of the earth over the pipes. A very slight covering is sufficient, and I am decidedly of opinion that it is a safe and good practice.

THE SUBSOIL.

We give the following from an article by J. Towers, in the Journal of Agriculture of the Highland and Agricultural Society of Scotland:—

In substance, temperament, and combination, it is extremely various: that of the worst quality consists of an indurated *pan*, impenetrable by air, by water in any available quantity, and, as in the case of the natural concrete gravel—known as "plum pudding stone"—by the common implements of agriculture. *Chalk* is a good subsoil, if not too deeply seated, effecting perfect drainage, and, by its retentive power, holding fast a quantity of water sufficient to maintain verdure during arid seasons, where clay-lands crack into open fissures. *Sandy* and *gravelly* subsoils are poor; but those which consist of *strong* clay may easily be converted into valuable and fertile land, by gradual laboration. To enable the reader to appreciate facts which are but little understood, and still less practically applied, I refer to, and shall extract somewhat freely from, a valuable letter from C. Wren Hoskyns, Esq., addressed to the farmers of Herefordshire, in 1847. The writer alludes in no measured terms to the sort of prejudice which is too far entertained against *subsoils*—as substances inert, void of nutriment, incapable of sustaining a healthy vegetation, but frequently, on the contrary, promoting cancer in trees, and discoloration in vegetables. "The notions," he says, "entertained about that mysteriously calumniated, ill-used, down-trodden thing—the *subsoil*—amount, in truth, almost to a national prejudice. So many causes have conspired to produce it—so many writers and speakers have increased it—that any one might justly fear to attack it, who had not proved it to be as utterly unsupported by experiment, as it is erroneous in theory."

The subsoil cannot, indeed, be neglected with impunity, if *de facto* it is the *repository—the storehouse*—of those salts, with alkaline or earthy bases, which lie unseen until disturbed by tillage. *Loams* are stated to contain *potash*; *green-sand*, coprolyths, and those *phosphoric* acid. Farmers cannot analyse subsoils: they are not in possession of available means of research; but if scientific chemistry be deserving of credence, such stores, of inappreciable value, now lie buried in the subsoils of their arable staple. In proof of what may be effected by deep tillage alone, Mr. Hoskyns adduces the fact, that "in the island of Madeira the vine is not a native plant, and, after growing well for a few years, the fruit begins to degenerate, and makes inferior wine. The expense of new stock, usually brought from the Hock vineyards of Germany, being very great, every expedient has been tried in order to postpone the evil as long as possible; but no *manuring*, or pruning, or attention, is of much avail; and the *only* remedy is found in extremely *deep cultivation*. I once saw the process. Nearly a score of labourers, hard at work, were standing in a long trench, deep as they were tall, stocking the earth from one side and throwing it on the other. On inquiry, they told me they were trenching an *old vineyard* for fresh planting; *trenching nearly six feet deep!*

As deep tillage, by bringing up potash from beneath the exhausted surface soil, restores the grape, so, by analogy, we claim the necessity of deep tillage everywhere. We read that the Flemings, those skilful and industrious men who have converted a sandy waste into rich and fertile land, "dig trenches about a foot deep over the field, from the bottom of which, assuming the soil to be ten inches deep, and they have therefore dug up two inches of subsoil; and, as they proceed, they fling the whole over each land on which the seed has been previously sown, which they thus cover. The trench being shifted sideways each year, and the process renewed at the end of a certain number of years, two inches of the whole subsoil will have been mixed with the upper surface, and the soil deepened to that amount. The same process is then repeated two inches deeper. In this way, after four or five courses of trenching, the soil is brought to a depth of 18 or 20 inches of uniform quality. On one Flemish farm, of about 140 acres, the whole of one field of 106 acres has been repeatedly trenched to the depth of 2 or 3 feet." Our "skimming" operations defeat our best processes, and clearly prove (as has been elsewhere asserted) that however we may flatter ourselves as first-rate cultivators of

the surface soils, we are lamentably remiss in our appreciation and treatment of *the subsoil.*

"Some months after, a merchant, in taking me over his wine-stores, pointed out, in some casks, that were being broken up, a mineral incrustation about as thick as a half-crown, and as brittle as glass, which he called *tartrate of lime*, adding, that it was commonly deposited by the wine, especially when new. I afterwards ascertained that potash and soda existed in the deposit."

