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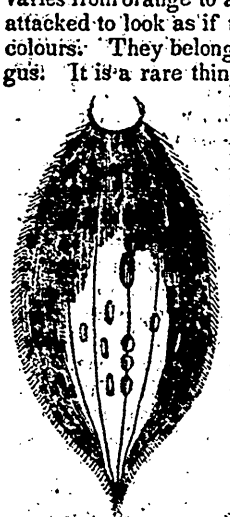
NEWCASTLE FARMER.

VOL. II.—NO. VIII. COBOURG, APRIL 1, 1848. THOS. PAGE,—EDITOR.

BLIGHTS OF THE WHEAT.

CHAPTER III.

In pursuance of the plan announced in the first chapter, attention will be next directed to the fungi found on the leaves and chaff-scales of the wheat-plant. They are different in appearance from *puccinia*, but one of them sometimes affords reason to suspect that it is in nearer alliance with it, than has hitherto been imagined by botanists who have observed the two separately. These fungi are called *uredines*, the plural of *uredo*, which is a term derived from the Latin word *uro*, to burn, because the discoloration of the parts of plants affected by them produces a burnt appearance. The uredines are chiefly found on the young or old leaves of corn-plants, and occasionally on the stems; but, in the last instance, it has been surmised that the indications similar to uredo are only immature forms of puccinia. We shall soon have to advert to this point. There is no stage of growth in which the wheat-plant is free from the attacks of a uredo. Early in the spring it is found on the young blades; and this year (1846) it was in such quantities in some districts, that the fields looked quite yellow with it, and at one time it produced much alarm. Later in the season, it often abounds in the glumes and paleæ of the ear, even after the grain is formed. These yellow or orange uredines are of two kinds. One of them, from the oblong form of its spores, is called *uredo linearis*, the other *uredo rubigo*, whose spores are nearly spherical. *Uredo rubigo* means red rust, and no name could possibly convey a truer idea of its appearance. Both these uredines are closely allied to the rust on the leaves of rose-trees, called *uredo rosæ*. Their colour varies from orange to a brownish hue, and they cause the parts attacked to look as if they were dusted with rustiness of these colours. They belong to the order *coniomycetes*, or dusty fungus. It is a rare thing to find any wheat-field altogether free from them at any season of the year. When the chaff-scales are attacked, the spots look exactly as they are represented in the one here drawn, and the matter forming them exudes like a red gum from the inner surface. Hence, red-gum is a name sometimes given to it; but it is most frequently known as red-robin, red-rust, or red-rag.



Chaff-scale affected by red-robin, highly magnified.

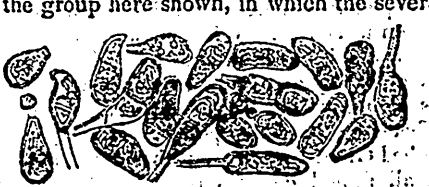
The chaff-scale delineated here, gives no further indication of the character of this fungus, than the manner in which it comes out and spots the parts of the plant where it vegetates. To see the form of the spores requires a very high power of the microscope, by which it may first be viewed as an opaque object, and then a small bit should be scraped off and treated in the way described in the case of *puccinia graminis*. The spores will appear of the forms accurately exhibited in a drawing by Mr. Leonard, from a specimen given him by the author to examine and figure. The fine threads of the *mycelium*, or spawn, are extremely well shown. Thus magnified, the organization of these fungi is perceived to be beautifully delicate, and the red gummy powder is found to be composed of innumerable spores growing from the spawn-threads, as here represented.

Spores of uredo, magnified 240 diameters, showing the *mycelium*.

The botanist therefore becomes completely acquainted with the distinctive character of the uredo by the aid of the microscope, while the vegetable physiologist is enabled to form an opinion on its peculiar habits and modes of growth. The real habits of this common disease of the wheat-plant, are no longer veiled by inaccurate observations, or popular imaginations. The mystery is cleared up, and the cultivator who has often witnessed the discoloration of his crops by this fungus, without any real knowledge of its nature, may now become thoroughly acquainted with the object of his frequent surprise and annoyance.

Very often, as happened in the spring of 1843, and in that of the present year, 1846, the corn-fields have seemed quite to droop under the influence of this parasite. The aspect on such occasions is so sickly as to create serious alarm. But the arrival of a few bright warm days soon dissipates the evil. The genial beams of the sun seem completely to vanquish it, so that it disappears in an astonishing manner, and a healthy greenness speedily succeeds to the sear and yellow tints that have disheartened the farmer. The fact is, that when the sun dries up the superfluous moisture, the fungus cannot spread, and health returns. It reminds us of the moral maladies which disappear before the light of truth.

We will now proceed to notice the opinion of certain eminent botanists, that *uredo rubigo* and *uredo linearis* are only imperfect forms of minute fungi, which, in their perfect state, are known by other names. For example, it is said the uredo of the rose passes into a condition called *aregma*. So it is considered by professor Henslow, an eminent and most judicious observer, that uredo in the corn passes to *puccinia*. He published an able paper in the "Agricultural Journal" for 1841, on what he designated "the Specific Identity of the Fungi producing Rust and Mildew;" and his arguments are ingenious and well worthy of perusal. The point is considered by him as fairly established by observation of certain intermediate forms, confirming their connexion and proving the identity of their origin. With regard to these appearances, the author desires to state that, in the autumn of 1845, he found in a wheat-field many specimens of yellow-looking blotches on the straw, which seemed to confirm the professor's opinion. Examination by the aid of his own microscope, revealed forms similar to those drawn and described in the paper recently alluded to. He placed a specimen in the hands of Mr. Leonard, requesting him to observe and delineate what he saw. The result was the group here shown, in which the several stages



Various forms of the spores of the wheat mildew of 1845, magnified 240 diameters.

suspected as existing may be seen. It looks certainly like a case of transition. All, however, that the author can as yet venture to assert is, that some puccinia have clearly the appearance of uredo before the *septum*, or division of the spores into chambers, is fully developed. In a splendid figure by Corda, these various forms are given with great effect as they burst the epidermis; and the drawing of that incomparable delineator of fungi confirms the opinion that the last observation is the one that is safe and accurate. Questions of this kind will be viewed at first sight as purely botanical, though they certainly tend ultimately to the combination of science and practice. For if certain parasitic fungi, hitherto supposed to belong to genera entirely distinct, can be shown to be specifically identical, there will be a reasonable expectation that any remedy or palliative discovered for the disease in one stage, will preclude the necessity of seeking a different corrective in another. Rust and mildew may then be checked by a common treatment. More observations are, however, still required on this curious subject. A remark from Professor Henslow is worthy of notice. He says that the rust seems to be more common and more dreaded on the continent than the mildew, whilst with us the mildew is considered a far greater pest than the rust. "Is it," he adds, "that our climate is better suited to the more complete development of the spores of these parasitic fungi, and that our continental neighbours are more rarely favoured with the opportunity of seeing them in their most perfect form?"

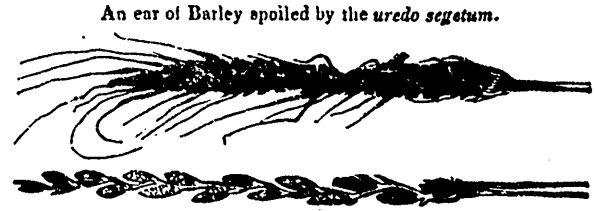
The rust is perhaps the least alarming in England of all the parasites attacking the wheat. Unquestionably it passes off in the way described more readily than any other; but when that beneficial influence of sunshine is not effectually exerted, a deterioration of the crop takes place. When it is found in later stages of growth, and on the glumes and paleæ of the chaff, it is more injurious than when it merely appears in the earlier periods of growth.

This is the proper place for a few remarks on certain other fungi, not so common as the red-rust, or red-robin, which are occasionally found on the leaves of the wheat plant. One of these is the *erysiphe graminis*, almost universal on it in 1846, but which did not seem to do much harm, and upon which therefore there is no need to enlarge. On the continent, there are two species of moulds which are extremely curious, and one of them is fearfully destructive. The former, called *chionyphe*, from its being developed during snow, was discovered in Iceland, by Thieneman. Two other species have since been seen in the neighbourhood of Dresden, where they were abundant. This singular mould is found on the snow, when it just melts before the sun, without any general thaw. It consists of spreading shining fleecy patches, and the reproductive portion of it is sometimes red and sometimes green. As soon as the snow melts, it appears on the young herb in a stratum resembling a cobweb of great delicacy, which is not of long duration. It is most likely due to the existence of some animal matter in the soil, and is extremely remarkable; though by reason of its vanishing so quickly, not attended with disastrous results.

Not so the other, called by Unger *Lanosa Nivalis*, with reference also to its coming in time of snow. Unlike the last, this fungus is developed beneath the snow, and is excessively injurious both to grass and corn. During the spring of 1846, a description of it was published in the "Gardener's Chronicle." It appears in white patches, a foot, or even more, in diameter, tinging the snow with a red hue, arising from the spores of the fungus, which are of this colour. When a spore is greatly magnified, the coloured contents are very perceptible. A completely withered plot is left behind, wherever this fungus has run its course. When snows have come on without previous frosts, it has been known to destroy whole crops, particularly of barley and rye. In places where it prevails, the farmers plough up the frozen surface, so complete is the mischief effected on the young plants. Happily for us, it has not yet reached Great Britain; but that it will not, no one can predict, for all fungal diseases are very alarming, and may appear when least expected, especially in a climate where the seasons vary as they do in ours.

The next parasitic fungus is the one which so materially affects the flower of the wheat-plant, and which has in many

An ear of Barley spoiled by the *uredo segetum*.



An ear of Wheat spoiled by the *uredo segetum*.

places prevailed most extensively this summer, 1846. It is much more minute than those previously described. The name given to it by botanists, is *uredo segetum*. Farmers call it by various appellatives, as "smut, dust-brand, bunt-ear, chimney-sweeper;" the last designation evidently arising from its looking exactly like a coating of soot adhering by some gummy substance to the young ear.

It reduces the ears both of wheat and barley to the condition figured in the drawings, and has the same effect upon oats. The black masses of sooty powder are the spores of the fungus which are here delineated, magnified 375 diameters.

Spores of *uredo segetum* in wheat, magnified 375 diameters.

Spores of *uredo segetum* in barley, magnified 375 diameters.

The specimens from which these drawings are made, were gathered by the author in the summer of 1845. The ears were, in both cases, completely ruined. Some farmers say they like to see a little of it, because it is always accompanied by a good crop. Certainly, as professor Henslow well observes, the "little" can only be, with any propriety, on the principle of the less the better. Undoubtedly every ear attacked is destroyed, as is evident from the first instant it emerges from its hose, or sheath. The extreme smallness of the spores of this fungus may be inferred from the drawings, but still further from M. Bauer's investigations. He says the one hundred and sixty-thousandth part of a square inch contained forty-nine of them. Hence he calculates that not less than seven millions eight hundred and forty thousand would be required to cover a square inch English measure. It has, indeed, been a question with some persons, whether these appearances are not due to a mass of diseased cells, and that they are not fungi at all. But the answer to this is, that diseased cells would not germinate, which these uredines unquestionably do. There is no apparent difference, generally speaking, between the spores of this uredo in wheat and barley; but there is certainly a degree of dissimilarity in those delineated in the figures before us. This is probably due not to the difference in the fungi themselves, but to the matrix where they grow; and there is great reason to believe that the produce of fungoid matter does vary in this manner, and even to a greater extent, with the peculiarities of the matrices by which they are nourished. If the spores of this uredo are so small, what must the sporules be as to dimensions? The highest imaginable power of a microscope could only be expected to exhibit them as a vapory cloud. The next question is, how the fungus acts upon the part of the plant which it principally affects.

When the plant is attacked by this fungus, the first injuries are found upon the interior portions of the flower, which render it completely abortive. In a short time afterwards, the *pedicels*, or little stalks, to which the florets are attached, swell and look hard and fleshy. At length the whole is consumed; and the ear, particularly in the case of wheat, becomes dismantled of all its reproductive organs, and the remainder is powdered over with the before-mentioned black, dusty smut, which has a most disagreeable appearance. In all specimens

the author has ever seen, the fungus has been visible only in the ear. M. Bauer, however, states that it has been found in some other portions of the plant. These instances are certainly very rare, and have been noticed by scarcely any observers. In some seasons, immense quantities of it may be seen, during summer, in the corn-fields, long before the rest of the grain reaches maturity. All these ears are, as we have said, destroyed by it, and therefore the amount of crop greatly diminished. But as its spores are scattered to the winds for weeks before the ripening begins, the farmer scarcely sees it during the harvest, and consequently thinks but little about it. This is probably the true solution of the prejudice in its favour.

There is every reason to believe that the fungus enters the plant by means of its sporules being so small that they find access with the ascending sap, by the spongioles of the roots. With this sap the spores circulate, and are developed as has been described. Some difficulty attends this view; but it will be partly cleared up in the next chapter. There, also, allusion will be made to the remedies which are common to this and the parasite to be next described.

A LITTLE FARM, BUT GREAT PRODUCT AND PROFIT—HINTS TO FARMERS.

