THE

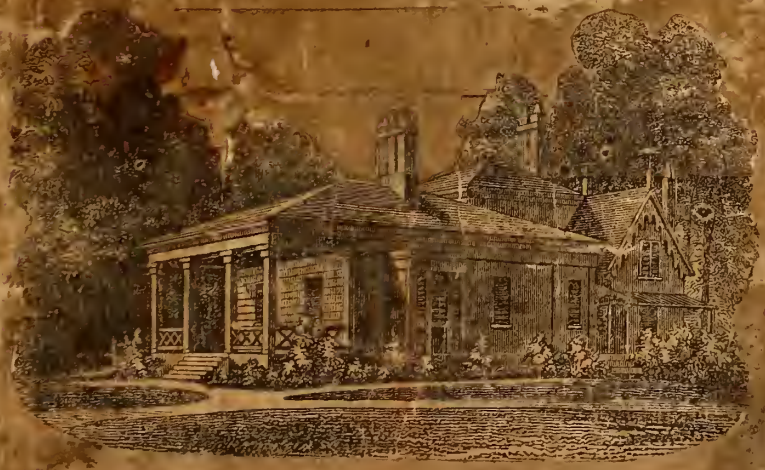
SOUTHERN PLANTER,

DEVOTED TO

AGRICULTURE, HORTICULTURE,

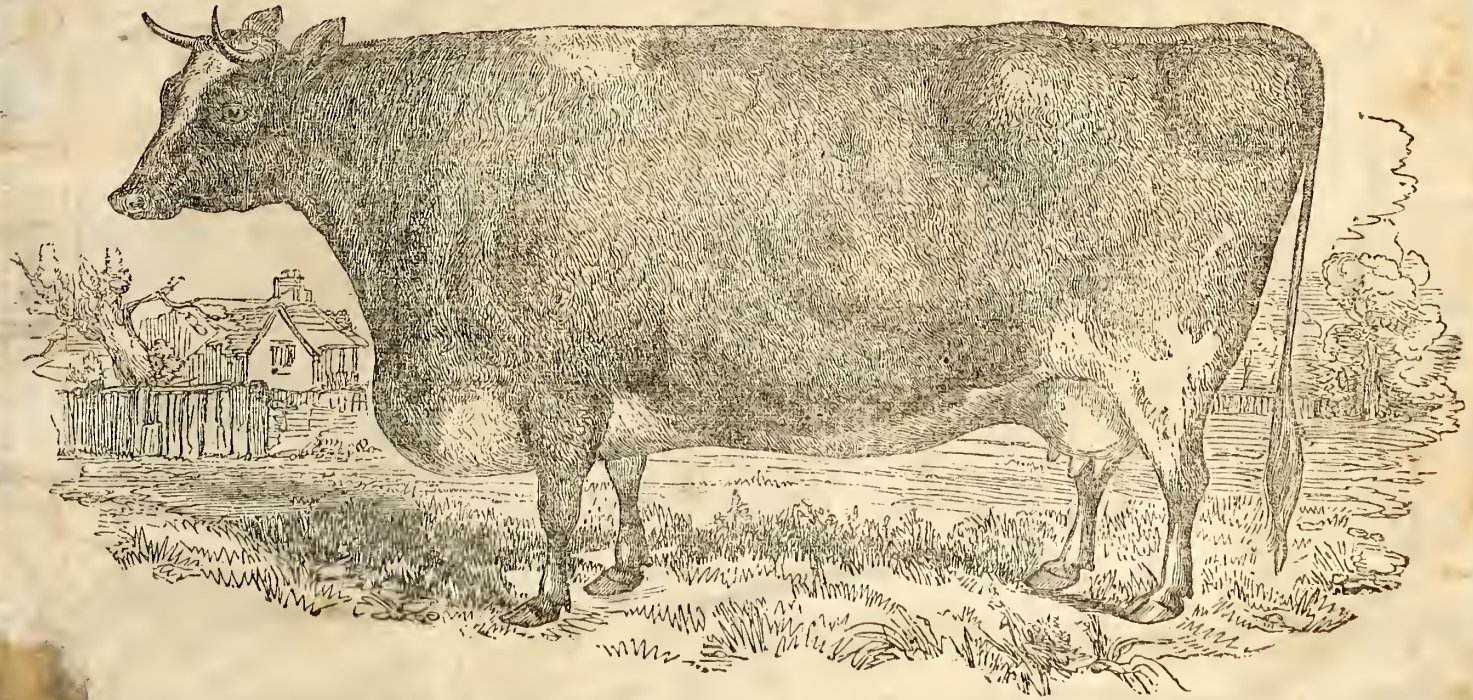
AND THE

HOUSEHOLD ARTS.



RICHMOND, VA.
MACFARLANE & FERGUSSON, PRINTERS.
1861.

DUTCHESS 34th---The Property of Thomas Bakes, Esq., Kirkleavington, England.