This incrustation that forms upon wine casks is crude tartar, that is, the acid salt of potash, with two proportionals of tartaric acid, known in commerce by the name of *argol*. Chemically, it is identical with cream of tartar, degraded by some impurities from the wine. The best argols come from Leghorn and Bologna. *Tartaric acid* is found in the juice of grapes, and, it is said, in that of the tamarinds and mulberries, But it is the peculiar acid of the vine, wherein, after vinous fermentations, it always is found combined with potash, which alkali can only have been obtained from the *soil;* hence the interpretation of the singular process of deep trenching described by Mr. Hoskyns.

Horticulture.

CULTIVATING ORCHARDS.

BY J. J. THOMAS.

For a few years past about eighty thousand dollars' worth of fruit trees have been annually set out into orchards in the single state of New York. If these were all treated in the best manner, in preparing the ground, in carefully transplanting, and in good care and cultivation afterwards, each years planting would probably be worth to the owners in ten year's not less than three millions of dollars, so far as their value may be measured by a sum of money. The question arises, what proportion of this great number of trees are actually advancing with full promise of what they might attain?—What portion will really become in ten years, by the best treatment, full sized healthy and productive?

Several intelligent individuals have given it as their opinion that not one half of the trees that are set out, ever survive the third year. A very large number are certainly lost by careles removal, hasty transplanting into hard ground, and total subsequent neglect. But of those which survive, there are undoubtedly not one-tenth, that make half the growth they would attain under good management. We have seen whole orchards of young peach trees, smothered to death the first summer by the heavy growth of meadow grass which nearly enveloped them. A far larger number, however, are those which are not killed outright, but which linger year after year, with a slow and feeble growth. Now this tardiness is altogether unnecessary. Peach trees as far north as forty-three degrees, have been made to yield the third summer from transplanting, three pecks of peaches, and apple trees, the fifth summer, one bushel each.—An eminent pomologist now living in Western New York, set out a large fruit garden after long years had silvered his head with whiteness; yet for the past twenty years he has annually enjoyed a profusion of fruit from this identical garden. The secret consisted simply in treating his trees as well as every good farmer treats his corn and cabbages.

"But we cannot afford to give so much attention to our trees—the rich man only can do this," says the laboring farmer. What! not afford to be economical? The man of small means is the very person to save his trees after he has paid for them; he is the very man who should not spend his coin to have feeble and fruitless orchards. Let him buy half the number, and apply the other half of the purchase money in taking care of what he has, and he will soon become the gainer by the operation. It is however a great mistake to suppose that much expense is needed. Enriching the land is largely paid for by the heavy crops of potatoes, carrots and rutabagas which grow between the rows while the trees are small, and by the equally heavy and more valuable loads of ripe fruit profusely yielded afterwards. The expense of plowing once a year, and harrowing four times, is perhaps not half the first cost of the orchard, to say nothing of the annual crops afforded; while it soon renders it quadruple the value of the neglected plantation. Why do not farmers apply the same wit and wisdom to the management of their orchards, that they do to their corn and clover crops? Why should they not, when many who fortunately have already full grown orchards, get more in monied value from them than from all their farms besides.

The difficulty is rendered greater in most cases by the very inconvenient machinery used for plowing near the rows. A plow drawn with a two-horse team, with double whiffle-trees, cannot safely approach nearer than three feet to a tree, and every plowman dreads a task which is commonly attended with mutilated bark on one hand, and wide grassy "balks," on the other. A great improvement is made by placing one horse ahead of the other, with short single whiffle-trees, especially if the draught traces of the hinder horse are considerably lengthened to allow running to right or left.