We are enabled by favor of the Secretary of the American Institute, to publish the following interesting extract from the forthcoming Report of that Institution:

New York, Feb. 20, 1848.

T. B. Wakeman, *Esq., Sup. Ag't Am. Ins.*

Dear Sir,—Circumstances have recently brought within my observation the situation and condition of the Bloomingdale Asylum.

The Asylum has 40 acres of land, 10 of it in wood. Including buildings and immediate enclosures, perhaps about 30 acres under cultivation, as garden and farm. I was so much pleased, and in particular with the management and produce of this branch, and thought it so honourable to the Governors of the Hospital, that I sought for and obtained a copy of the summary of its debtor and creditor amount. I hasten to communicate the sum to you, believing it will be an *exhibit* of great usefulness to the American Institute. It illustrates the benefits and the profits which will arise from the proper care and cultivation of the soil; it shows what you may expect to accomplish if the Legislature, in its wisdom, should grant the petition of the American Institute, to establish an *Agricultural School and Experimental Farm* near this city.

I think the *exhibit* enclosed is a volume of very useful information. It is *seed*, from which, with suitable *cultivation*, Agriculture may raise very profitable crops.

Truly yours,
JAMES TALLMADGE.

Statement *of the Products of the Bloomingdale Asylum Farm of* 30 *acres under cultivation, with the market value, for* 1847:

HAY, MILK, &c.

40 tons Hay at $10 per ton	$400 00
1296 pounds Pork at 6 cts. per lb.	77 76
663 pounds Butter at 25 cts. per lb.	165 75
4488 gallons Milk at 16 cts. per gallon	718 00
303 dozens Eggs at 1s. per dozen	37 98
150 pounds Poultry at 6 cts. per lb.	9 00
Total	$1,408 47

FRUITS.

200 bushels Apples at 50 cts. per bush.	$100 00
20 bushels Pears at $1 per bush.	20 00
150 bushels Cherries at $1 per bush.	150 00
25 bushels Currants at $1 per bush.	25 00
15 bushels Peaches at $1 per bush.	15 00
1200 pounds Grapes at 6¼ cts. per lb.	75 00
8 bushels Strawberries at $2 per bush.	16 00
Total	$401 00

VEGETABLES.

900 bushels Potatoes (sound) at 75 cts. per bush.	$675 00
180 bushels Sugar Beets at 37½ cts. per bush.	67 50
100 bushels Blood Beets at 50 cts. per bush.	50 00
460 bushels Turnips at 31¼ cts. per bush.	143 75
28 bushels Carrots at 50 cts. per bush.	14 00
120 bushels Parsnips at 50 cts. per bush.	60 00
45 bushels Onions at 75 cts. per bush.	67 50
150 bushels Corn at 37½ cts. per bush.	56 25
20 bushels Egg Plants at 50 cts. per bush.	10 00
125 bushels Radishes at $1 per bush.	125 00
120 bushels Beans at 50 cts. per bush.	60 00
65 bushels Peas at 75 cts. per bush.	48 75
75 bushels Pumpkins at 37½ cts. per bush.	28 12
130 bushels Squashes at 37½ cts. per bush.	48 75
210 bushels Spinach at 75 cts. per bush.	157 50
40 bushels Asparagus at $3 per bush.	120 00
140 bushels Tomatoes at 50 cts. per bush.	70 00
100 bushels Cucumbers at 75 cts. per bush.	75 00
1 bushel Nasturtions at $2 per bush.	2 00
4 bushels Peppers at 75 cts. per bush.	3 00
52 bushels Rhubarb at $2 per bush.	104 00
75 bushels Citron Melons at 10 cts. per bush.	7 50
2500 heads Celery at 3 cts. per head	75 00
3000 heads Cabbages at 4 cts. per head	120 00
1000 heads Leeks at ½ ct. per head	5 00
2000 heads Salsify at 1 ct. per head	20 00
4000 heads Lettuce at 2 cts. per head	80 00
Total	$2,293 62

Farming Department in account current with Bloomingdale Asylum,

To* Farmers' Wages,	$781 00	By am't Vegetables	$2,293 62
" Board	520 00	" Hay & Milk	1,408 47
" Implements	20 80	" Fruit	401 00
" †Manure	311 00	" Live stock sold	178 00
" Live Stock purch'd	191 38		
" Grain, feed, &c.	295 64	Total	$4,281 00
" Balance	2,251 27		
Total	$4,281 00		

Will the mass of our Farmers never learn the lesson here so plainly taught? How many of them have been skinning one to three hundred acres all their lives, their lands growing poorer and they no richer, who, when exhorted to mend their ways, make answer, "Oh, I would farm better, if I *only had money enough* to buy manures, hire help, &c." Why, Sir, why *won't* you see that you should sell half, three-fourths, or even seven-eighths of your land, if need be, *until you have money enough* to cultivate what is left thoroughly, though it be but a patch of four acres? Those, well tilled, will produce more than a hundred used in the miserable old way.—*N. Y. Tribune.*

DOMESTIC ECONOMY IN COOKING FOOD FOR MILCH COWS.

Next to our inability to obtain the greatest amount of produce from a given space of land, is the loss in domestic economy by an injudicious appropriation of that produce. We look on foreign competition in our grain market as an evil, forgetful that such competition enables us to support our poor at a cheaper rate than, under present circumstances, we can do with our produce. Let us but once raise from our land the greatest amount it is capable of producing, with the least possible expense—which can be done by skilful labour, when the people will be properly instructed, and which cannot be surpassed in quality in any other country, and more cheaply than such can be supplied to us by foreigners—and we will soon have our markets remunerating, because our producers, as consumers, will be found our best customers, and thus keep in our country that which we now must pay strangers for, feeding their people while at *work*, profitable to them, in pro-

* 5 in summer—2 in winter.
† Purchased (in addition to that made on the Farm.)

ducing food for our people while *idle*, and, as a consequence, ruinous to us.

To obtain the greatest amount of nutriment from a given amount of any ordinary food, whether for man or beast, that food must have undergone a chemical change, by which the greatest amount of residue, if we can use the expression, is converted into flesh, fat, milk, or butter. To discuss these subjects in a purely scientific manner, would be quite beside our province, if in our power to do so, and when done would, perhaps, be little understood by the class for whose instruction we write; we will, therefore, confine our remarks to a few practical details, and a few familiar illustrations.

Every poor housewife, who has reared a family, knows that gruel, broth, or boiled food, whether animal or vegetable, when used by a nurse, will produce more food in its mother's milk for an infant, than if such food consisted of dry bread, corned beef, or raw vegetables; and every lady who has employed a nurse must know that the doctor will advise giving the nurse XX to drink; so it is with the animals of the farm, where the greatest amount of milk is expected the food that will best produce it must be reduced to liquid, and, in some cases, a slightly fermented state, to be productive of the best results.

We have found that from 2½ to 3½ stones of good oats, or from 2 to 3 stones of barley per week (if malted so much the better), and prepared as we shall hereafter describe, will produce an amount of milk in cows, of ordinary capacities, of sufficient quantity, and valued at 6d. per gallon over what would be produced by such cows if fed on hay and ordinary grass, after all expenses in cooking, as would pay for the oats at 1s. to 1s. 2d. per stone, and for the barley at from 1s. to 1s. 3d. per stone, and if, by reducing the quantity of oats or barley, say one-fourth to one-half, and by adding from one-fourth to one-half the usual quantity of mangel-wurzel, or carrots, or parsnips, half boiled or half steamed, and bruised or crushed, the results would be still better, because the latter food can be grown so much cheaper, and because, also, it is less saleable at market. Thus, say at the rate of from one and a half to two stones of carrots or parsnips, and from three to four stones of mangels per day, for a medium or large sized milch cow, with the proportionate amount of barley or oats, as already stated, will increase the milk of such a cow, in some cases, over 100 per cent. more than she would give if fed on dry hay, in the ordinary way; besides, there will be a saving of one-fourth, at least, of the usual quantity of hay consumed, by cutting one-half of it, and mixing it in the compound about to be made up. The process is simply this:—chaff the hay, bruise or rather cut the grain, and crush the roots; get them all into a large tub or keeve, wooden box or metallic implement, and pour in boiling water over them; cover the entire up closely, so as to keep in the steam, and, at the end of two hours, let off the liquid; apply fresh boiling water, which, covered, let stand two and a half hours more; draw off the liquid again, apply fresh boiling water, and cover as before; at the end of three hours draw off the liquid again; apply fresh water and cover up, and let it rest so till next morning; then draw off, and mix all together, and let it rest from thirty-six to forty-eight hours before being used, when a beverage of three bucketfuls, or 15 gallons, will be had for each day, a bucketful at each of their feeds—those at morning and at night—given before milking, and a bucketful will also be had for a mid day feed, and a bucketful of the grains, so called, to give at night, when the stalls are being made up; a little hay to be given after each feed of the liquid, and also at night—good sweet straw will do in the latter case; it will do in every case where a saving of hay is an object.

In thus feeding milch cows each should exercise his own judgment, according to the different circumstances that each must be governed by, always bearing in mind the strict principle of economy. If the object be to increase flesh and fat, the cooked food could include turnips, oil-cake, linseed-meal, bean or pea meal, or Indian corn, boiled or crushed, and steamed.

Such of our practical friends as will adopt these suggestions, we are sure will improve on them according to their circumstances; we will be most happy to hear of such, and if we can further aid them, need we say our greatest pleasure will be, to have it in our power to do so.

THE PRINCIPLES AND EFFECTS OF DRAINING.

A superabundance of water on the surface of bogs, fens, and marshes, is so obvious a cause of great and manifold evils, as not to require explanation; yet it operates, in many respects, quite as leniently as an excess of moisture in the cultivated land of peopled districts. "The water which is retained under the soil on impervious layers of earth," remarks a writer in the *Quarterly Journal of Agriculture*, "effects incalculable mischief. While hidden water remains, manure, whether putrescent or caustic, can impart no fertility to the soil; the plough, the harrow, and even the roller, cannot pulverize it into a fine mould; the grass can contain no nutriment for live-stock, as the finer sorts disappear, and their places are usurped by coarse aquatic plants; the stock can never receive a hearty meal of grass or straw from land in such a state; they are always hungry and dissatisfied, and of course remain in low condition; the trees acquire a hard bark, stillened branches, and soon become the prey of innumerable parasites; the roads in the neighbourhood are constantly soft and rutted; the ditches and furrows are either plashy or like a sponge full of water,—suitable receptacles for the newt and the frog; the circumambient air is always damp and chilly, and from early autumn to late in spring, the raw hoar-frost meets the face like a wet cloth, morning and evening; in winter, the frost incrusts every furrow and plant with ice, not strong enough to bear one's weight, but just weak enough to give way at every step, while the snow lies lurking in crevices behind the sun till late in the spring—fit feeding-ground of the woodcock and snipe; and in summer, musquitoes, green flies, midges, gnats, and gadflies, torment the cattle, the labourer, and his horses, from morning to night, whilst the sheep get scalded heads and eaten up by maggots during the hot blinks of sunshine." Yet dismal and horrible as is this catalogue of evils, it does not point at one half of the principles on which draining operates, or name one half of the calamities which it conquers or repels.

The excessive humidity of our climate, particularly throughout all Ireland and the western parts of Scotland and England, might suggest the probability of draining being as requisite for the corn-fields of our country as irrigation is for the rice-fields of the tropics. An excess of either moisture or drought is seen by all observers to injure most cultivated crops; and an excess of humidity in one set of climates, corresponding to an excess of aridity in another set, might seem to the most unreflecting mind to be a provision of the all-wise and all-beneficent Creator, to provoke man to the exercise of forethought, prudence, and healthful manual labour. Farmers cannot control the clouds of either a dry climate or a wet one; but they can, with comparative ease, supplement the former's deficient supplies of rains by irrigation, and draw off the latter's excessive supplies by draining. "It is the nature of the climate, then, that regulates the necessity for draining; and as the humid seasons greatly outnumber the dry ones in this country, we must therefore adopt that necessity. Had our climate been like that of Italy, not only no draining would have been in general necessary, but our rivers, like hers, would have been directed into channels to irrigate our lands, in order to preserve to them that pleasant verdure in the height of summer, on which the eye gazes with so much delight, amid the rich luxuriance and the plains of Lombardy."