Dutchess 34th is the most splendid cow we ever saw, and we know of nothing that can compare with her, except two three-year olds that we were shown along side of her at Kirkleavington. She is descended from the old stock which has been bred in Durham for two centuries, and has the distinctive mark of the short, fine, clear, *upturned*, waxy horn, peculiar to this superior tribe. She is now nine years old, has had eight calves, and, though repeatedly shown against the best cows in England, has never been beaten. She was offered a few years ago, by her breeder, to come to America, but was declined, as we understand, through the influence of Mr. Whitaker; whether because he was not aware of her merits, or that he thought she would make too fine a show along side of much that he sent out here, we did not learn. Had our breeders possessed her, and a few others at the time offered, our Short-horn stock now could not be beaten in England; as it is, we must still continue to purchase for improvement.—*American Agriculturist.*

THE

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Agriculture, Horticulture, and the Household Arts.

Agriculture is the nursing mother of the Arts.—XENOPHON.
Tillage and Pasturage are the two breasts of the State.—SULLY.

J. E. WILLIAMS, M. D., PROF. WILLIAM GILHAM, } EDITORS. { AUGUST & WILLIAMS, PROPRIETORS.

VOL. XXI. RICHMOND, VA., JANUARY, 1861. No. 1.

From the Christian Intelligencer.

"Peruvian Guano, and Phosphates."

With no sort of propriety can it be said, that Peruvian guano is a *stimulant* to vegetation, in the common sense of the word—1st, because it has almost no stimulating property whatever; and 2nd, because if it had, vegetation itself is not, and cannot be the subject of *stimulation*. We very properly call alcohol a stimulant, simply and only for the reason, that when it is brought in contact with the sensation nerves, and blood-vessels, of an *animal*, it produces in them a peculiar irritation or excitement, called *stimulation;* but as guano is almost devoid of any stimulating principle of any kind, and as plants have neither nerves, blood-vessels, nor sensation, nor any thing else precisely analogous thereto, of course it would be simply absurd to liken the action of the one, on the vegetable organism, to that of the other on the animal economy.

Equally true and demonstrable is it, that guano does not *stimulate* plants in any manner or sense whatever. No doubt there are many very credulous farmers, who, making it a point to believe every thing they read in the advertisements of interested manure *manufacturers*, very dogmatically assert the contrary of this, and talk very flippantly on the subject, who have no definite views of any kind, as to the action of guano. There are others, however, who make a sort of figurative application of the word *stimulant*, and with some show of plausibility contend, that as guano (because of its relatively large per centage of ammonia) uniformly and invariably causes a rapid and excessive growth of the stalks and leaves, and corresponding extention of the roots of plants, its constant and inevitable tendency, is to drain the soil of the mineral constituents of plants, and that a frequent application of this fertilizer, to the same land, will sooner or later—surely—effect a complete and hopeless exhaustion of the soil, by depriving

Dr. Jacob Townsend," was the inventor of the matchless and inimitable *"Townsend Sarsaparilla!"* But as he is clearly of the opinion they are all good, he concludes it best to try them all, by throwing all the different kinds into *pi*, and making a sort of *pell-mell* application, like a physician I've heard of, who in an obscure case, gave his patients *a dozen different kinds of medicine at once, in order, as he said, that Nature might choose between them which she'd prefer.* Being anxious, however, to test the merits of each fertilizer, he of course reserves small portions of each for separate experiments, but being much surprised and *taken aback* to find little or no difference in the crop, is puzzled to solve the mystery much in the same way of the school-boy, who, in working a sum in *substraction*, insisted it must be a mistake in the arithmetic to say *"Naught from naught and nothing remains,"* for somehow or another, *"Naught certainly does remain."*

But one very desirable quality claimed for *phosphates* is, that while they do not very sensibly promote the growth of the *straw*, they do invariably produce a *marvellously fine effect on the grain*, both as to the quality and yield, that the heads of wheat have more grain in the mesh, and are besides longer, fuller and plumper than those grown from Peruvian guano, and other forcing manures. Possibly this may be so, and that in process of time some hopeful and public spirited farmer, who has faith in them, will greatly improve our breeds of wheat by lengthening the head and shortening the stalk, (much in the same way that the short horn breeder, by careful breeding, improves the form of his cattle,) so that the tall, rangy, shanghai stalks of the Poland variety shall at last come to be decidedly dwarfish and duck-legged in their proportions. But while the *theory* is that *phosphates* produce an astonishingly fine effect on the grain, the general *experience is, that when used alone, they produce little or no effect of any kind.*

But since the necessity of applying *phosphates* to all worn and exhausted soils, is generally admitted and urged by chemists, it has been deemed advisable to mix Peruvian and Phosphatic guanos together, *half and half*, by a peculiar mixing and grinding process, called *manipulation*, by which is produced a fertilizer, finely powdered, convenient to handle, and several dollars in the ton cheaper than the Peruvian, and no doubt it is a good thing. But after all it is questionable whether the mass is a great deal *enriched* by the addition of the *Phosphates.* Indeed the idea of *improving* Peruvian guano by any such means, reminds me of an anecdote I have heard told of an *old toper*, who one day being quite *thirsty*, as well as quite out of money, went to a neighbor who had some good cider, and told him if he would give him a pitcher of cider, he would advise him how to fatten his hogs very cheaply. The cider was brought and drunk, and the *recipe* demanded. "Take," said he, "one bushel of saw-dust and one bushel of meal; mix the same well in a barrel, and then add water sufficient to cover the whole; let it stand till cool, and then feed of the mixture to your hogs, plentifully, three times a day, and they will fatten astonishingly

fast." The neighbor was delighted; but just when the old toper had drained the pitcher, and was about leaving, he dryly remarked: "I forgot to tell you, neighbor, that instead of a bushel of saw-dust, it would be *better* to use only half a bushel, *and upon the whole, I dare say it would be better still not to use any at all.*"