A wide error is committed in cultivating orchards by those who forget that roots extend far beyond the circle measured by the branches.—The whole surface of the ground is covered by the net-work of roots, where full-grown trees stand 20 or 30 feet apart. The larger and more obvious roots, it is true, are near the base of the trunk; but all the finer ones, which so largely contribute nourishment, are spread at great distances. Hence all orchards which have made some years of growth, should have the whole surface cultivated and kept mellow, and not narrow strips or small circles just at the foot of the trees.—*Cultivator.*

FALLEN FRUIT.—Be careful to gather all punctured or decaying fruits, whether on your trees or on the ground, and give them to your hogs. If you do not, the worms which they contain,

and which have been the cause of their premature decay, will make their escape into the ground, and you will find the evils which await their visitations increase upon you another season.

FRUIT.—The Albany Journal says:—"We hear most favourable reports, in every direction, of the fruit crop. Within a range of twenty miles from this city, the prospect was never better." In New Jersey, peaches will be very abundant, and prices will consequently be low.

SOAPSUDS FOR THE GRAPE.—A. J. Downing says:—"I have seen an Isabella grape produce 3,000 fine clusters of ripened fruit in a single season, by the liberal use of manure and soap suds from the weekly wash."

The effect of soapsuds on other plants is sometimes surprising. A cypress vine which had remained stationary for a fortnight when about two inches high, immediately commenced growing after a good watering with soapsuds, and grew about six inches the first five days.

General Science and Miscellany.

BATHING.

There is scarcely any thing more conducive to health than frequent bathing.—By removing all obstructions to free perspiration, they open the pores of the skin and permit all extraneous matter, not congenial to health to escape. One great cause of sickness; of the sallow complexion, the jaundiced and bilious hue we so frequently meet, is the practice of keeping the body thickly wrapped during the close winter months, and neglecting those daily ablutions which are requisite to preserve the system in a healthy state. Bathing frequently in winter is requisite to comfort, and in summer it is absolutely indispensable. No family ought to be without its bathing tub. And, by the bye, we have a word to architects on the subject. Every house designed as a human dwelling should have a bathing room. This need not be a large and expensive apartment, such as would in any considerable degree increase the expense of the building—it may be merely a closet—five by seven feet would be ample, and if by opening from a convenient bed room, a still less size will answer the purpose. But at any rate let it be a bath if it be set in one corner of a room or a shed. No dwelling house can be regarded as properly furnished without one. The expense to poor families by whom bathing is quite as indispensable as rich ones, is, we know, in their estimation very considerable.

But even in these cases we believe it would be more than saved, in a single season, by their greater exemption from sickness, and the consequent lessening of the doctor's bill, which in many a poor man's family is often very great. A dozen calls of the doctor, with a few bottles of medicine, would engross the price of a good bath, and then how much better the members of the family would be in the increase of their health and vigour, and consequently on their strength for the performance of labor. The best bathing tubs cost fourteen dollars, but we have no doubt that if the demand were greater they could be afforded at a much less price. They are usually made of double tin and painted, but perhaps some cheaper material, or some means of construction might be invented which would render them more accessible to the poor. We have seen some very neat and convenient ones made of wood by an ingenious carpenter which might be purchased for about three or four dollars. These if well painted, and kept carefully cleaned, would answer the purpose, perhaps as well as the tin ones, only that the latter from their greater curvature of shape, require rather less water to fill them.

Let us repeat our advice to every individual to bathe frequently, and in giving such counsel we are contributing more to the health and happiness of mankind, than we could in forty lectures on phrenology, animal magnetism, or many similar topics of fashionable discussion.

A PASSING THOUGHT.