Plants of different species have wide differences of constitution for relishing or disliking moisture, as well as for enduring extremes of heat and cold; and, with very few exceptions, such plants as agree with much moistur contain exceedingly little of the elements of nutrition for either man or beast.—Through succulent aquatics, such as can thrive in the presence of constant surface water, are chiefly sphagnums, hypnums, algæ, cotton-grasses, and other cryptogams and worthless phenogams, fitted only to accumulate themselves into the substance of bogs, fens, and morasses; and the less decided aquatics, or such as thrive only above subsoil water or with but the

occasional presence of surface water, are chiefly rushes, sedges, coarse bents, and other tall and bulky herbage, large-rooted, and usurping enough to prevent the growth of fine grasses, and consisting principally of elements and secretions which the stomach of no domestic animal can digest. The draining of morasses, therefore, brings them into a condition for producing land plants; the draining of wet grass lands disposes them to exchange their coarse herbage for the finer grasses; and the draining of corn fields deters them from giving a coarse aquatic character to their produce, and enables them to bear their crops in the manner of superior fertility. "On drained land," remarks Mr. Stephens, "the straw of white crops shoots up steadily from a vigorous braird, strong, long, and at the same time so stiff as not to be easily lodged with wind or rain. The grain is plump, large, bright coloured, and thin-skinned. The crop ripens uniformly, is bulky and prolific, more quickly won for stacking in harvest, more easily thrashed, winnowed, and cleaned, and produces fewer small and light grains. The straw also makes better fodder for live stock. Clover, in such land, becomes rank, long, and juicy, and the flowers are large and of a bright colour. The hay from it wons easily, and weighs heavy to its bulk. Pasture-grass shoots out in every direction, covering the ground with a thick sward, and produces fat and milk of the finest quality. Turnips become large, plump, as if fully grown, juicy, and with a smooth and oily skin. Potatoes push out long and strong stems, with enlarged tubers, having skins easily peeled off, and a mealy substance when boiled."

Both soils and subsoils have wide differences of capacity for moisture, so that a degree of humidity of climate which is eminently fertilizing to one kind of land, may produce a great excess of moisture upon another. Humus, clay, and chalk readily absorb moisture to the degree of saturation; and when they are presented with more than a saturating dose of it, they retain it as if they were vast beds of minute sponges, and as completely prevent its percolation as if they were strata of tallow or of metal; while silicious sands and gravels, on the other hand, can receive none of it into their granules, and allow it to percolate amongst them with all the freedom of a rapid and constant filtration. Soils of humus, clay, or chalk, therefore, if not freed from an enormous proportion of water by drainage, will necessarily produce nothing but aquatic plants in climates which naturally enrich and fertilize arenaceous soils; and substrata of clay or chalk, especially substrata so high as to sustain the relation of immediate subsoils, if not constantly tapped and fissured by the action of drains, will so arrest the descent of the water of prolonged or heavy rains, as to cause the repletion and drowning of even sandy surfaces. The composition and structure of the earth's crust, also—the great number of its materials, their diversity, their mixture, their differences of mechanical condition, their geognostic relations, the disturbed connexions of alluviums and rocks, of strata and crystalline protrusions—occasion amazing differences and sudden transitions of retentiveness and porosity, rendering one place thirsty and insatiable, and another spouty and disgorging, and sometimes producing as great and unconquerable a necessity for artificial drainage on the farm, as for natural drainage at the sources of rivers. But we reserve a full view of the saturating of land from springs and subterranean stagnations to the sections on respectively strata-draining and subsoil-draining.

The natural or artificial stagnation of considerable bodies of water frequently occasions, not only the loss to cultivation of the extent of surface which the water covers, but a very mischievous excess of moisture in circumjacent cultivated land. Lakes and ponds, in many instances, are so shallow and cover such beds of rich alluvium, that the draining of them is one of the cheapest and easiest possible methods of obtaining an accession of good land; and even some lakes and ponds which are deep, and which cover rocky, gravelly, or otherwise barren bottoms, are, in some instances, the causes of such wide-spread wetness and spoutiness of both soils and subsoils, that the draining of them is well repaid by the permanent drying of the surrounding lands. The water of ditches which surround fields, also, particularly of such as extend along the highest side of the fields, often finds its way downward into the porous parts of the subsoil, oozes up to some parts of the surface of the fields, and effects, in wet weather, as great and mischievous discharges and plashiness as the outbursting water of a strong perennial spring. The water of dams, large surface drains, and small confined rivulets, whenever flowing along a higher level than that of adjacent fields and meadows, is likewise a frequent cause of considerable local wetness of land; and may be pointed out as a species of drainage which itself requires draining, and as illustrating the necessity of maintaining all sources of water, whether natural or artificial, at a lower level than the proper seat and aliment of plants in the adjacent lands.

The drying of land by draining produces a most powerful effect upon the food of cattle, exterminating noxious aquatic plants, improving the quality of the finer grasses, vastly increasing the amount of nourishment, and occasioning an agreeable dryness and a palatable flavour in both roots and leaves. Grass lands which were formerly wet, poached, and rushy, become thickly carpeted with fine nutritious grasses, maintain a greatly increased number of sheep and cattle, prevent the sheep from being attacked with rot, render the cattle good-tempered and kindly, and occasion the flesh of both sheep and cattle to be greatly improved in points and flavour. "In the southern districts of Scotland, particularly in the counties of Berwick, Roxburgh, Selkirk, and Peebles," said Sir John Sinclair in 1817, "most of the principal sheep farms have been very much drained, and the consequence is, that the size, quality, and healthfulness of the stock in these districts have been thereby so much improved as appears almost incredible to those who were acquainted with the former state of sheep-farming in those parts. In many of these farms, the rent has increased fourfold, and the rot is now hardly known." Even the stiffest and most retentive clay lands, such as, with slight or imperfect draining, would be thoroughly poached by cattle, and would bring a pestilence of rot upon sheep, may, by a process of complete subsoil-draining, be rendered excellent turnip soils, perfectly healthy for all live stock, and capable of being folded or fed off by sheep in either summer or winter.

The texture of wet land multiplies the labours of tillage, and is vastly improved in its workable capacities by draining. Its texture, even though everywhere consisting of the same materials, is exceedingly and fitfully various in hardness and softness Some portions of it are spongy with the springing or the percolating of water; some are consolidated by the successive expulsion of moisture, tread of cattle, and drying the evaporation; some are tough with the matted and elastic roots of carices and semiaquatic grasses; some are stubborn and refractory with the firm imbedding of small stones; and some present a rapid succession of depths and shallows of soil, ready at one moment to fling up the plough to the surface, and at another to tempt it down to a perilous and impracticable depth. A ploughman in working such land, must practise the utmost steadiness of eye and skill of hand; he is kept on a constant tension of vigilance and effort; he is worn with exertion, tantalized in his efforts, vexed and plagued in temper, put to a severe and constant trial of all his powers as a ploughman, and all his patience as a man; and even though he should be one of the ablest, most experienced, most persevering, and best tempered operatives of his class, he will utterly fail to maintain uniformity of depth in the furrow-slice, or to effect regularity or tolerable goodness in general execution. His plough will dip in some places, and be tilted up in others; it will now be arrested and now let go, so as to make a succession of violent strains and jerks upon the horses; and it will in few places lay the furrow-slices completely over, or so effectually detach their lower edges from the basement-soil, as to make their upturned sides cohere in the manner of a continuous mass. The harrows, too, will rather scratch the tops of the furrow-slices, than tear their whole body into powder; and the roller will effect such a compression as to render the surface somewhat like that of a footpath. But when even the wettest and most clayey arable land is completely drained, it acquires a free, friable, homo-

geneous texture, as sweetly and facilely workable as that of a naturally light arenaceous soil. "Being all alike dry, its texture becomes uniform; and being so, the plough passes through it with an uniform freedom; and where ordinary-sized stones obstruct its course, the plough can easily dislodge them. The plough by its own gravity tends to raise a deep furrow; and the furrow on its part, though heavy, crumbles down and yields to the pressure of the mould-board, forming a friable, mellow, rich looking mould, not unlike the granular texture of raw sugar. The harrows, instead of being held back and starting forward, swim smoothly along, raking the soil into a smooth uniform surface, entirely obliterating the prints of footmarks. The roller compresses the surface of the soil, and leaves what is below in a soft state for the expansion of the roots of plants."

ON THOROUGH DRAINING.

Those who are practically acquainted with the cultivation of the soil, must be aware that the profits of draining wet land arise in many different ways, viz. less seed, less manure, less labour, and more easily performed, and can be wrought comfortably almost in any kind of weather. These are advantages of no minor importance, and if duly weighed, are no doubt valuable; however, they do not form part of the profits generally calculated on by the unobserving Farmer. He only looks to the increased produce of crops obtained by the operations of draining and subsoiling; and although I never met with an individual that had performed these operations thoroughly, but admitted that he had been amply repaid for his labour, yet I believe very few can tell in what shape, or in what length of time; as is exemplified in the case of a clever Land Surveyor, when lately pursuing his vocation in the lower district of Aberdeenshire, I believe chiefly for the purpose of arranging matters regarding the drainage of land. Amongst all the principal Agriculturists in the district, within twenty-five miles from Aberdeen, he only found one person possessed of any correct data of the returns, from a rotation of crops on a field prior to being drained and subsoiled, and the same after those operations had been performed.

Now, as this is a point of primary importance to the Agricultural public, especially to those immediately connected with draining, I shall here give a short statement of the produce of a field, on the home farm of Haughton, Alford, six years previous to being drained, and four years after. The information has been kindly communicated by the Farm Overseer, and carefully noted from his farm accounts, the accuracy of which can no doubt be depended on. The acre is the Scotch measure; and the field in question contained five and a half acres. The surface soil was poor, black, and mixed with gravel, running from four to six inches deep, resting on a stiff bound pan, composed of poor yellow clay and gravel, strongly impregnated with the oxide of iron, to the depth of about two feet, below which it became more porous and open. It was ploughed from three-year-old grass, or rather from rushes and bent, in the autumn of 1837. At that time, the water in many places was standing above the surface. It produced a crop of oats in 1838 of one and a half qrs. per acre. In 1839 it was under turnips, laid down with 25 cubic yards well made farmyard dung per acre. The season proved rather wet, and the crop cankered, and turned red; the turnips were very small and coarse, scarcely worth pulling. In 1840, oats and grass seeds were sown, and the season being pretty dry, the produce was three qrs. oats per acre. The winter following was favourable, and the sole of grass kept pretty well; and in 1841, the yield of hay per acre was one hundred and forty stones of twenty-two lbs. In 1842 and '43 the field was in pasture grass, and was valued at thirty shillings per acre. In January 1844 the thorough drains were opened thirty feet apart,* thirty inches deep, and six inches wide at bottom, filled with four-inch stones to the depth of sixteen inches, closely turfed, and covered with subsoil firmly beaten down. The leading drains were three feet deep, with a built conduit of five inches wide and seven high. The whole cost of draining was £5 per acre, exclusive of cartages. The crop of oats in 1844 was rather late, but produced a fair quantity of straw, and three and a half qrs. of oats per acre, besides a considerable quantity of small oats, which in consequence of lateness had not come to maturity. In February 1845, the field was subsoiled by a plough drawn by four horses to the depth of sixteen inches, and cost £2 per acre, including the digging out of large boulders, which were pretty numerous. It was then put under yellow turnips, manured with 24 yards of good farm-yard dung, in conjunction with six bushels of bone-dust per acre. The yield was good, and was estimated at twenty tons per acre. In 1846 the field was sown with oats and grass seeds, and gave a pretty close equal crop of five qrs. of good oats per acre, and straw in proportion. The grasses were close, strong, and healthy. Last year (1847), the yield of hay per acre was 260 stones of 22 lbs.:—

COMPARATIVE STATEMENT OF CROPS.

Before Draining.	Per acre.	After Draining and Subsoiling.	Per acre.
1838, Oats after lea . .	1½ qrs.	1844, Oats after lea . .	3½ qrs.
1839, Yellow turnips, say	3 tons	1845, Yellow turnips, .	20 tons
1840, Oats after do. . .	3 qrs.	1846, Oats after do. . .	5 qrs.
1841, Hay	140 st.	1847, Hay	260 st.
1842, Pasture worth, . .	30s.		
1843, Do. do.	do.		

INCREASE AFTER DRAINING.

Per Acre.	Value of Increase.
1844, Oats after lea, 2 qrs., with the straw, at 30s.	£3 0 0
1845, Yellow Turnips, 17 tons, at 7s. 6d. per ton	6 7 6
1846, Oats after turnips, 2 qrs., with the straw, at 35s. . .	3 10 0
1847, Hay, 120 stones per acre, at 7d.	3 10 0
Profit, in whole, for four crops . . .	£16 7 6

If it were necessary, similar statements could be adduced to shew the good effects of drainage and subsoiling; but the above seems quite sufficient *to substantiate the fact*, that these improvements *will pay handsomely*, even on very ordinary soil.

THE DAIRY.

The Dairy-house should be situated on a porous soil, and on the top or declivity of a hill, or in circumstances otherwise thoroughly favourable to constant ventilation, pure air, and entire freedom from vapours and noxious gases, and it should also enjoy shelter, whether by the configuration of its site or by screens of trees, from northerly, easterly, and south-easterly winds. The principal parts of a dairy-house are the milk-room, the work-room, and the cheese-room.