And yet every farmer should be willing and anxious to give these *manipulations* an extended trial. It is only by a series of the most careful experiments that he can determine their value, and he should regard it his bounden duty to try them fully and fairly. In the mean while, I would advise him to preserve his *equilibrium,* and not suffer himself to be carried away by "every wind of doctrine." "'Tis a base abandonment of reason to resign his right of thought," and he ought to think and act calmly, dispassionately, and impartially, not taking anything for granted, but questioning everything; and while it is right to respect chemistry and to honor the chemist, who has done, and is yet doing very much to elevate and advance the noble art of agriculture, he should recollect that the chemical and physiological *laws* which regulate and control vegetable assimilation and nutrition are as yet but little understood by the chemist, and that in truth it may well be said of him, as Hamlet pithily remarked to his friend, Horatio: "there are more things in Heaven and earth than he ever dreamed of in his philosophy."

P. B. PENDLETON.

Louisa County, October 25th, 1860.

From the British Farmer's Magazine.

The Forces used in Agriculture.

A paper by MR. J. C. MORTON, *read at the Society of Arts, Wednesday, December* 7, 1859. J. BENNETT LAWES, Esq., *in the Chair.*

The three forces to which I shall refer are steam-power, horse-power, and manual labour. Each of them has employment in our present English agriculture, and one object of this paper is to point out the extensive fields open, especially to the first and last of them, in the agriculture of the future. For there are three classes under which all the operations of the farm may be arranged, and they correspond exactly to these three forces which we have at our command.

In the first, where the greatest uniformity of process obtains, the greatest power is needed, and a purely mechanical force, acting through levers, wheels and pulleys, is in this way sufficiently under our control for their performance, and this class of operations increases in extent and in importance with almost every permanent improvement of the land, *i. e.*, with everything which tends to the uniformity of its condition. In the second class as much force is needed; but rocky subsoil, awkward hedge-rows, crooked roads, and scattered produce, interfere with any possibility of uniform procedure. Some machinery, more pliable than cranks and rods, is needed by which to carry out the purpose of the mind; and here, therefore, it must work by means of the teachable and powerful

horse. This class of operations diminishes in extent and importance with every permanent improvement of the soil, *i. e.*, with every removal of those obstacles to which I have referred. In the third class, the care and cultivation of individual life, vegetable and animal, are concerned; no great power is needed, but there is need for the constant and immediate exercise of the will, varying, it may be, at every successive moment; and here, therefore, the human mind can work only by its most perfect instrument—the human hand. It is plain that everything by which, on the one hand, land is brought to a uniform condition, and by which, on the other, the quantity of its living produce is increased, will extend the first and last of these three fields of agricultural operations, and will diminish the necessity of employing horses.

And this is no mere speculation: it is the principal lesson of the agricultural experience of the past few years. If we knew for several successive years exactly the employment of our agricultural labourers, its nature, its quantity, and its reward on each of the farms which make up the surface of Great Britain; and if we also knew the quantity and the manner during all these years of the horse-labour of all these farms, its cost per acre and its effect; and if, in addition to all this information, we had the full experience, now very considerable, of the use of steam-power upon the farm, not only for threshing and grinding and cutting, but for cultivating the soil, we should certainly learn from it how rapid has been the extension of those circumstances under which steam cultivation becomes possible, and how perfectly along with it the demand for agricultural labour has been maintained. Such a review of agricultural experience, would, however, teach us more than this, for by a comparison of the experience of different farms we should learn the most economical mode of obtaining these powers, and the best way of applying each within the field thus open to it. We should learn how to ensure the most economical and efficient condition of our steam engine and its machinery; we should learn how to obtain the most economical and efficient horse labour; and by so large an experience those circumstances would be pointed out under which the best farm servants are to be procured and retained.

The forces used in agriculture, thus considered, form, therefore, a very extensive subject, and it is only two or three illustrative remarks under each of these several aspects of it that can be made within the hour.