Rothschild is forced to content himself with the same sky as the poor newspaper writer, and the great banker cannot order a private sunset or add one ray to the magnificence of the night. The same air swells all lungs. The same kind of blood fills all veins. Each one possesses, really, only his own thoughts and his own senses. Soul and body—these are all the property which a man owns. All that is valuable in this world is to be had for nothing. Genius, beauty and love, are not bought and sold. You may buy a rich bracelet, but not a well turned arm on which to wear it—a pearl necklace, but not a pearly throat with which it shall vie. The richest banker on earth would vainly offer a fortune to be able to write a verse like Byron. One comes into the world naked and goes out naked; the difference in the fineness of a bit of linen is not much. Man is a handful of clay which turns rapidly back again into dust.

IMPROVED BEDSTEAD.—Mr. John W. Favor, of this city, has taken measures to secure a patent for an improved method of coupling bedsteads, and for an improvement on their bottoms. His coupling consists in having wedge protections on the posts, and metal boxes with wedge grooves secured on the ends of the rails, so that by inserting the projections in the grooves, the posts and rails become perfectly dovetailed together. The bottom of the bed is made of thin strips of metal interlaced.—*Sci Am.*

HORSES.—Flies are a great trouble to horses at this season. They will eat the skin off the inside of their ears, and then feed upon the flesh, producing a great deal of pain and uneasiness. This evil may be prevented by rubbing upon the inside of their ears a little grease or oil, which should be repeated occasionally.

THE SWORD AND THE PLOW.

BY F. BENJAMIN GAGE.

Far back in Time's departed years,
Ere earth was drenched in blood and tears,
Two brothers, from their father's hearth,
Went forth to toil upon the earth;
Each with stout heart and hardy frame,
And each in search of wealth and fame:
One was the Sword, with haughty brow,
The other was the humble Plough.

The Sword the fairest of the twain,
Was reckless, cruel, dark and vain;
A daring and ambitious youth,
The foe of virtue, peace and truth.
Forth from his father's hearth he sprang,
While far and wide his praises rang;
Yet mercy shuddered as he came,
And fled affrighted, at his name!

Men shrunk in terror from his wrath,
While cities blazed along his path!
Kingdoms into the dust he hurled,
And bound in chains a wandering world.
In every land in every clime,
He wreathed his brow with blood and crime,
Yet still the life-devouring Sword,
Was praised, exalted and adored.

As bold the humble Plough went forth,
But not to desolate the earth—
To counteract God's wondrous plan,
And swell the countless woes of man;
But with the heart and hand of toil,
To break the deep and fruitful soil—
To scatter wealth on every hand,
And beautify and bless the land!

He made the nations thrive in peace,
And swelled their stores with rich increase;
Bound the torn heart of want and woe,
And bade the land with plenty flow;
And scattered wheresoe'er he trod,
The golden harvest-gifts of God!
Yet even then and until now,
Men have despised the humble Plough.

Thus bow the nations to adore
The wretch who stains their hearts with gore!
And thus despise the nobler mind,
That toils to bless the humble kind;
Yet it shall not be so for "aye,"
For lo! there comes a brighter day,
When, through the darkness of the Past,
The sun of Truth shall gleam at last.

Then shall the carnage-loving Sword,
So long exalted and adored,
Sink in forgetfulness and shame,
'Till men shall cease to know his name.
Then shall the Plough, despised so long,
Be theme for universal song:
The first of all in Honor's van,
And noblest of the friends of Man!

ORIGIN OF HUMAN MALADIES.—John Abernethy the eminent surgeon, used to tell his scholars that all human maladies arose from two causes—stuffing and fretting.

THE RAVAGES OF INSECTS.

Such insects as Hessian and wheat flies, curculios, weevils, army and boll worms, annually destroy crops to the amount of twenty millions of dollars. If a pirate on the high seas, or an Indian savage on the land, injures the property of a citizen to the amount of a few dollars, millions are expended, if need be, to punish the offender. This is right. But when public enemies of a different name do a thousand times more injury to a whole country, are its citizens under any necessary restraint which forbids their making a common effort to protect their property from insect devastators?—Parasitic plants, such as rust on wheat, and many fungi, as well as injurious insects, are on the increase. To attempt to explain the reasons why this is so, would lead at once into questions in animal and vegetable physiology, out of place in this brief synopsis of such rural topics as are believed to be of general interest. It may not be amiss to remark, however, that many boys are apparently educated to kill all small birds that subsist mostly on insects, so soon as these youngsters are large enough to shoulder a gun.