The milk-house ought to be of sufficient capacity to contain one day's milk of all the cows which are kept upon the farm. It must be cool, of uniform temperature throughout the year, thoroughly ventilated, and perfectly free from damp vapours and bad smells; and it must be always kept clean, dry, and sweet aired. Its temperature in any part of the year must not rise above 55° nor fall below 50°, else it will certainly injure the milk; and this temperature can be maintained only by means of deep cooling shade in the season of intense sunshine, and of a stove, surrounding flues, or some kindred appliance, in the season of cold winds and of frost. It may be constructed either by sinking the floor some feet under ground, and making the roof a prolonged arch of stone or brick, or by having the floor on a level with the surrounding surface, and forming the roof in the ordinary manner, with a covering, not of slates or of tiles, but of straw-thatch, or of turf or 'divots;' and in the latter case, it ought to enjoy the shade of overhanging trees or of adjoining lofty buildings. The distance between floor and ceiling ought to be at least ten feet; the floor should be a close pavement of polished sandstone, or of tiles, with all its seams so completely puttied as to prevent the entrance or stagnation of even the smallest portion of liquid, and with a prevailing inclination toward a drain for carrying off the water; and the bench or table for holding the milk-pans should consist of polished marble, or of beech or plane-tree, or at worst of polished sandstone, and should extend round the

* The Overseer at Haughton considers the thorough drains thirty feet apart too wide; and although the land is rendered ordinarily dry, he thinks it would have been more efficient and l[illegible]ing, had the drains been only 21 feet apart, and would have paid the additional expense well.

walls—if the milk-house be a sunken one—at a line a little below the level of the outer ground, or, in any case, not more than three feet from the floor. Two windows may open toward respectively the north and the north-east, and should be covered with a sieve of brass wire, or zinc wire, impenetrable to mice, and a sheet of gauze-cloth within the wire, such as to exclude flies and yet to admit light and a current of air. If only one window can be thus constructed, or the two be insufficient in size for abundant ventilation, air holes, covered with wire, should be cut a little above the milk-bench and on opposite sides of the room; and if the windows cannot be opened toward the north or the north-east, but look in some other direction, each must be shaded with a board, so placed as to admit a current of air, and at the same time to exclude the rays and heat of the sun. Glazed windows may be added for the winter; yet, except in either very cold or very hot weather, they are quite useless, and ought always to stand open. "A complete ventilation," remarks Sir John Sinclair, "may be preserved by a number of openings in the outside walls near the floor, covered with canvas or wire-cloth, to which sliding shutters are fitted on the inside. If there is no apartment above, a ventilator should be made on the roof, covered with weather boarding, and communicating with the ceiling of the milk-room by an enclosed box or case formed betwixt the scantlings, with openings both on the under side next the ceiling, and on the upper side to the ventilator in the roof. Where there is no apartment above, the case in the ceiling should have openings at the ends through the walls, with wire-cloth coverings. Two of these cases should be made in the ceiling, with two openings to each from it, about one foot sqare, perforated with holes or covered with wire-cloth.' The milk-bench, the floor, and the walls of the house, ought all to be so closely constructed as not to admit of the lodgement of milk, dirty water, dampness, or any impurity; the milk-bench and the floor ought to be carefully washed and dried every time that milk or water is dropped on them; the walls and the ceiling ought to be frequently swept, so that no dust may accumulate or cobwebs be formed; and the drain which carries off the water should be kept as clean as the floor itself, and should communicate, not with any sink or pond, but with an outward channel of perfectly free and open conveyance. *When a little rill of water from a closely adjacent spring can* be made to flow along the drain of the milk room, it has a finely cooling and purifying effect, carrying off effluvia, keeping up continual ventilation, and maintaining consant freshness and sweetness in the air. The work-room requires to be as near as possible to the milk-house for convenience, and yet to be sufficiently distant and separate not to communicate to the milk-house any of the steam from its boiler or of the effluvia from its floor. It must have a closely paved floor, and be quite clean, and perfectly free from stagnations of milk, from putrefaction of curd, from lodgements of dust, from foul vapours, and from all other kinds of impurities. On all small farms, the work-room ought to be of ample capacity for all the operations of the dairy, both direct and subsidiary; on large farms, it ought to comprise three apartments—one for churning, one for making cheese, and one for cleansing the utensils and vessels. A verandah round both milk-house and work-room is also a very desirable contrivance, shading the milk-house from the sun in summer, somewhat aiding its warmth in winter, and allowing the dairy utensils to be dried and aired in rainy weather. The cheese-room ought, in every instance, to be a separate apartment, no matter in what part of the farmery, but clean, moderately cool, perfectly dry, and quite free from bad vapours and gases.—*Rural Cyc.*

ON THE NATURE AND ECONOMY OF GRASSES.

Go where you will, your eye rests both on hill and dale, mountain and valley, all clad in beauty and enlivened with "nature's living green;" "all," as the poet truly says, "lovely to behold." This tribe of the vegetable kingdom is indigenous to almost every species of soil—and I may say, likewise, that it is natural to every clime; in fact, I may very appropriately consider them among our domesticated plants, inasmuch as you are sure to find it in every part of the world where both man and the lower orders of animated creation have obtained for themselves a habitation. Thus, while it constitutes the food as well as the couch of the most important and valuable animals with which the service of man is blessed, yet it forms, at the same time, the most variegated and splendid carpets with which the Almighty, in the plenitude of his wisdom, has graciously thought fit to adorn the surface of the fertile land he has created for the sustenance of the various classes and orders of animated nature; and, as I have before stated, so do I now repeat, that there is no vegetable which is so extensively and profusely grown in the wide garden of the known globe, as that of grass; and we may inquire with some degree of truth and philosophy, and ask ourselves this simple question, What kind of animal diet does man partake of, which, when alive—the creature whose remains form his food—did not, in a state of nature, subsist upon some one, or perhaps many, of the natural grasses? The question is easily solved, when I say, *None.*

Like every other species of vegetable which man, in a state of civilization, has become acquainted with, the grasses are capable of being improved to a very considerable extent; and the more we examine into the philosophy of agriculture, the more do we daily witness the benefits which the hand of science is capable of conferring upon mankind. In many parts of the globe we find the grasses, when in their natural states, innutritious in their properties, extensive in their height, and rank in their qualities. Examples of this fact we find in the almost interminable and dreary plains of New Holland, and many parts of North and South America. Now, contrast these with the luxuriant pastures of England, and examine their nutritious properties, although we must acknowledge the diminution in their dimensions, yet, in the manner they are cultivated by the British agriculturist, they not only are valuable as food for his cattle, but a source of great pecuniary profit in many instances, they rewarding his talent and toil.

All nations that we are acquainted with who have distinguished themselves by their advancement in the science and art of agriculture, and those collateral departments of human knowledge which are generally attendant on the results of civilization, have at all periods more or less devoted some considerable share of their time, skill, and attention to the cultivation of not only the grasses in particular (as so especially denominated), but other articles of food for the due sustenance of their domesticated animals; accordingly, if we but turn our attention to the pages of history, we shall soon discover that it had been successfully practised in the first century of the Christian era; that it was progressively continued by the inhabitants of surrounding nations, and especially by the natives of the low countries, which, Mr. Turner tells us, were, at that period, equally celebrated for the cultivation of not only the science of agriculture, but also the collateral branches of human knowledge, manufactures and commerce. Towards the middle and termination of the seventeenth century, instructors in these important subjects made their appearance in various parts of this mighty empire, and it would, did space permit, form a pleasing retrospect, to historically sketch the various improvements which have been gradually but successively made from that period down to the present. I do not, on this occasion, intend to give your readers anything like a history of agriculture, but merely a few observations respecting the introduction of the tribe of fodder grasses, &c. into this country, and their nature, which, I hope, at least to the naturalist and botanist, cannot fail of proving interesting.

On referring to both the records of sacred and profane history, we shall find that the Jews, Egyptians, and Greeks, with many of the inhabitants of surrounding nations, displayed considerable care, skill, and attention in the cultivation of the cereal plants, and those which were conducive to their subsistence and clothing, as well as other comforts. I am well aware that in those days of primitive civilization, the sole wealth, or nearly so, of a monarch, a noble, or a landed proprietor, consisted in his flocks and herds; yet, as far as my researches have gone, I do not think that they cultivated any

of the plants now employed by us as the means of subsistence for the animals they bred, reared, and domesticated; neither can I discover any evidence that this was done by surrounding and contemporary nations, and a very long period elapsed before they received that due attention they so richly deserve; in fact, it was not until mighty, luxurious, and imperial conquering Rome was in the zenith of her grandeur, that when the toils of the battle field were over, and her warlike nobles, senators, and soldiers, retired from the turmoils of war, to seek repose in the useful and delightful calm pursuits of agriculture, when, as Columella quaintly remarked, "The earth delighted to be ploughed with a share adorned with laurels, and by a ploughman who had been adorned with a triumph." The ancient Romans paid considerable attention to the cultivation of wheat, barley, oats, rye, far or spelt, beans, &c., which they cultivated for bread; but they also grew both grass and herbage for their animals, among which I may mention red clover, lucerne, fenugreek, and lupines, with a great variety of other leguminous plants, which they gave, both in their green and dried states, to their live stock, and also the rape and the turnip; but from the seeds of some of the cerealia, they fed their working oxen, their farm, war, and pleasure horses. The pea, bean, and many other leguminous plants, were employed by them for the same purpose. But we well know that Rome fell from its high and lofty state: that a series of barbarous ages succeeded the grandeur of this once immense empire, and with it fell also some of the most useful arts; science was obscured, and, to a great extent, that of agriculture generally, especially that portion which taught mankind the manner by which the grasses and other plants employed as food for their domesticated animals were produced, and, as a recent author justly remarks, that "if the growth of clover, lucerne, &c., was at all continued, it must have been so to a very limited extent, and that most likely confined to the countries where their usefulness was most generally appreciated."

THE HORSE: HIS BREEDING AND MANAGEMENT.

BY MR. H. D. RICHARDSON.

We were speaking of *horse taming*: to resume. Some years since I met with a person named O'Hara, whose performances I can affirm to have been truly wonderful, and very similar to those described as having been performed by Sullivan.—Whether O'Hara was acquainted with Sullivan's secret or not, I cannot say; but he seemed, at all events, able to produce equally surprising effects. On one occasion, when under the influence of liquor, O'Hara was heard to declare that *his* secret lay in *rocking* the horse: but on another occasion, when equally tipsy, he spoke of *biting* the animal's ear or lip,—I forget which, but I think it was the former.

The following anecdote is related of Sullivan, by Castley, in "The Veterinarian":—"At the spring meeting of 1804, Mr. Whaley's KING PIPPIN was brought on the Curragh of Kildare to run. He was a horse of the most extraordinary savage and vicious disposition. His particular propensity was that of *flying at* and *worrying* any person who came within his reach; and if he had an opportunity, he would get his head round, seize his rider in the leg with his teeth, and drag him down from his back. For this reason he was always ridden with what is called a *sword*, which is a strong, flat stick, having one end attached to the cheek of the bridle, and the other to the girth of the saddle—a contrivance to prevent a horse of this kind from getting at his rider.

"King Pippin had long been difficult to manage, and dangerous to go near to, but on the occasion in question he could not get out to run at all. *Nobody could put the bridle on his head.* It being Easter Monday, and consequently a great holiday, there was a large concourse of people assembled on the Curragh, consisting principally of the neighbouring peasantry; and one countryman, more fearless than the rest of the lookers on, forgetting, or perhaps never dreaming that the better part of courage is discretion, volunteered his services to bridle the horse. No sooner had he committed himself in this operation, than King Pippin seized him somewhere about the shoulders or chest, and, says Mr. Watts (Mr. Castley's informant), 'I know of nothing I can compare it to so much as a dog shaking a rat.' Fortunately for the poor fellow, his body was very thickly covered with clothes, for on such occasions an Irishman of this class is fond of displaying his wardrobe, and if he has three coats at all in the world, he is sure to put them all on. This circumstance, in all probability, saved the individual who had so gallantly volunteered the forlorn hope. His person was so deeply involved in extra integuments, that the horse never got fairly hold of his skin, and I understand that he escaped with but little injury, beside the sadly rent and totally ruined state of his holiday toggery.—The 'WHISPERER' was sent for, who, having arrived, was shut up with the horse all night, and in the morning he exhibited this hitherto ferocious animal, following him about the course like a dog—lying down at his command, suffering his mouth to be opened, and any person's hand to be introduced into it; in short, as quiet, almost, as a sheep. He came out the same meeting, and won his race, and his docility continued satisfactory for a considerable time; but at the end of about three years, his vice returned, and then he is said to have killed a man, for which he was destroyed."

Some time ago an article in connexion with the subject of horse taming, appeared in the *Times newspaper, in which* allusion was made to Mr. King, proprietor of 'the learned horse,' then exhibiting in London; and it was stated that Mr. King professed his art to depend on the *compression of a certain nerve* in the horse's mouth, called 'the nerve of susceptibility.'