In the first place, then, let me attempt a more particular comparison of steam power, horse power, and hand power for the cheap performance of mere labour. In describing steam engines, the term "horse power" is used as a unit of force. The power exerted by a horse is assumed, on the authority of experiment, equal to the pull or lift of 33,000 lbs., 1 foot per minute; and to this agricultural experience agrees, for if a pair of horses draw a plough along with an average pull of 300 lbs., at an average rate of 2½ miles per hour, *i. e.*, of 220 feet per minute, it is the same as if those 300 lbs. were pulled over a pulley, *i. e.*, lifted that height in that time, and 300 lbs. lifted 220 feet per minute is just the same

as 66,000 lbs. lifted 1 foot high per minute, which, as the performance of a pair of horses, is exactly the 33,000 lbs. apiece, at which their force is valued by the engineer. Now, it is not on a comparison merely of the *cost* of horse power in the animal and in the engine that so great superiority of the latter will appear as really belongs to it. In addition to this, the performance of which they are severally capable must be taken into account. An ordinary 10-horse power locomotive agricultural engine will, according to the Chester judges of the work done by Fowle's steam plough there, cost in coals, oil and water, and attendance, and tear and wear of implement and engine, but excluding interest on capital employed, nearly 45s. a day, or about 4s. 6d. an hour, which is 5½d. per hour for each nominal horse power exerted, but as the real force exerted is more often that of 20 horses in the case of a 10-horse power engine, we must really divide this by 2, and call steam-produced horse power worth 3d. per hour. Now, the cost of horse labour on 21 farms, in different parts of this country, of which the particulars have been kindly given to me, did not exceed 5d. per horse for each of the working hours of the year. Those farms employ 282 horses, and they cost for food, for depreciation of value and saddler's and blacksmith's bills, £7,815 a year; their implements need £870 a year to keep them good; and the ploughmen and boys employed about them cost £4,241 a year in wages—about £13,000 in all, or £46 per horse per annum; and supposing that there are 2,500 working hours in the year, this is rather less than 5d. per horse per hour.

Besides this, the estimated expense of Fowler's engine was, I believe, excessive, and the nominal power of it was certainly below the actual force at which it could be worked with the estimated quantity of coal consumed; for of 30 engines tried at Chester only one consumed the 11 lbs. of coal per hour for every horse power produced, which is the consumption named for Fowler's engine, and the majority did not consume more than 6 to 8 lbs. during that time.

A horse at plough with an average length of 120 yards of furrow loses one-third of his time on the headland in the mere act of turning the plough. At the dung-cart not one-third of his time is employed in the actual conveyance of the load, two-thirds are lost standing at the heap and in the field and returning with the empty cart. Or rather, let me say this loss of time is a necessary part of his employment, however he may be engaged. He can pull 33,000 lbs. 1 foot high in a minute, but he cannot keep that performance up for 10 hours at a time.

On six farms the details of which I have so ascertained as that all the ploughing, scarifying, harrowing, rolling, horse-hoeing, carting—all the horse labour in fact on each—is converted into lbs. lifted so many feet per minute throughout the working year, I find that the actual performance per hour through the year is not 33,000 lbs. lifted 1 foot per minute, but more nearly one-half that quantity, varying from 14,000 lbs. in the lowest case, to 19,000 lbs. in the highest.

No doubt, even in the case of steam power, there must be periods of waste labour—ploughs must be turned upon the headland even if it be done by steam; but these occasional periods of comparatively fruitless work are no necessary con-

dition of steam power; *it* is better if maintained continuously, and machinery will be invented to reduce this waste time to a minimum with a positive advantage to the efficiency of the engine. Whereas in horse labour, the waste time is necessary for the maintenance of the power itself. And it is plain that, along with the 5d. per hour for every horse, which on the average it may cost, there has to be taken into account a performance on the average of the year of only 19,000 lbs. lifted by it 1 foot high per minute as its best result; whereas in the case of the steam engine *its* 3d. per horse per hour has to be taken along with nearly twice as large a performance as *its* best result.

And the relative cost of the two forces is affected not only by the question of time during which each can be continuously maintained, but also by the quality of the performance of which each is capable. In thrashing, uniformity of speed is a condition of good work; it is more easily maintained by steam power than by horses. In ploughing, the avoidance of trampling and of pressure generally is almost a condition of good work; it is more easily obtained by steam-drawn machinery for the purpose. But to this I shall recur.

Let us now estimate the cost of manual labour engaged in what I call mere work, *i. e.*, where the least degree of skill is called for. I have four facts in illustration of this point:

1st. A man will dig 8 perches of land, or say 2,000 square feet, nearly a foot deep, in a day. In doing so he lifts probably three-quarters of it through at least a foot in height; that is to say, he lifts 1,500 cubic feet, weighing at least 150,000 lbs., 1 foot high in ten hours' time, and to do it therefore he must maintain upon the average a lift of 250 lbs. per minute all that time. Of course, in addition to the mere lift, there is the labour of cutting off this earth from the firm ground to which it was attached. In my second case, then, this portion of his labour is very much reduced. 2nd. Three men will lift—I have often paid them for doing it—100 cubic yards of farmyard dung, and fill into carts in 10 hours' time. The 33 cubic yards which fall to each man's share, or about 14 cwt. apiece, weigh 50,000 lbs., and this is lifted over the hedge of the cart, or 4 feet high—equal to 200,000 lbs. lifted daily 1 foot high, or 330 lbs. per minute. This is one-fourth more than in the last case. Now take one where there is no labour in detaching the weight from any previous connection. 3rd. A man will pitch in an hour's time—I have often seen him do it—an acre of a good crop, tied in sheaves, to an average height of full 6 feet, on the cart or wagon. Straw and corn together, such a crop will weigh more than 2 tons, say 5,000 lbs. In doing this he therefore lifts 300,000 lbs. 1 foot high in 10 hours' time, or 500 lbs. per minute. 4th. My fourth case is much the same kind. One man and five boys, or women, equal as regards wages—and I will therefore assume equal as regards power to three men—will throw into carts upon an average, of swedes and mangel wurzels, 3 acres of a good crop, say 70 tons in all, in a day of 9 hours' length. They lift, then, 150,000 lbs. 4 feet, being, say 600,000 lbs. 1 foot; being 200,000 lbs. apiece in 9 hours' time, or about 370 lbs. a minute.