Government can do much to check the ravages of insects, by collecting and diffusing useful information as to their habits, times of transformation, and the best means of destroying or avoiding them. If farmers fold their arms, and say that nothing can be done by the science of entomology, nor by any other means, what but an increase of the evil is to be expected? Not to *try* to escape the infliction, is treating one's enemies with unmanly forbearance, and evinces a belief in fatalism worthy a disciple of Mahomet.—*Patent-Office Report.*

POTATOE BREAD.—Take potatoes, boil them until thoroughly done, peel or skin them, and then mash them up as fine as they can be made. Add a sufficient quantity to your yeast and flour, make into dough and bake. This is not only more economical than the bread made of all flour, as it takes less flour; but it also makes superior bread, and one that continues soft much longer. The sweet potatoe makes a most delicious bread when thus used, and superior to that made by the common potatoe.—The toast made from this bread is much softer, sweeter, and superior to that from bread made in the ordinary manner. Sweet potatoe biscuit are excellent, but not so healthy as bread.—*Ex.*

NEW METHOD OF JOINING METALS.—Some interest has been excited by the experiments of a French gentleman, in London, who hasit is stated, discovered a method of joining, by some cement, pieces of metal together so firmly, that when exposed to a tensile strain, they will break through the metal rather than at the joint. Could such an invention be brought to bear practically, it would effect a complete revolution in works of metal.

THE PLANETS.

We have something more than the mere magnitude of the planets to alledge in favor of the idea that they are inhabited. We know that this earth turns round upon itself; and we observe that all those celestial bodies, that are accessible to such an observation, have this movement. We know that the earth performs a yearly revolution round the sun; and we can detect, in all the planets which compose our system, a revolution of the same kind, and under the same circumstances. They have the same succession of day and night.—They have the same agreeable vicissitudes of seasons. To them light and darkness succeed each other; and the gaiety of summer is followed by the dreariness of winter. To each of them the heavens present as varied and magnificent a spectacle; and this earth, the encompassing of which would require the labour of years from one of its puny inhabitants, is but one of the lesser lights which sparkle in their firmament.—To them, as well as to us, had God divided the light from the darkness, and he has called the light day, and the darkness he called night. He has said, let there be lights in the firmament of their heaven, to divide the day from the night; and let them be for signs, and for seasons, and for days and for years; and let them be for lights in the firmament of heaven, to give light to their earth; and it was so. And God has also made to them great lights. To all of them he has given a sun to rule the day; and to many of them he has given moons to rule the night. To them he has made the stars also. And has set them in the firmament of heaven, to give light upon their earth; and to rule over the day and over the night, and to divide the light from the darkness, and God has seen that it was good.—*Dr. Chalmers.*

CAPT. TAGGARTS FLYING MACHINE.

At Lowell, on the 4th, at 4 P. M,. Captain Taggart made a balloon ascension with his flying machine attached. He was up 1½ hours, travelled about 75 miles, and showed himself over Cracut, Tewksbury, Haverhill, Reading, Andover, Ipswich, Georgetown, Lawrence, Danvers, Methuen, Salem, and other towns. He also went some distance out to sea. On his way back to Lowell, at Middleton, the gearing to his flying machine broke. Had not this accident happened he would have landed in or near Lowell, where he started from.—Capt. Taggart has exhibited a great deal of energy on trying his experiments, although we have seen no balloon to satisfy us of the safe and economical feasibility of travelling through the air; yet may we not expect the next great invention of locomotives to be an ærial one—and such an one as will save the construction of railroads, steamboats, and all clamjamfry.—*Sci Am.*

French Cement.—Gum water thickened with powdered starch. It is used by the French naturalists and artificial flower-makers. It keeps for a long time. A little lemon juice is sometimes added.