The secret of Sullivan's summary mode of taming the horse is likely ever to remain a mystery; but it is certain that a power little removed from his is attainable by a very simple process. That Sullivan's son, however, either had not inherited the secret from his father, or was unable to put it in practice, is evident from the many failures which attended his attempts. Amongst others we take the following from Mr. Castley's account:—"We had in the regiment a remarkably nice horse called Lancer, that has always been very difficult to shoe; but seven or eight years ago, when we first got him, he was downright vicious in that respect. When the regiment was stationed in Cork, the farrier-major sought out the present Sullivan, the son of the celebrated whisperer, and brought him up to the barracks, in order to try his hand upon Lancer, and make him more peaceable to shoe; but I must say this person did not appear to possess any particular controlling power over the animal, more than any other man. Lancer seemed to pay no attention whatever to his charm, and at last fairly *beat him out of the forge.*"

An account published some years ago by Mr. Catlin, whose experience among the American Indians has obtained for him so much celebrity, bids fair to solve the mystery, or at least to suggest some important inferences. He thus describes the mode in which the Indians tame the wild horse. "He coils the *lasso* on his arm, and gallops fearlessly into the herd of wild horses. He soon gets it over the neck of one of the number, when he instantly dismounts, leaving his own horse, and runs as fast as he can, letting the lasso pass out gradually and carefully through his hands, until the horse falls for want of breath, and lies helpless on the ground. The Indian advances slowly towards the horse's head, keeping the lasso tight upon his neck, until he fastens a pair of hobbles on the animal's two forefeet, and also loosens the lasso, giving the horse a chance to breathe, and passing a noose round the under jaw, by which he gets great power over the affrighted animal, that is rearing and plunging when it gets breath, and by which, as he advances, hand over hand, towards the horse's nose, he is able to hold it down, and prevent it from throwing itself over on its back. By this means he gradually advances until he is able to place his hand on the animal's nose, and over its eyes, and at length to *breathe into its nostrils*, when it soon becomes docile and conquered, so that he has little else to do than to remove the hobbles from its feet, and lead or ride it to the camp. The animal is so completely conquered, that it submits quietly ever after, and is led or rode away with very little difficulty."

Mr. Youatt, in his excellent volume on "The Horse," gives the following interesting note:—"Mr. Ellis, B.A. of Trinity College, Cambridge, happened to read this (Mr. Catlin's) account, and he felt a natural desire to ascertain how far this mode of horse-taming might be employed among British horses. He soon had the opportunity of putting the veracity of the story to the test. His brother-in-law had a filly, not yet a year old, that had been removed from her dam three months before, and since that time had not been taken out of the stable. A great amateur in everything relating to horses was present, and, at his request, it was determined that the experiment of the efficacy of breathing into the nostrils should be immediately put to the test. The filly was brought from the stable, the amateur leading her by the halter. She was quite wild and bolted, and dragged the amateur a considerable distance. He had been using a short halter; he changed it for a longer one, and was then able to lead the little scared thing to the front of the house.

"The experiment was tried under manifest disadvantage, for the filly was in the open air, several strangers were about her, and both the owner and the amateur were rather seeking amusement from the failure than knowledge from the success of their experiment.

"The filly was restive and frightened, and with great difficulty the amateur managed to cover her eyes. At length he succeeded, and *blew* into the nostrils. No particular effect seemed to follow. He then *breathed* into her nostrils, and the moment he did so, the filly, who had very much resisted, having her eyes blindfolded, and had been very restive, stood perfectly still, and trembled. From that time she became very tractable. Another gentleman also breathed into her nostrils, and she evidently enjoyed it, and kept putting up her nose to receive the breaths.

"On the following morning she was led out again; she was perfectly tractable, and it seemed to be almost impossible to frighten her. A circumstance which in a great measure corroborated the possibility of easily taming the most ferocious horses, occurred on the next day. A man in a neighbouring farm was attempting to break in a very restive colt, which foiled him in every possible way. After several manœuvres, the amateur succeeded in breathing into one of the nostrils, and from that moment all became easy. The horse was completely subdued. He suffered himself to be led quietly away with a loose halter, and was perfectly at command. He was led through a field in which were four horses that had been his companions; they all surrounded him; he took no notice of them, but quietly followed his new master. A surcingle was buckled on him, and then a saddle, and he was finally fitted with a bridle. The whole experiment occupied about an hour, and not in a single instance did he rebel.

"On the next day, however, the breaker, a severe and obstinate fellow, took him in hand, and, according to his usual custom, began to beat him most cruelly. The horse broke from him, and became as unmanageable as ever. The spirit of the animal had been subdued, but not broken."

From Bell's Weekly Messenger.

THE MIXTURE OF FOOD.

In our recent observations on the feeding of live stock, we have had occasion to notice, incidentally, the advantages of a *mixture* of food. It may be useful to many of our readers if we pursue this portion of the investigation more in detail, and endeavour to see our way a little more clearly in this important practical inquiry. Before we look to the result of our experience on this head, or that of other practical farmers, it may be well to examine one or two of the explanatory observations of men of science on the subject. "In the rearing of young animals of all descriptions," remarks Mr. Karkeek, an eminent Cornish veterinary surgeon (Jour. R. A. S. v. 5, page 262), "it must be evident that substances rich in nitrogen are particularly required for the growth of the various parts of the body, since there is no part of an organ that contains less than 17 per cent. For the growth of bone, muscle, blood, membranes, skin, horn, hair, and cellular tissue, a certain amount of this substance is absolutely necessary. In the rearing of horses, where the object is to produce a great development of muscle, this is particularly required; hence it is the practice of intelligent breeders to supply the young stock with a proper allowance of oats, peas, beans, and shelter during the winter, and it is from the want of these requisites that so many thousands of horses are rendered worthless." The observation of Mr. Karkeek is confined to the chemical composition of the food, and its effect in the production of muscle, but the advantages of mixing food are not confined to these and other chemical advantages; there are mechanical advantages, as well as chemical good effects, produced by the mixture of certain food, such as straw and hay, or chaff, with better and more concentrated food, advantages which are alluded to by Professor Lyon Playfair (Journal R. A. S., v. 4, p. 235), when he observes:—

"I am quite aware many farmers entertain the opinion that cutting hay is only of use in the facilities which it affords for mixing with the hay, straw, or other inferior fodder. Straw, except when new, is not a very nutritious food, for we find a great part of it unchanged in the fæces of the animal fed upon it. Its principal use is to give a bulk to the food taken; even in the case of turnips, a food of considerable bulk, straw is necessary, because turnips contain nearly 90 per cent. of water, which becomes soon separated. Thus it is that cattle fed upon turnips voluntarily take 2 lb. or 3 lb. of straw daily, or as much as will serve to give the necessary bulk to the food. The digestive process of herbivorous animals is very complicated. The food is primarily taken into the first stomach or rumen, which is analogous to the crop in birds. Here it is moistened with a secretion from the stomach. The coarse unmasticated food is thence transmitted into the second stomach, or *reticulum, where it is rolled up into little balls, one* of which from time to time is returned to the mouth to be further comminuted and insalivated. After this reduction, it is sent into the manyplus or third stomach, where it is further reduced to a pulpy mass, and in this state enters the fourth stomach, where true digestion commences. The object of the first three stomachs being merely to obtain a proper comminution of the food, it is necessary to have that food of sufficient bulk, otherwise the peristaltic motion of the stomach would be impeded. This would appear to be the reason for giving straw with turnips and other kinds of succulent food. The expression of the farmer is "that straw corrects their watery nature," which means, increases their bulk when their water has left them and reduced their volume. Rumination is requisite in order to keep an ox in health. A little straw or hay is accordingly necessary to enable it to chew the cud. We know a case in which barley-meal and boiled potatoes were given to cows without hay or straw. Constipation resulted, and the cattle nearly perished from the ignorance of the feeder. From these considerations we are induced to consider that a greater return will be made by food partly but not too much reduced. The turnip-slicer is known to save food, and this arises from the fact that the sheep expend less force in eating sliced than whole turnips, and to their being enabled to lie down more constantly. On similar grounds are we to ascribe the advantage of steaming food, or reducing it to the state which the first three stomachs would otherwise have to do at a great expenditure of force, and consequently of food to produce it."

THE FATTENING OF CATTLE.

Stall feeding of cattle for the shambles, is now become a most important feature of modern husbandry, and as improvement of the soil counties to progress in our densly populated country, in like manner most increase the number of beasts annually fed for the acquirements of a rapidly increasing population. We are quite well aware, that in many of the turnip growing localities, the best methods of feeding are perfectly understood by those who have long studied and practised the art; and that in England it has been carried out to an extent that is far from being profitable or commendable, and can be looked upon as nothing short of deliberate waste and

imprudence, as any who has seen the frightful monsters led out of all shape, and annually exhibited at the Smithfield Show, will readily aver. For not only are the animals pampered with every kind of food that can be thought of, and that should have rather been used by a starving peasantry; but they are brought to such a pitch of oily fatness, that often the flesh cannot be used, except by those who have the stomachs of cannibals. Many however, are but tyros in the art, and only feeding two or three beasts annually, who, in course of a few years, as draining increases, may be feeding as many dozens; and, from observations lately taken in a large district, where potatoes used to constitute, almost solely their green crop, but where, from necessity, they are forced against their will, to resort to turnips, the method practised is truly ludicrous, and much in want of reformation; and to such, a few hints, if acted upon, may be of a little service.

It has long been a point at issue, whether feeding beasts should be tied up, or kept loose in pens, in pairs, with a comfortable shed to lie in. We are of opinion that those tied up will fatten fastest, as the less exercise the animal takes, the faster will he take on; whereas those in pens, particularly if they have much freedom, will range about to an extent that will require nearly a fourth of more food to make them fatten equal to those tied up, which in the end will tell heavily against the profit of the feeder. It is, however, asserted—and we believe with a good deal of reason on its side—that from the exercise taken, the quality and solidity of the beef, will be much increased; but that is a point which should not be looked to by the feeder, as the butcher who buys the beast will not give one penny more for it on that account than for one of equal weight, however soft the beef may be. Seeing then, that fat and weight in the shortest period possible, is the great object, the means by which that can be obtained, should be carefully sought, and closely attended to.

In feeding at the stake, the greatest regularity in their meals should be observed. They should be commenced with the softer varieties of turnips, such as white or red globe, which should be followed by yellow, and lastly by the hardy Swede, so that as the animal increases in fat, the quality of the food is also increased. Before feeding in the morning—and more particularly if the weather is frosty—a little dry fodder should be given, as cold turnips taken into the empty stomach chills the animal, and sometimes produces shivering. The first feed past—which should be by seven o'clock—the byre neatly cleaned, well littered, and some fodder given, the animals should be left in perfect quiet till mid-day, when their second feed should be given, and the same order observed till the time for giving the third and last feed for the day; the byres should again be cleaned of the dung, and the animals left till eight o'clock, when any bits of turnip in their stalls should be removed—for fear of choking during the night—some fodder given, and the byres shut up for the night.—Particular care should be taken to have the feeding houses well ventilated, so that the effluvia may be speedily carried off. Warmth is also a desirable object, and a thermometer on the wall to regulate the temperature should be in every feeding-house; for however much moderate heat may facilitate the fattening process, an over degree of it, such as when the animals can scarcely breathe, must be equally hurtful, and as much to be avoided as extreme cold. A regular application of the curry-comb daily is indispensable, as conducive to the general health of the animal, as clearing the skin of any hardened scurf, and promoting free egress to moderate perspiration. Many animals, when first tied up, particularly if north country, are so rough in the coat, that a great waste is daily sustained by their unlimited perspiration. In all cases of this kind, when others of the lot may be thin of hair, and require a high temperature for their comfort, we recommend *clipping*—we have tried it, and can vouch for it as a very great improvement, and have seen the animals after being relieved of their shaggy coat, under which they were continually in a state of wetness, improve every day with extraordinary rapidity. When potatoes were abundant, and prices low, one feed per day was an excellent change of diet, and a good deal practised. But under existing circumstances they cannot be spoken of in the same light. Where no mixture of food is given in which salt can be administered, pieces of rock-salt should be kept in the stall in reach of the animals, so as they could lick as much as they required, the advantages of it being too well known to require explanation. Under such treatment a well-bred beast will feed in sixteen or twenty weeks. We have been only treating of the plain modes of feeding, without using any extraneous article whatever; and really the *high* system of forcing is practised in so many different ways, that it would be a difficult matter to decide which has the precedence. Oil-cake, begun in small quantities, say 2 lbs. per day, and increased to 6lbs., is an excellent auxiliary, and in respect to the improvement of the manure stands unrivalled. Bean-meal, baked into balls, is also much used, and there is no doubt whatever produces a better quality of beef than oil-cake; it has also the effect of increasing the weight of tallow more than beef, the cake laying on the fat outwardly, which is always a desirable object for the seller. Numbers are now in the habit of steaming all the food, and, we have no doubt, in a short time the practice will be universal. —*Ayrshire Agriculturist.*

ON THE VALUE AND MANAGEMENT OF TURNIPS.