These four cases indicate the mere force of a man, then, at a cost of, say 3d. an hour, as equal to a lift of 250, 330, 500, and 370 lbs. per minute; the two former being cases where the load has to be detached as well as lifted, and the third being performed under the influence of good harvest fare.

But now compare this, even in the best case, with the duty of a steam engine, or 33,000 lbs. 1 foot high per minute for 3d. an hour, and compare it with the actual average performance of the horse, 16,000 lbs. lifted 1 foot per minute for 5d. an hour. In order, at the best rate named, to do the work of the steam engine, 66 men would be required, at a cost, not of 3d., but of more than 15s. per hour; and in order to do the work of the horse 32 men would be needed, at a cost of 8s., instead of 5d., an hour. It is plain that if we can take much of the mere labour of the farm out of the hands of the labourer, and put it into the hands of steam power for its performance, there is an enormous amount of saving to be made in the cost of agricultural production. It is plain that it is mere folly in the labourer to think that, as regards the *mere* labour of the land, he can compete with either steam power or horse power. Strength of body is desirable, and sinew hardened by long practice in hard labour has a considerable marketable value; for that, however hardly it may sound, is the aspect of the matter in which the interests of the labourer most directly appear; but it is plain that for sheer lift and the mere putting forth of force, horse power, and still more that of untiring steam, must grind the soul of anybody that shall pretend to competition with them. It is in the cultivation, not so much of mere strength of body as of skill and intelligence, that the safety of the labourer lies, and in his capability of education he is perfectly secure.

As the matter at present stands, then, and confining ourselves to that large and increasing class of operations in which the power required is great and the process almost uniform, and looking only to the cost per unit of work done, we have seen that steam power stands decidedly first in the race; horse power is a tolerably good second, and the agricultural labourer is literally nowhere. There are, however, two considerations which greatly affect the position of horse power in this competition, and place it much further back than it would at present seem to be. They both affect its fitness for those acts of cultivation where it is plain that there is the greatest room for an extended use of steam power. I refer, first, to the injury done to the land by the trampling of draught animals; and secondly to that irregularity of employment on the farm for horses during the year, which in effect makes you keep upon a large farm several horses all the year round for the sake of their work during a few weeks of spring and autumn. If a steam engine, which costs nothing when it is idle, can be used to take this extra work, and so reduce the horse labour of the farm to an uniformly monthly amount, then its cost has to be compared, not with that of the horses which it has displaced only during the few weeks in question, but with the cost of those horses throughout the year. It is this fitness of the engine for the cultivation of our stubbles in autumn, and so its power to displace so many teams throughout the

year which would otherwise be kept just for the few weeks of most laborious time, that greatly heightens the economy of its employment. And as to the superiority of its work of cultivation, I will just quote the statement of a ploughman on the clay land of the oldest steam-cultivated farm in England—Mr. William Smith's farm, of Little Woolston, in Buckinghamshire—that in turning back the wheat stubble in the autumn with the horse-drawn plough, he used often to uncover the foot-prints of the horses' shoes which had trod there at that depth when turning in the bean stubble for the seed twelve months before. Of course it is no part of good agriculture that all the produce of the land is to be made out of a particular layer called the soil, which has to be cultivated, turned to and fro, and stirred and mixed upon an impervious floor hardened by a perpetual trampling, below which lies the subsoil. All recent improvements of the soil have proceeded upon the idea that there is no essential or necessary distinction between it and the subsoil—that *thorough* drainage and deep cultivation both increase fertility, and that the existence of anything like a pan within thirty inches of the surface is injurious. The ability of steam power for the deepest cultivation, and its applicability at the same time to the thorough cultivation of any depth to which it may be desired to stir or turn the soil without any pressure on it except by the wheels of the implement employed, must ultimately obtain for it the preference over horses for all mere ploughing and stirring, especially of clay land. And a very large share of the horse-labour of ordinary agriculture will thus be handed over to the steam engine.

Let us consider how much. I will refer to three instances. On a farm of 675 acres, occupied by Mr. Melvin, at Bonington, near Ratho, in West Lothian, the whole horse labour of cultivation and carriage being converted, as I have already said, into weight lifted, amounts to upwards of 100,000 cwt. pulled, *i. e.*, lifted one mile per annum. Of this the ploughing and scarifying alone amounts to 27,000 cwt., or more than one-quarter; the harrowing, rolling, and drill cultivation amounts to upwards of 20,000 cwt.; and the carriage of dung, crops, and produce amounts to 60,000 cwt. lifted one mile. The carriage is here an enormous proportion, more than one-half of the whole horse-labour of the farm, and much beyond its average amount in ordinary experience; but still even here one-quarter of the horse-labour goes in mere ploughing, which can all be done by steam-power, and *so* done as that an eight-horse-power engine shall displace more than eight horses, and do their work much more effectually.