Making Stone Fence.—With us the motto would be, whenever stones are removed from the field, put them into a wall. If ten rods cannot be made, make five, and the next time the field is plowed and more loose stone appear make five rods more, but do not throw them into the corners of the fence, nor into the street. As to the kind of wall, we should like to see posts with two wires connected with a wall. If boards are put upon the posts, the wind frequently moves the posts and injures the wall. We feel confident that a wall with wired posts may be made one-half a foot thinner than when boards are used, and yet be more durable.—The posts might be smaller, and the cost on the whole much less.—*Culturist and Gazette.*

To Cure a Felon.—Take one table-spoonfull of castile soap, mix them with as much weak lye as will make it soft enough to spread like a salve, and apply it on the first appearance of the felon, and it will cure it in ten or twelve hours.

Fall of Aerolites.—At a meeting of the London Astronimical Society, the following extract of a letter from Mr. Richardson, dated off Jerbah, 25th of January, 1850, was read: "I will trouble your lordship by the mention of the astronomic phenomenon which arrested or terrified the attention of the whole of this coast some two months ago. This was the fall of a shower of aerolites, with a brilliant stream of light accompanying them, and which extended from Tunis to Tripoli, some of the stones falling in the latter city. The alarm was very great in Tunis, and several Jews and Moors instinctively fled to the British Consulate, as the common refuge from every kind of evil and danger. The fall of these aerolites was followed by the severest or coldest winter which the inhabitanis of Tunis and Tripoli have experienced for many years."

Blackberry Syrup.—We are indebted to a friend for the following recipe for making blackberry syrup. This syrup is said to be almost a specific for the summer complaint. In 1832 it was successful in more than one case of cholera. To two quarts of juice of blackberries, add one pound loaf sugar, one-half ounce nutmegs, one half ounce cinnamon, pulverised, one-half ounce cloves, one-fourth ounce allspice do. Boil all together for a short time, and when cold, add a pint of fourth proof brandy. From a teaspoonful to a wine glass according to the age of the patient, till relieved, is to be given.

To Decoy Rats.—Mix a shillings worth of Spanish flies in a pint of the best French brandy, cork it well, and after shaking, let it stand six weeks, and it will be fit for use. A few drops of this liquid is said to entice he rats from their holes into any kind of trap.

Subsoil Ploughing.—A correspondent of the *Agricultural Gazette* says he formerly made a point of ploughing at least ten inches deep when preparing for turnips; but he is more successful in growing them by keeping the manured soil near the surface, and loosening the substratum with the subsoil plough, going about seven inches deep with the first plough.

Editor's Notices, &c.

TO OUR EXCHANGES.

We request our contemporaries of the Press, to copy the regulations of the approaching Provincial Exhibition inserted in the present number, for the information of the country at large.

TO CORRESPONDENTS.

T. S.—A full reply to your questions would require more space than we can spare at present. Much of the success attendant on the cultivation of root crops, depends on frequently and thoroughly stirring the soil, thereby keeping down the growth of weeds, and enabling the soil to absorb moisture from the air and subsoil. Deep and frequent cultivation by the plough, or horse hoe, is more needed in dry seasons than in wet. Plants will thus be better enabled to resist the effects of drought, and will extend their roots deeper and wider in search of food. A slovenly culture of root crops, as indeed of all others, will be sure to end, more or less, in disappointment and failure.

NEW WORK ON COLONIZATION.

We observe that JAMES FITZGERALD Esq, of this City, has in the press a work in which some new and important principles are developed for the Colonization of the wild lands of Canada, by families from the mother country. Mr. Fitzgerald's plan has been very favorably noticed by the Provincial Agricultural Association, and also by the Niagara District Agricultural Society. The object of this publication, in whatever light it is considered, is one of paramount importance; and we hope the author will not fail to receive, both from the government and the public, that degree of attention, which the nature of his theme most certainly demands. The work will be published in Demy 8 vo., 64—70 pages. Price to Subscribers, 2s. 6d. per copy.