About the beginning of the present century the culture of turnips in this country seems to have been but very imperfectly understood, and they were consequently, considered to be an exhausting and unprofitable crop. When we take a retrospective view of the general mode of their treatment at that period, it appears pretty evident that they must have been so; for to quote the old Farmer's own words, who says, 'I min' weel fifty years ago, fan ther wis naebody but the muckle Farmers growing neeps, an' thae only had twa or three butts [the shortest of the old crooked ridges] the piece. The lan was aye ploughed wi' the ousen afore winter after carrying nine or ten craps o' corn, it gat anither fur i' the spring, an' ten twal duble tinings wi' the harrows, syne about three week's after Whitsunday it was mucked, an' the muck ploughed down, weel harrowed, an' the neep seed sawen braid cast out atween the twa foremoist fingers an' the thumb, and either hapit wi' a rake, or a gude trale o' whin busses. Fan the seed was gude they war aye bra an, thick, an' fan we hoed them we first took bye the plant wi' wis' gaun to leave, an' pat on our fit upont, an' cutted out a' the lave wi' the hoe for ten or twal inch roun', took by anither, an' pat on our fit upon it, an' so on till they wir a' hoed. In those days there wis only a few men in the quentry that wis thought capable o' hoeing neeps, an' thae jiest gade fra toun to toun an' wrought at them the hale simmer, their wages wis generally a saxpense i' the day an' thir meat. The neeps wis aye unco sma', bat fine an' sweet, they war aye required for the family an' a cow or twa for gien milk, unless fat the baads [Hares] ate in winter.' Such a mode of turnip Husbandry has now happily given way to a more profitable and better system, and during the last thirty years the cultivation of this valuable root has gradually increased from small patches, seldom reaching the twentieth part of each farm, so as now to occupy the place of a rotation, generally one-sixth, and sometimes even one-fifth part of the whole arable land. This four-fold increase is of itself sufficient to shew that Farmers have found turnips to form one of the most profitable and useful crops in their rotation, not only directly for the feeding of cattle, but also indirectly for feeding the land, which may be clearly inferred from the luxuriant crops of grain and grass which almost invariably succeed a good turnip crop: and in place of exhausting the soil (when properly managed), they have proved themselves to be an excellent restorative. In many of our rural districts the rearing of turnips has now arrived at a high state of perfection, which may no doubt be attributed to various causes, particularly the use of bones, drying and thoroughly pulverising the land, and the better preparation of farm-yard dung. And where all these (combined with good management) have been adopted, 25 tons of Swedish bulbs per acre are now no

uncommon crop. That quantity when their nutritive juices are preserved, will feed two bullocks of about 8 cwt. each, for a period of 20 weeks, 200 lbs., with plenty of good straw, being the maximum quantity required for each beast per day; and if the animal is thriving and of ordinary good quality, regularly fed, and clean kept, it will increase in weight and fat during the 20 weeks about 2½ cwt. or 2 lbs. per day. Thus we may assume that 5 cwt. of the best animal food can be produced from one acre of good turnips, which, on an average of years, is worth £2 10s. per cwt. The indirect value of a turnip crop can scarcely be estimated, but is derived in various ways—viz. the great increase in quantity and quality of farm-yard dung, the use of tops ploughed into the land, and many valuable saline matters drawn from the atmosphere when growing, and imparted to the soil. These facts clearly prove that turnips are the Farmers' most profitable crop, and well entitled to his best attention.

Having given a cursory view of the culture and value of turnips, I shall now advert to a few practical points regarding their management, which appears to be far behind in the march of improvement. The white and red globes should be all used before December, the different kinds of yellow come next in order, and the Swedes left till the months of March, April or May, unless where cattle are to be early fed off, and in this case the Swedes may be used sooner. Milch cows should get no Swedes; they increase fat very much but always lessen the quantity of milk.

NEW MODE OF PREPARING BONES FOR MANURE.

By Ph. Pusey, Esq., M. P.

Having succeeded in discovering a simple process for the cheaper use of bones as manure, I beg to state shortly the grounds which led me to the inquiry, and the proofs of its success.

In a few pages of the Society's Journal, on the use of bones and sulphuric acid I mentioned (two years since), that, if bones and moist peat-ashes are thrown in a heap together, the mixture heats violently, and the bones in a few days almost disappear, while their strength as manure is found to have greatly increased. This effect I ascribed to sulphuric acid contained in the peat-ashes; but it was a mistake, for the mixture, when examined chemically by Dr. Hofman, shewed little or no sulphuric acid; and that Professor suggested that the decomposition must arise as in many animal and vegetable substances, according to Baron Liebig, from the presence of moisture.

This hint was the more encouraging, because if peat-ashes were not a necessary ingredient of the process it would be no longer confined to those Farmers, a small number comparatively, who have peat-ashes at command. I therefore procured three cart-loads of crushed bones, and, having wetted them, mixed one cart-load with two loads of peat-ashes, another with two loads of coal-ashes, and the third load of bones with two loads of sterile white sand, dug up from some depth, and quite unfit in itself to support vegetation. The three heaps were made up as compactly as possible side by side.—In a few days they all heated equally, becoming too hot in the middle to be borne by the naked hand; in a few more, the bones had disappeared in each heap equally, being reduced in general to a blue mouldy substance. Some corroded fragments, indeed, remained in the centres; and the outsides, to the depth of five or six inches, were unchanged, because there the heat was insufficient.

The experiment having so far succeeded, the next step, of course, was to try the effects of the dissolved bones on the land, and in May 1846, they were used upon half-acre lots of early turnips in equal proportions; the crops produced by each mixture were equally good. But as a single experiment does not, I think, justify one in putting forth the recommendation of a new practice, I waited for the result of another year's trial, which I will now lay before the Society.

It was made in July of the present year with common turnips. The object was to test the new preparation by comparing it, on the one hand, with unprepared bones, and on the other, with bones dissolved by sulphuric acid, called *superphosphate*.

The land is a hot stonebrash newly taken in hand and very much out of heart. Bones act upon it very strongly; for the trial-lots are part of seventy acres of turnips and swedes, a good crop produced by superphosphate, notwithstanding the drought; but wherever that preparation was purposely missed, the yield was not more than four, or at most five, tons to the acre.

The trial was made on the supposition that certain quantities of each manure were likely to yield equal produce; and it was proposed to test the difference, not of produce from the same cost of manure, but of cost for nearly the same amount of produce. The mixture was made in this case by throwing together a waggon-load of crushed bones wetted, and, by a mistake of the workmen, half that quantity only of sand.—The heap, however, heated violently, and was in a few days fit for use. Three bushels of the mixture are valued higher than two bushels of bones, because the heap sank during the process one foot in four, shewing, as I had suspected, that from the shrinking of the the bones, there would be more than two bushels of bones in three of the mixture.

First Experiment.

Bushels of manure per acre.		Cost of manure per acre. £ s. d.	Produce per acre. tons. cwts.
1.	17 bones.....	2 6 9	13 5
2.	4¼ sulphated bones.....	1 2 9	14 5
3.	8½ heated bones and sand.	1 0 9	13 5

The amount of produce was nearly equal, as I had hoped it might be, and both preparations shew a large saving as against unprepared bones. In another experiment a larger quantity of each manure was applied with the following results:—

Bushels of manure per acre.		Cost of manure per acre. £ s. d.	Produce per acre. tons. cwts.
4.	25½ bones.....	3 10 0	14 5
5.	7½ sulphated bones.....	2 3 0	14 5
6.	12¾ heated bones and sand.	1 11 0	17 1

On the three last lots it will be seen the manures were applied, each at the rate of about half as much again as on the first three lots. The reason was this: I proved in a former Journal, by a careful experiment devised for the purpose, that some manures, when applied in increased quantity, do not produce a corresponding increase of crop—have, in fact, a limit beyond which it is vain to apply them. This view, having since been confirmed by the experience of others, may now be regarded as founded in the laws of vegetation. It is also strikingly confirmed here, for, by increasing the dose of sulphated bones rather more than one half, we get *no increase* of turnips: and by increasing the rough bones one half, while swelling the expense from 46s. to 70s., we get *no increase* worth speaking of. It would be a fallacy, therefore, to compare different manures without knowing whether each had been used to the proper extent and no further; and this is the exaggeration which I wished to avoid.

The result of the whole seems to recommend decidedly the mode of preparing bones which I propose, and, but for a mistake of my men in mixing so small a proportion of sand, I believe the effect would have been stronger. Practically I think that the manuring virtue of bones is increased from three to four fold by this simple process, which cannot be said to cost anything. It is within reach of every one to practise on a large scale and at a few days' notice. Though I mixed barren sand with the bones for the sake of experiment, any light loam would no doubt answer as well or better—the soil itself, in fact, of any farm where bones themselves are likely to answer; and the labour is so trifling that it is not worth speaking of.

The quantity of bones applied should be between five bushels and eight bushels per acre. Bones prepared in this way do not produce at first so lively an effect on the young plants as bones prepared with sulphuric acid. Thus, in this trial, lot 6 looked for many weeks worse than its neighbours, yet in solid food that lot has turned out the best of the whole.

This mode of preparation has been tried, at my suggestion, by a neighbouring Farmer, Mr. Edmonds, who mixed up eighty bushels of bones with sand in a single heap of a circular form, and, having applied them at the rate of eight bushels per acre, tells me that he shall henceforth use bones in no other manner. This is no doubt the right shape for a heap, because the exterior being cool will always remain unchanged, though this defect might be removed by a covering of earth. Some bulk of bones is necessary, I think, to produce the heat, and the bones, as well as the material mixed with them, should be moistened if dry.

Another Farmer, Mr. Davy, who tried the mixture of bones with ashes at my suggestion, informs me that sixteen bushels of unprepared bones, four bushels of unprepared bones, four bushels of heated bones, and two bushels of sulphated bones, or superphosphate, gave each the same yield of swedes. The principle at work is evidently putrefaction taking place in the gelatinous substance of the bone; but no disgusting smell is produced, merely a strong odour of ammonia when the heap is opened. Most of this ammonia is probably drilled into the land—an advantage over the process of dissolving bones in acid, which seems to drive the ammonia away.

In proposing this simple method, I do not mean that other ingredients may not be mixed up advantageously, if experience should prove their necessity. But this is less likely, as the whole doctrine of manuring plants with the ingredients of their ashes is rendered very doubtful by Mr. Lawes's careful experiments. In any case, however, the process now proposed will be equally applicable. Since this inquiry was begun, I find it mentioned by Baron Liebig that moistened bones generate heat and enter into putrefaction. The application of this principle is what I now feel warranted, after two years' careful trial, to recommend to the notice of English Farmers. It is the same principle as, when carried to excess, shews itself in the formidable shape of spontaneous combustion; but I entertain the hope that this law of nature, which has hitherto only been known to us by setting fire to our ricks, or kindling the cargoes of ships, may at last become a willing handmaid in enriching our fields.

AGRICULTURAL SEEDS.

(Concluded.)

"Five and-twenty years ago," said Mr. P. Shirreff in 1828, "the variety of turnip cultivated in East Lothian was spurious and worthless in the extreme; but since its seed has been judiciously propagated, the crops of this root have been improved in nutritious value upwards of three hundred per cent." The propagation of only undegenerated seeds of the best varieties, while it would greatly increase the bulk of crops and considerably improve their quality, is an improvement which neither destroys any existing investment of capital, nor involves any new expenditure of money or labor, but only requires a little attention in the selecting of seeds, a little patience in propagating them, and a little care in keeping them free from interm xture. Mr. Shirreff calculates that, as the result of a few years' practice of this most cheap and easy improvement, the disposable produce of each Farmer might probably, on the average, be increased nearly ten per cent.; and he adds, "The facility of propagating genuine seeds will become manifest from a statement of my practice. In the spring of 1823, a vigorous wheat plant near the centre of a field was marked out, which produced 63 ears that yielded 2,473 grains. These were dibbled in the autumn of the same year; the produce of the second and third seasons was sown broadcast in the ordinary way; and the 4th harvest put me in possession of nearly 40 quarters of sound grain. In the spring of this year (1828) I planted a fine purple-top Swedish turnip, that yielded (exclusive of the seeds picked by birds, and those lost in threshing and cleaning the produce,) 100,296 grains—a number capable of furnishing plants for upwards of five imperial acres. One-tenth of an acre was sown with the produce, in the end of July, for a seed crop, part of which it is in contemplation to sow for the same purpose in July 1829. In short, if the produce of the turnip in question had been carefully cultivated to the utmost extent, the third year's produce of seed would have more than supplied the demand of Great Britain for a season."

The power of distinguishing new or special varieties of seeds, and of instantly or rapidly forming a judgment of their comparative value, is of great importance to any farmer, not only for his guidance in selecting seeds by purchase, but for enabling him to detect any desirable new varieties which might happen to appear among his own crops. "Valuable varieties," remarks Mr. Bishop, in his "Casual Botany," "may sometimes appear to those who have had it not in their power to prove them by trial; and if they have, the probability is, that the means to be employed require more care, time, and attention than they are disposed to bestow on plants the merits of which are doubtful; whereas, were such persons capable of forming an estimate of the worth of the varieties from their appearance, then would they use means for their preservation, whenever their appearance was found to indicate superiority." That this is an attainment of considerable importance, will be readily allowed; yet that it in some cases requires the most strict attention, appears from the circumstance of varieties being oftentimes valuable, though not conspicuously so. Let us suppose, for instance, that in a field of wheat there exists a plant, a new variety, having two more fertile joints in its spike, and equal to the surrounding wheat in every other respect,—a man accustomed to make the most minute observations would scarcely observe such a variety, unless otherwise distinguished by some peculiar badge; nor would any but a person versed in plants know that it was of superior value if placed before him. How many varieties answering this description may have existed and escaped observation, which had they been observed and carefully treated would have proved an invaluable acquisition to the community! The number of fertile joints in the spike of the wheat generally cultivated, varies from eighteen to twenty-two; and the inhabitants of Great Britain and Ireland amount to nearly the same number of millions; therefore, as the wheat produced in those islands has been of late years sufficient, or nearly sufficient, to supply the inhabitants thereof with bread, it is evident that a variety with two additional fertile joints, and equal in other respects to the varieties at present in cultivation would, when it became an object of general culture, afford a supply of bread to at least two millions of souls, without even another acre being brought into cultivation, or one additional drop of sweat from the brow of the husbandman.