Again, on a farm of fen land of 790 acres, occupied by Mr. Atkin, near Spalding, Lincolnshire, where the horse-labour of the farm is nearly the same as in the last instance, or equal to 100,000 cwt. lifted one mile per annum, the carriage does not exceed much more than a quarter of the whole, while the ploughing is nearly 40,000 cwt., 4-10ths of the whole labour, and the harrowing and rolling about 35,000 cwt. per annum.

On Lord Ducie's farm at Whitfield, Gloucestershire, 260 acres, the horse-labour amounted to 37,000 cwt. lifted one mile per annum; and of this 12,000

(one-third) was carriage, nearly 15,060 (or 4-10ths) was ploughing and cultivating, and the remainder harrowing, rolling, and drill culture. This seems to be a pretty ordinary division of the labour; and if it applies generally to arable land, it would appear that though farm-carriage and all the lighter work of harrowing, drilling, and rolling continue to be done by horses, there are still 4-10ths of the horse-labour of the farm which may be done by steam. I know that a great deal ought to be said of the great advantage of this substitution, owing to the more thorough performance of the cultivation which steam-power will accomplish. Ample evidence exists on steam-cultivated farms in this country on this point; but I will leave it to be adduced by others who may follow me, and I will continue to speak merely of the saving of the expense which is thus effected. It appears, then, that on arable land two-fifths of the horse-labour of the farm can be handed over to a power which is capable of nearly twice as much duty for about one-half the expense. One other remark on this point, and I have done. On examining the horse-labour of a farm of 240 acres of arable land under alternate husbandry, it will be found that it does not much exceed 500 days of a pair of horses in the year, and that need for it is distributed among the months extremely unevenly. Not more than 35 days of a team per month are wanted in December, January, and February; about 45 days a month are wanted in March and April, May and June; about 15 days are wanted in July, about 60 in August, 90 in September, and 55 in October, November, and December. August and September stand highest; and as there are not generally more than 24 working days in each of these two months, there must be a provision of at least 3½ pair of horses all the year, in order that the work of August and September may be done. Now the two-fifths of the horse labour, which is proper for steam power, is not going merely to displace two-fifths of these seven horses through the year; for the ploughing and cultivating, being done by steam, will take, not two-fifths, but more than half of the labour of the incumbered months of March and April, May and August, and September and October, and so reduce the amount to something like 35 days' work during each month of the year, which two pairs of horses will more than easily accomplish.

I believe, then, that by steam-power at least three out of every seven horses on arable land may be dispensed with all the year, at a cost not exceeding the cost of these horses during the three or four months when alone they are really needed on the land.

The first-class of operations then upon the farm, which includes the ploughing and turning of the soil, will be taken by steam-power out of the field of horse labour, just as threshing, and cutting, and grinding have been taken by it out of the field of hand-labour.

To the second division of farm work I shall refer but very shortly. It includes such cases of ploughing and cultivation as are taken, by very rocky subsoil and very crooked hedgerows, out of the scope of the steam-driven plough; it also includes the lighter class of horse-work, such as harrowing and horse-hoeing, which

however might very well be done by steam; and it more especially includes the work of carriage, which, considering the scattered position of the produce to be collected, and the crooked roads along which it must be drawn, I see no probability, as long as these remain, of getting done except by horse-power and manual labour in the usual way. Mr. Halkett does, indeed, propose to remove these obstacles, and is therefore able to accomplish all by steam. The third class of operations includes the lighter work, requiring skill and thought as well as labour. The planting of seed equidistantly within the land may be done by machinery, but the culture of the young plant, much of the hoeing of the land immediately around it, and its treatment during growth according to its condition, must be left to the hand. When ripe it may be harvested by horse-drawn implements: our corn crops are reaped, our potatoes may be dug, and roots cut from the ground by horse-drawn machines—they must however be gathered into bundles or heaps, and ultimately removed by the help of manual labour.

When stored they are threshed, and ground, and cut, and steamed by steam-driven engines, but they must be administered as food by manual labour. Leaving the vegetable, which, even when living, may be treated to some extent by machinery, and when no longer growing becomes at once the subject of steam-driven processes, we come to the treatment of the animal which it feeds, and here we leave altogether the region of machinery actuated by steam, and are confined to the hand, directed by intelligence.

Is it not a remarkable thing, however, that agriculture, which was once wholly the work of men's hands, but which has long since given up the tillage of the soil, and the carriage of the manure, and the sowing of the seed, and three-fourths of the hoeing of the crops to be accomplished by the horse—which has lately given up the threshing of the grain and the cutting of its straw to be effected by steam-power—which is rapidly abandoning the work of reaping to the former and of cultivation to the latter—should nevertheless require more labourers than ever?—that steam being first, and horse-power second, and the agricultural labourer nowhere in the race, considering the three merely as economical producers of power, the last should nevertheless be wanted more than ever?