GRANTS TO THE PROVINCIAL AGRICULTURAL ASSOCIATION.

The Inspector General recommended, and the Parliament has allowed a liberal grant of £600 towards this institution, for the present year. A similar sum, we are glad to hear, has also been granted to the Agricultural Society of Lower Canada. This is as it should be. We hope that the farmers, and public generally, will zealously second the praiseworthy efforts of the Legislature, in advancing the Agricultural, and other industrial interests, of this young, but rapidly improving country. The chief thing required is UNITED effort. We learn that the following grants have been made already by agricultural Societies, to the Provincial Association: County of York, (Home District) £30, Kingston, (Midland District, £25; County of Haldimand, £25, County of Middlesex, £25, and the town of Niagara has subscribed £300. Other Societies will no doubt follow their example.

ADELAIDE ACADEMY.

We are requested to state that the next term of Adelaide Academy, conducted by J. Hurlburt, A. M., and Lady, will commence on the 2nd of September. This Academy, for the education of Young Ladies, has now been in existence some eight or ten years' first in Cobourg and the last three years in Toronto, and is well known to the public. The course of study, as can be seen from the circular of the Academy, is perhaps more extensive and complete than in any other Ladies' Academy in the country.

THE CROPS, MARKETS, &c.

The wheat harvest in most parts of Upper Canada is now fast drawing to a close. In many sections of the Province, the crop is unusually heavy, and we have heard of none in which it is below an average. The late heavy rains have done injury in some localities, particularly in the northern parts of the Home District, causing the wheat to sprout in the ear; but in the west and south, we hear few complaints in that respect. The heavy storms and rains, however, with which many parts of the country have been visited, for the past two or three weeks, must affect, to some extent, the colour and quality of the grain; but we have now good reason to hope that the injury will not prove near so disastrous as was at one time apprehended. In fact we learn from some counties, that the wheat has been housed in good condition. In a showery season like the present, which, by the bye, is not at all common in this country, more care should be taken in putting wheat into shock, and by "hooding" the same with inverted sheaves,—a good old-country practice—the rain rapidly runs off. Wheat that has suffered from wet, or is carted in a damp state, should be put into small ricks; the air and frost will afterwards bring it into grinding condition. We have already seen several fine samples. The Hon. Adam Fergusson sent us, the latter end of July, a specimen of some heavy, plump, and bright wheat, grown by himself, near Hamilton; and Mr. Richey, of Carlton Place, Bathurst District, left at our office a bunch of very superior *Northern Flint*, a variety which he has successfully cultivated for three or four years.—We learn that the crops East are heavy upon the whole; and that spring grain, owing to the frequent rains will prove much better than was at one time expected.

In the States the wheat harvest has been completed, and the crop must be considered, upon the whole, abundant.

Our latest advices from Europe (July 27th) continue encouraging; and all kinds of grain are represented as highly promising throughout the United Kingdom. The potato disease, however, having now decidedly manifested itself, both in England and Ireland, an effect had been produced upon the grain market, and prices may be considered as improving. Flour had advanced 6d. a barrel; wheat 2d. per bushel; and Indian corn 1s. 6d. a 3s. per quarter. A sudden advance had taken place in the price of wheat in France. Much anxiety will be felt till the harvest is concluded, and the probable extent of the potato failure determined.

In the Toronto market the business transactions for several weeks, have been on a very limited scale, as is usual at this season of the year. Prices are at present nominal, with a downward tendency. How they will ultimately range must depend upon the amount and quality of our growth, and the state of foreign demand. We would advise our readers not to be precipitate in forcing their grain upon the market—take breathing time, and watch the progress of events. It is always a safe rule to sell when prices are remunerating. We fear that Canadian Farmers will continue to bear the 20 per cent American duty against them. Surely this monstrous anomaly cannot endure much longer, if British Connection be anything more than a mere name!