One grand means of improving seed-corn is, on the first occasion of sowing, to obtain the finest and most productive quality suitable to the particular soil and climate, to clean it, as thoroughly as possible, from all broken grain and seeds of weeds, and to give it the best condition of cultivation which good draining, good tillage, and good exposure can command; and then, for a series of years, at the time of the ripening of the crop, to select as large a number as time and circumstances will permit, of the strongest and healthiest of the plants, for the seed corn of the next year's sowing. Two plants growing beside each other, under the same conditions of culture, often differ widely in both their total and their nutritious contents; and the practice of selecting some of the strongest and plumpest for intermixture with the portion of crop set apart for seed-corn, would have the additional advantage of creating the habits of minute and discriminating observation which Mr. B. desiderates, and might probably lead to the detection of some entirely new and valuable varieties. Plants which grow together in enormous numbers, like the cereal grains and the other common vegetable productions of a farm, are constantly exhibiting individual instances of great change in their habits of growth, of development, and of fructification, from the operation of chemical agency in the soil, of obscure expansions or contortions in the individual organism, of electric or gaseous influence in the atmosphere, of the hybridizing power of foreign varieties which happen to be present, and

of several other causes to which superficial thinkers are not likely to advert; and were the plants raised from choice and selected seed, observed from year to year with a tolerably knowing eye—were they even glanced at, along the sides of a field, during a few minutes of each of several days when their ripening is in progress—they could scarcely fail, on almost every farm, to present some specimens which would richly reward the observer's care. Yet a judicious man, in all his observations and efforts for the improvement of seed corn, will bestow an hundred-fold more pains in improving a confessedly good variety already in possession, than in nursing a new variety of doubtful character, or making a strenuous effort to offer an original contribution to the good varieties of the shops. Some farmers—and these not always well qualified for the task—seem to have almost a passion to become the discoverers of new varieties of grain, and to give their names in connexion with them to the world; and many have expended large portions of their time in watching, and nursing, and forcing pet plants of their detection, with no other result than blank disappointment, or at the best the contribution of varieties which had little or nothing to recommend them but their novelty. The system of accidental discovery, in fact, has, with a very few exceptions, been a plague to the discoverers, and a nuisance to the world; and hence the necessity of new varieties being sought only by minute, practised, and scientific observation, or by the artificial but still more certain process of hybridizing.—*Rural Cyc.*

Talk about Horse Shoes.—Horse shoes have varied little in Europe, retaining now very nearly the form, even of that figured in the mosaic before mentioned. But the most ancient Circassian horse shoe appears to have been round; and if the figure of it remaining in a brand be correct, it had only three nails or clamps secured on the outside of the hoof. Another round horse shoe is in use among the modern Egyptians, and partly the Syrians; it is a round plate with a hole in the middle; the common shoe, also used, has the ends turned against the heel. In other parts of Turkey, the plate is square behind, and rounded at the toe. On the continent of Europe, the ends, particularly in winter, are cocked; and when there is ice on the ground, both are frequently pointed. Rough shoeing, if confined to making the nail heads prominent, we know, from ample experience to be of very little service, and often dangerous; for the heads snap off, and the shoe is without power of holding on the ice: nay, it is then liable to come off altogether. The great difficulty in the management of a horse's foot seems to have been how to combine the preservation of the corneous substance without contracting the heel. Iron shoes, with a hinge at the toe have been tried, it appears, in vain. Veterinarians, after infinite experiments, have certainly succeeded in designing an improved shoe; but, after all, it seems that, like the ladies' shoes of China, cramping the feet to some extent is inherent in the material; and, in sandy countries, unshod horses have many advantages. We have known Indiarubber successfully adopted to restore the feet of horses seriously injured; and it may still be a question whether a composition of the same gum and coarse hair or felt, mixed with iron fillings, might not be made to answer the most requisite qualities of iron shoes without producing their defects.—*New Sporting Magazine.*

Newcastle Farmer.

COBOURG, CANADA WEST, APRIL 1, 1848.

We have to acknowledge the receipt of a voluminous communication from a correspondent in Haldimand, who doubtless is a *practical Farmer*, and whose sentiments we fully appreciate; but we could wish that our friend would condescend to be a little less florid in his language and style, even to the extent of being common-place; for it would be totally impossible for us either to print the article entire, or to spare the time necessary for a revision, acceptable to our general readers, to do justice to the subject and its writer.

Our correspondent is evidently a man of sense and given to observation; his ideas are just, and his sentiments pure and excellent. But he has fallen into the error of obscuring his real meaning by lofty phraseology, which renders his purpose too often, nearly unintelligible. We have to cater for the mass, and as the generality of our readers are not learned men, we are necessarily compelled to use great plainness of speech, and to prefer simple energy to lofty eloquence, in order to convey the greatest amount of information to the largest number.

Our friend is a practical farmer, not above receiving instruction, even though it should be "book farming." He sets a just value on Agricultural publications, believing (very truly) that much valuable information is procurable through their medium. He regrets the indifference manifested by too many to such sources of instruction; but while regretting such apathy, expresses a conviction that it is on the wane, and that numbers are not only benefitted themselves, but are disseminating instruction to their neighbours, beyond the present circulation of the papers themselves. We are fully certain that our correspondent is able successfully to advocate the adoption of such papers generally, from a firm conviction of their beneficial tendency; and we ourselves are convinced that amidst a farming population, no work is calculated to be more lastingly beneficial as a class-book in our common schools, than the Agricultural publications of the day.

Our Correspondent takes a view of the earlier progress of Agriculture,—of the rude implements then in use, now so greatly improved,—of the employment of animals for the more laborious operations of Agriculture, to lighten and soften the primeval curse,—expresses gratitude to the Almighty for his fostering care in causing the earth to bring forth its increase, corresponding to the wants of man,—contends that no more, in an average of years, than a fair proportion for the necessities of the whole human family, is produced, for that a surplus would neither tend to an increase of wealth or happiness. He notices the improvements consequent on a just selection of seed, its applicability to certain soils, seasons, situations and climates, and the necessity for a wise and systematic rotation of crops.

He touches, too, upon that bane of the farmer, prolonged credit, and stigmatizes it as injurious to the farmer's peace and happiness; extols the honourable calling of the farmer, which should never be compromised by any excesses,—advocates steady perseverance, skill, and economy, while he deprecates the growth of grain for distillation,—and contends for the application of the growth of so many misapplied acres to the feeding of an extra amount of stock; the manure from which

would more than counterbalance the amount of remuneration arising from the sale of the grain for such a purpose, and argues that a rapid improvement would soon be visible on our farms from such a course of procedure, and that no necessity would exist for the purchase of foreign manures, and contends that a great deterioration of the soil must ensue from an opposite practice. He exhibits the true independence of a practical scientific farmer, and places the agriculturist in his proper light, as engaged in a most honourable and needful employment, which makes him at once a safeguard to the state, and the most genuine benefactor of the whole human race.

We cannot suppose our correspondent aimed at mystifying us,—the general tenor of the communication precludes such a thought; but while the style borders on the hyperbole, we must confess that it nearly passes our limited comprehension how to separate the pure metal from the glittering tinsel.

We believe, from a conviction of the native good sense of our correspondent, that he will take these remarks in the kindly spirit in which they are dictated, and that his next paper,—which we hope soon to be favoured with,—will exhibit *solid*, without highly wrought superfluous matter, and we are quite sure it will be generally acceptable to our readers.

TO THE PRESIDENTS, VICE-PRESIDENTS, DIRECTORS, SECRETARIES, AND MEMBERS OF THE AGRICULTURAL SOCIETIES, THROUGHOUT WESTERN CANADA.

GENTLEMEN:

At a Meeting of the Directors of the Provincial Agricultural Association, lately held at Toronto, an extract from the proceedings of which is hereto appended,* you will observe that amongst other things, the President is directed to address the Agriculturists throughout the Province in behalf of the Association.

You are aware that an Act incorporating this Institution has been recently passed, and that under its provisions, two Exhibitions have been held,—one in Toronto in October 1846, and the second in Hamilton, in October last. It is also decided that the next Exhibition shall be held in Cobourg, in the Newcastle District, on the first Tuesday, Wednesday, Thursday, and Friday in October next.

The Premiums awarded at the two former Exhibitions, amounted to about twelve hundred pounds; of this sum, nearly three hundred pounds remain yet unpaid. The amount required for Premiums at the next Exhibition, will fall little short of seven hundred pounds.

Thus, Gentlemen, you will see that nearly one thousand pounds will be required for the above purpose, and for this the Provincial Association are wholly dependent upon you.

An application will be made at the next Session of the Legislature for a grant from the public funds in aid of this imporant Institution, and it is confidently expected to be successful. But it must be clearly understood that no part of this can be got for this year's operations; and under these circumstances, the Society must, as on former occasions, appeal to you for the contribution of a sum equal to the amount of Premiums to be awarded at the next Exhibition.

It is proper that you should be informed that, in future, all sums of money, voted or otherwise, raised for this object by the several Agricultural Societies throughout the Province, shall be applied solely to the payment of Premiums; and that the local expenses, for enclosures, erections of buildings, and other necessary preparations, shall be borne by the inhabitants of the locality in which the Exhibition for the time being shall be holden.

Besides the sum necessary for the last mentioned purpose, which will not be less than £250, to be raised by subscriptions in the vicinity of Cobourg, I am authorised to state that the several Agricultural Societies in the Colborne and Newcastle Districts have appropriated nearly £250 towards the Premiums.

Placed, as I have the honour to be, at the head of this Institution, which must, if properly supported, command an influence upon the destinies of Canada beyond that of any other Association, it would indeed be surprising, if on that account alone, I should not feel a great anxiety and lively interest in the success of our infant society. But being a practical farmer myself, and having spent nearly half a century amidst the practical operations as well as the science of Agriculture, in a part of Her Majesty's dominions which stands unsurpassed for spirit, zeal, and industry in the cause of husbandry, I cannot sufficiently express to you the deep solicitude with which I regard the dawn of a scientific system, which has done so much for the Farmers of the British Isles.

Amidst the various Associations formed on every hand for the purpose of fostering and protecting the arts, sciences, and the numerous learned professions, it would indeed be strange, as it would be disreputable to the people of this Province, if this Association, calculated as it is to support and encourage that great class of the community to whom all others must look for the supply of food, should be permitted to languish for want of pecuniary sustenance.

It has been charged, and I fear with too much truth, upon Agriculturists, that improvements in husbandry encounter great difficulties, if not direct opposition, from those whose interest it is to support them, and therefore work their way very slowly; whereas innovations and improvements made in the mechanic and manufacturing departments are seized upon and turned to advantage as soon as promulgated. The reason of this is obvious. Manufacturers, mechanics, mercantile men, and various other classes, are generally residents of, and congregated in, the towns and villages, and have intercourse and interchange of sentiments, by reason of greater facilities than the farmers, from their isolated position, can ever possess. We must therefore, if we would improve our condition, either physically, morally, or mentally, remove the obstacles by increased exertion, and determine to unite and make common cause with our brethren all over the world, in placing *our* profession upon a scientific foundation, by which, with far less labour and toil, we may expect to reap advantages which every other effort and exertion in the power of man will fail to accomplish.

From such considerations have arisen those numerous public Societies from which so many advantages have been produced,—Societies for promoting science and literature, arts and manufactures, and for encouraging knowledge, industry, and virtue in general. Foremost amongst these Associations, may be classed those for the support of manufactures and agriculture.

Now, as *all* are more or less intimately concerned in the benefits, and dependent on the skill of the tillers of the soil, it behoves *all* to aid and assist in all measures calculated to benefit the community at large. It is, indeed, imperative on all who have a spark of patriotism, to combine with such bodies as are formed for carrying out to the utmost the whole available resources of the country, and the genius and abilities of its population.

In proportion as we can raise amongst ourselves those necessaries which *all* demand, and those supplies which the more wealthy require, in such proportion will be our true happiness and independence.

Wealth, in whatever shape, must in Canada, as an agricultural country, spring from the soil, and proceed from the skill and industry of the farmer; and to encourage that industry and develope that skill, such Societies as "The Provincial Agricultural Association" are formed, and in the benefits arising from such institutions, every class must participate—artisan, mechanic, manufacturer, and merchant.

* Note from Minutes of Committee Meeting:

Resolved.—That an appeal to the several Agricultural Societies of Western Canada be drawn up and circulated, urging the necessity of renewed and vigorous action on the part of the friends of Agriculture, Manufactures, &c &c. throughout the Province, especially for the purpose of sustaining this association; and that Thomas Page and Henry Ruttan Esqrs. of Cobourg, be a Committee to carry this resolution into effect.