The explanation lies in this: that agriculture is more and more becoming the work of intelligence and skill as well as power—those parts of its processes, where intelligence and skill are wanted, are becoming a larger portion of the whole. Cultivation is more perfectly performed, and over a greater extent of land—the crops cultivated require more labour and are more productive—the stock consuming them is proportionally larger and needs proportional attendance. Probably each acre cultivated in 1759 employed more manual labour in its cultivation then than each acre cultivated now; but how many more acres are there under cultivation now than then? Each bushel of wheat grown half a century ago involved so much more labour then, that 8s. was the lowest price at which it could be grown with profit; but how many more bushels per acre does land upon an average yield at present? Each pound of beef and mutton cost more in wa-

ges 33 years ago than now; but we have a double and triple store of food for stock; we have two crops of fattened sheep and cattle where formerly we had one, and each supplies a double quantity of meat.

But, whatever the explanation be, the fact is certain, that the use of steam-power on a farm is a part of that system which employs most labourers in agriculture. Mr. William Smith, of Woolston, who has an 8-horse engine for 110 acres of arable land and 70 acres of pasture, and works this engine only 14 days a year in cultivation, and not more in threshing, employs regularly throughout the year seven men and four boys, equal to nine men upon the whole, or one to every 12 acres of arable land and 8 of grass—"more than any farmer in the neighbourhood employs." His steam cultivation, he tells me, costs him, on the average, 10s. 10d. annually per acre on his clays, and 8s. 3d. annually per acre on his lighter soil. It has displaced exactly the two-fifths of the former horse-power which I had anticipated that it would; and he says that 70 per cent. of the cost of engine-work is manual labour, and only 30 per cent. engine-food, while of the horse-work displaced only 20 per cent. is manual labour, and 80 per cent. is horse-food.

Mr. Pocock, who farms 300 arable acres and 300 acres of grass-land, near Farringdon, employs regularly 22 men, eight women, and ten boys, equal to 30 men in all, or one for every ten acres of arable and ten acres of grass. He, too, uses steam-power for thrashing, grinding, and cutting, and employs one of Fowler's steam-ploughs.

Another gentleman, occupying 410 arable and 190 pasture acres, on the fat land below the chalk hills of Wiltshire, and who does all his cultivation by steam, says

"Steam cultivation will lessen horse-labour, I think, one-half, and in some cases two-thirds. A neighbour of mine, who has a steam plough, told me that he usually kept 18 or 20 horses: he now hoped to do with six. Another, who occupies about 2,000 acres of arable and pasture, hopes to do with 13 horses. My own impression is, that there will be more manual labour required where steam culture is adopted, and that a more energetic class of men will obtain higher wages."

Mr. Randall, of Chadbury, near Evesham, who cultivates 500 acres arable and 200 acres of pasture, employs, with slight variation, 30 men, seven women, and 12 boys throughout the year, with 70 additional men for three weeks in harvest-time—in all, equal to about 42 men regularly throughout the year, or one to every 12 acres of arable land and five of pasture. He too uses a steam cultivator, and says steam cultivation makes no difference in the manual labour needed on the land. All these, more or less, are instances of the cultivation of clay land, on which, if by force of *character* labour-giving crops are cultivated, of course the labour of cultivation must be greater than on lighter soils. It is these lighter soils, however, generally, which are devoted more especially to the growth of what are called fallow crops; and, taking the ordinary rotation on each class of soils into account, we may, therefore, fairly compare the experience of the steam-cultivated farms, as to the labour they require, with the labour-bills of

other farms, though not quite so heavy. This "one man to every ten or twelve acres of arable land, and eight to ten acres of grass," deducting 10s. per acre for the latter, is equal to a labour-bill of 50s. per acre per annum on the plough-land; and it is unnecessary to say that this is a very unusual amount.

On a number of farms in Gloucestershire, whose management I examined many years ago, where the pasture formed from one-tenth to five-tenths of the whole, the labour-bill reached 50s. per acre very rarely indeed. It was more generally between 30s. and 40s.

On a fen farm near Spalding, of which a most elaborate account of the labour used upon it has been kindly given me by the tenant, Mr Aitken, I find that on 790 acres almost wholly arable, the actual wages paid had during the last three years averaged £1,260, or about 32s. an acre. On another similar farm, near Chatteris, on 900 acres arable and 120 pasture, the last year's wages were £1,556, which is about 35s. per acre on the arable.

On one of the crack farms of East Lothian, of 630 acres wholly arable, 22 men are kept regularly, and 35 lads and women, besides 25 or 30 people for three or four weeks in harvest; and the wages, therefore, must be about £1,200—not £2 an acre—though potatoes, one of the crops requiring most labour, are very largely cultivated.