Experience has so fully proved that without unity of purpose no community can expect to accomplish any great object, that it would seem a work of supererogation to dwell upon that topic.

From small beginnings, within the term of about twenty years, a partial and imperfect organization has indeed been going on in isolated situations within the Province; and although some local benefit has been derived, still it is evident, without a combination and centralization of our energies, no lasting good to the Province at large need be looked for.

The means for such an union have now been afforded by the Act passed for the Incorporation of the Provincial Association; and a grant of five thousand pounds per annum has been made to aid in the formation and extension of District, County, and Township Societies; but no money has, as yet, been appropriated for the support of this Institution.

It remains, therefore, for you, Gentlemen, and indeed the whole of the population (for *all* are interested,) to say whether you will apply part of your means, either public or private, to the support of this *your own* Agricultural Society, and thereby place it on a fair basis,—or whether, by withholding your aid at this critical juncture of its history, you will ruin the prospects now opening before you.

Such a result I cannot by possibility anticipate, and in the fullest confidence of your support, commit the interests of the Institution to your keeping.

I have the honour to be, Gentlemen,
Your very obedient servant,
ADAM FERGUSSON,
President of the Provincial Agricultural Association, C. W.

For the Newcastle Farmer.

GOD SPEED THE PLOUGH.

God speed the Plough! the toiling Plough,
O'er hill and valley fair;
A blessing on *his* sunburnt brow,
Who grinds its shining share;
A blessing on his fertile land,
And on his loaded wain;
And on the merry harvest band,
That reap the ripened grain.

God speed the Plough! the peaceful Plough;
Sword! rust within thy sheath,
A most remorseless thing art thou,
The chosen friend of death:
Go, moulder with the Helms and Shields,
Of days long since gone by:
For the Plough hath won o'er bloodless fields,
A Holier Victory.

God speed the Plough! the noble Plough,
The tiller's manly toil;
That bids the golden harvests glow,
O'er all the fruitful soil;
Not ours the Olive or the Vine,
Of sunny France and Spain:
Thou hast withheld the oil and wine,
But giv'st the blessed grain.

Now, Ploughman trace the furrow fair,
Along the cultured mead;
Then, Father; to thy fostering care,
We leave the precious seed;
Thou, who hast heard the Lion's cry,
And fed the Raven's brood;
Send down thy blessing from on high,
And give thy children food.

...burg, 17th March, 1848. R. A. P.

EXPERIMENTS WITH COMMON SALT.

(From Correspondents of Gardeners' Chronicle.)

...tried salt on a four-acre field, newly broken up, and ...oats, the plant very fine, but in March nearly destroyed ...wireworm, and when harvested, produced about ten or ...sacks only. I sent to the salt pans near us and got ...bushels of the best salt at 1s. per bushel, and sowed it ...broadcast. It was ploughed in for a seed-furrow, and sown to wheat: the produce, seven sacks to the acre. The wire worm was destroyed, save in one or two places where these destructive creatures seem to lie in a bed. It was in the next ploughing and marling totally destroyed. Where salt is sown, the wheat continues to look green longer, and is about ten days later for the sickle than those wheats sown at the same time, and where no salt was applied.

2. Experiment was in a field sown to turnips. The wireworm was thinning them so rapidly that my foreman said they would single my turnips for the man who was hoeing them. The weather was showery, and I had sown two to three bushels of salt per acre. On examining the roots, the wireworms were found stiff and dead, and the crops came away luxuriantly, and I had a fine piece of turnips.

3. Field of seven acres was sown with salt. The turnips and oats were good; but I did not get entirely rid of the wireworm till I had marled the land well. The wheat crop good and the grain heavy. As the climate here is very dry, I sowed salt, as it causes the soil to retain its moisture much longer. I have also found it very beneficial to grass seeds. I consider the benefits arising from salt used in mixens and dung-heaps to be these:—It destroys the eggs of insects and slugs harboured in them: also prevents the germination of seeds of noxious weeds, which are commonly conveyed to the field in the dung cart, and so propagated; prevents fire-fang, and causes the heap to retain its moisture. In addition to these effects, it is beneficial in like manner to the future crop.

In reference to the use of salt as a condiment, I had a cow attacked with jaundice, or the "yellows." It was ailing several months, and looked poor though fed upon turnip. I generally kept a lump of rock salt in the yard, but had none at this time. I got some blocks and gave her one, which she daily licked, and shortly became quite fat and sleek in her coat. I gave it to sheep, horses, and rarely are my animals ill.—*X. Y. Z.—Hants.*

Salt was tried here this year as an experiment of its action on roots—potatoes, Swedes, and mangold wurzel. Potatoes, no effect whatever visible; Swedes, beneficial; mangold wurzel, beneficial in a higher degree.—*Sigma.*

WHITE CARROTS.—My long practice in the cultivation of the soil, and a due regard to Nature's laws, embolden me to write to you for that information you are pleased to impart on such subjects. From my observation on causes affecting the growth of vegetable productions by electricity, I referred this subject, which is of great importance, to men who have taken out their degrees in the school of philosophy, and who have more time to display their theoretical reasoning; but the Ruler of all events, as in the case of the potato blight, has thought fit to confound their arts and reasoning; as said hitherto, "Thus far shalt thou go, and no farther."

In my observation on a former occasion, relative to the premature growth of the Belgian white carrot, I said they had been frequently complained of this year by those who sowed their seed in April and May. I sowed my main crop during the first week in May, on a moory, drained bottom, with farmyard manure trenched in early, and this sowing showed signs of premature growth, while the red Altringham, sown same time with the like preparation, showed no signs. I sowed the white Belgian carrot again on the 1st of June, on the same bottom, with lime and clay incorporated, and they showed no signs of starting for seed, and their roots are very little inferior to those sown in May. From these experiments, I conclude that the proper season for sowing this valuable root, the white Blegian carrot, is not known; and I further observe, as already hinted, that from the luxuriant top-growth of this biennial root, the application of too much manure, consistent with the preparation of the soil, should be guarded against.

TO MAKE BREAD WITH MURIATIC ACID.—Take 2lbs. of meal, add 2 drachms of bicarbonate of soda, and mix the soda and meal as well as possible. Take 2 ounces by measure of muriatic acid, and add 10 ounces of water; of this *strong* acid take 2 ounces, and add a *pint* and a half of water; make an opening in the centre of the meal, and add this diluted acid as *quickly* as possible, mixing it effectually with the meal, which is immediately to be put into a tin shape, and at once placed in the oven, or pot, previously heated and ready to bake.—*Farmers' Gazette.*

Miscellaneous.

PLOUGH DEEP TO FIND THE GOLD.

Plough deep to find the gold, my boys!
Plough deep to find the gold!
The earth hath treasures in her breast
Unmeasured and untold.
Clothe the mountain tops with trees,
The sides with waving grain!
Why bring over stormy seas
What here we may obtain?
Oh, Britain need not bring her bread
From countries new or old,
Would she give her ploughshare speed,
And DEPTH to find the gold!
Plough deep to find the gold, &c.

Mark yon field of stately stooks
Rise on an Autumn day!
Lusty Labour jocund looks
Amidst their thick array;
Mark the barn-yard's ample space
How grateful to behold!
Towers of riches fill the place—
Plough deep, and find the gold!
Plough deep to find the gold, &c.

Earth is grateful to her sons
For all their care and toil;
Nothing yields such large returns
As drained and deepened soil.
Science, lend thy kindly aid,
Her riches to unfold;
Moved by plough or moved by spade,
Stir deep to find the gold!

Dig deep to find the gold, my boys!
Dig deep to find the gold!
The earth hath treasures in her breast
Unmeasured and untold.

A RAILWAY GHOST.—A ludicrous incident happened near Stockham, on the Lancashire, Cheshire, and Birkenhead Railway, a few days ago. It is pretty well known that the operations on this railway have stopped for the present. A few men were left for the purpose of carrying on some minor excavations which were thought necessary. About a month since a man was unfortunately killed by the falling in of the tunnel near the place where the men were set to work; and the men heard or thought they heard, most distinctly, the sound of a pickaxe on the very spot where he had been killed. The wind had been rather high for three or four days, but still they heard the monotonous sound of the dead man's work in the tunnel. At last it was agreed that one of them should descend and ascertain how matters stood, and if there should be anything to fear, a signal was to be given and the adventurer drawn up again. One of the party immediately consented, boasting that he feared not devil nor man. Accordingly, the rope was fastened round the waist of the hero, and he was let down the shaft, his companions ready, on the least notice, to draw him up. The boaster had not reached the bottom before a cry was heard from below, and such a twitch was given to the rope as plainly bespoke that something was the matter. The man was pulled up instantly, with a countenance pale as death, on which terror and consternation were strongly depicted. To the almost gasping inquiry of "What is it?" "What hast a' seen?" he related that, no sooner had he got to the bottom, than he plainly saw the white, pale face of the dead man, which went backwards and forwards as if he was at work, but which he recognized immediately as the countenance of his late friend. The news was quickly spread in the neighbourhood, and the "railway ghost" was the theme of every tongue; several persons went to hear the sound of the ghost at work, until a tipsy man in a pot-valiant fit would be so obstinately bold as to go down and fight the ghost! willing to see how such an one would act, they let him down, and in about five minutes drew him up again, with the innocent cause of all their terror in his hands. It proved to be a large new tin powder can which had been left there by the men, and which had been placed in rather a rickety position on a projecting stone. It was splashed with mud, in such a manner that it somewhat resembled a man's face, and the wind through the excavation had caused it to jolt from and against the side of the tunnel.—*Liverpool Albion.*

A VALUABLE TABLE.—The following valuable table was calculated by James M. Garnett, Esq., of Essex county, Va., and first published in Mr. Ruffian's Farmer's Register:—

Table.—A box 24 inches by 16 inches and 11 inches deep, will contain a half barrel, or 5,376 cubic inches.

A box 16 inches by 16 8-10 inches square and 8 inches deep, will contain a bushel, or 2,150 4-10 cubic inches.

A box 12 inches by 11 2-10 inches square and 8 inches deep, will contain half a bushel, or 1,074 cubic inches.

A box 8 inches by 8 4-10 inches square and 8 inches deep, will contain one peck, or 537 6-10 cubic inches.

A box 8 inches by 8 inches square and 4 2-10 inches deep, will contain one half peck, or 268 8-10 cubic inches.

A box 7 inches by 4 inches square and 4 8-10 inches deep, will contain a half gallon, or 131 4-10 cubic inches.

A box 4 inches by 4 inches square, and 4 2-10 inches deep, will contain one quart, or 67 2-10 cubic inches.

These measures come within a small fraction of a cubic inch of being perfectly accurate, as near indeed as any measures of capacity have ever yet been made for common use; the difficulty of making them with absolute exactness has never yet been overcome.

GLORY.—The following illustration of the lines in Hamlet—

"Imperial Cæsar dead, and turned to clay,
Might stop a hole to keep the wind away;"

occurs in a Yorkshire paper: Millions of bushels of human bones have been transported from the continent to Hull for agricultural purposes. These, which were collected on the plains of Leipsic, Austerlitz, and Waterloo, were the bones of the bold, the brave, and the chivalrous, who fell fighting their country's battle; with whom were mixed the bones of the horses, and both were conveyed to Yorkshire, where they were ground to dust, sent to Doncaster, and sold for manure.

CATCHING BEETLES.—A gentleman in Penrith, whose house is much infested with beetles, got out of bed one night last week, and, after executing a few of these gentry, lay down again, hoping to have peace. However, he had got scarcely into a slumber, till he found one, as he imagined under his head, which he seized with a shudder and threw across the room with great violence,—when he discovered, but too late, that the supposed beetles was his watch seal, and that he had broken his watch to pieces by throwing it against the wall.

A NEW ROTARY FOUR-HORSE POWER ENGINE IN A HAT-BOX.—Mr. Elijah Galloway has patented what has hitherto been esteemed much more as a philosopher's stone of steam-power than a practicable invention. It is said to be so wondrously portable as not to weigh more than two or three cwt., and not to occupy more than half the space of an ordinary hat-box. A steam-pipe from the boiler brings the steam into the receptacle; an eccentric crank is turned by the rotary motion within it; and here is all the machinery said to be necessary to propel the largest engines, whether mining, marine, or locomotive. The Admiralty are said to have ordered an estimate for supplying the *Minx* with a fifty-horse power one. They could not do better, we think, than name such a little whirling machine the *Minx* itself, and provide it with the all-sufficient accommodation of a band-box.—*The Builder.*

UNWOMANLY TASTE.—The Marquis of Breadalbane has been entertaining a shooting party at Taymouth. The Duchess of Montrose shot four splendid bucks in the marquis's forest, three having royal heads, besides stalking in first-rate style. No hill or glen no object, and all obstacles easily surmounted when game was in view.

AN EXCEPTION.—Shakspeare says that "use sleeps over habit." We tried the experiment on a coat, but it did not answer at all.

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