The wages on the College farm, near Cirencester, of 400 acres arable and 40 pasture, are £700 a-year. or 30s. an acre on the plough land. Mr. Stratton's farm Manningford, Bruce, near Pewsey, Wilts, 590 acres arable, 65 acres pasture, and 160 down, costs about £1.200 a year in wages, or £2 per acre on the arable land. Mr. Dods, of Anick Grange, near Hexham, occupying 310 acres arable and 100 pasture, employs 7 men and 9 women annually, and extra for a month, 7 men and 7 women. His wages cannot amount to more than £500, or not much more than 32s. an acre on the arable.

And, as a last instance, I will take the farms of Mr. Edmonds, of East-leach, near the Leachlade, Wilts, 2,000 acres arable and 430 acres pastures, employing on the average, and taking harvest into account, about 120 men and 20 to 40 women. His labour bill must, I should suppose, from his rates of wages, which he has kindly given me, amounted to at least £3,200 a-year, which is 32s. an acre. It must be admitted, then, that on a comparison of these figures, the labour paid for upon steam-cultivated farms is even more than on farms where steam-power is used only to drive the threshing mill.

Agriculture is, in fact, experiencing the truth taught in the history of all other manufactures—that machinery is, in the long run, the best friend of the labourer. This truth is taught even more impressively by a review of agriculture generally. than it is by the case of any individual farm. Here are we, twenty-one millions of people, producers and consumers, living in this island. on a great farm which we may, by the help of such statistics as we possess, describe as nearly 19,000,000 arable acres, and probably nearly as much grass, employing as farm labour, in-door and out, about 950,000 men and 120,000

women, besides 300,000 lads, and 70,000 girls, or averaging them by their probable wages, as has been done before, let us say equal in all to 1,150,000 men, or one to every 17 acres of arable land, and nearly as much pasture. We feed and use some 1,500,000 horses, of which probably 800,000 are strictly for farm purposes. We are annually inventing and manufacturing labour-saving machines at an extraordinary rate, and every year at least 10,000 horses are added to the agricultural steam-power of the country, certainly displacing both animals and men to some extent. We have taken the flail out of the hand of the labourer, and the reaping-hook is going; on many a farm he no longer walks between the handles of the plow—he no longer sows the seeds—he does but a portion of the hoeing and the harvesting—and yet, so far from being able to dispense with his assistance, he is more in demand than ever he has been.

I have had returns sent to me by all the leading manufacturers of steam-engines for agricultural purposes. Within the past ten years upwards of 40,000 horse-power has been added to the forces used in agriculture in steam alone. If I may single out Messrs. Clayton and Shuttleworth, of Lincoln; Garrett of Saxmundham; Hornsby, of Grantham; Ransome, of Ipswich; and Tuxford, of Boston, they alone are furnishing 10,000 horse-power annually to the farmer. Messrs. Tuxford, among the first to start the locomotive agricultural steam-engine, inform me that for the earliest suggestion of it they are indebted to Mr. John Morton, of Gloucestershire, then agent to the late Earl of Ducie, who twenty years ago recommended them to put these little engines upon wheels, thus foreseeing the fitness of these powers made locomotive to the circumstances of English agriculture. Messrs. Ransome, of Ipswich, were, I believe, the earliest to receive the commendations and the prizes of the Agricultural Society of England for their engines, and now the leading manufacturers of them, Messrs. Clayton, of Lincoln, send out ten of them each week, or 4,000 horse-power per annum.

Of reapers, again, since 1851 Burgess and Key have sold upwards of 1,900 of their improved M'Cormick's reaper, of which 771 were sold last year; and they now hold four times as many orders as they did twelve months ago. Cross-kills have sold 500 of Bell's reaper, and 800 of Hussey's; Messrs. Dray have sold 800 of their improved Hussey's reaper; Messrs. Garrett have sold 600 of Hussey's; 250 of Wood's clever little reaper have been sold last year; and the Cuthberts, of Bedale, who have just begun the manufacture of their equally clever machine, sold 100 before last harvest, and could have sold four times as many. In all probably 4,000 reaping machines were at work last harvest, capable of cutting more in a day than 40,000 labouring men, and yet there never was such a harvest as the last for the difficulty of procuring harvest men. Notwithstanding all this addition to the forces and the machinery of agriculture, more labourers than ever are required, and, as more labourers are not forthcoming, wages rise.

It is, indeed, possible that some of this general rise in wages of the past two

or three years is owing to the labourers in agriculture being, if anything, rather a diminishing than an increasing body; to that I shall refer directly: it is sufficient for the present to declare, what ample experience confirms, that the need of their assistance is increasing. * * * * *

However plain it is that its remedy is to be found in steam-power and reaping-machines and such like, the increase of steam-engines and machines need create no fear for the agricultural labourer.

Here, however, I would say, it is no part of my business to fear or to lament the progress of events, however they may happen to develope. Even if the result should be that agricultural labourers are to form a diminishing class—that at most only one of the labourer's family is trained to take his father's place, it may certainly be doubted whether his lot in future life, or that of his brother who has gone as a carpenter, mechanic, a soldier or a sailor, is to be preferred. The man will do his best to bring up his family for their good and, as he best knows how—and if wages fall, most of them will naturally endeavour to obtain a maintenance in some better way. I confess my belief to be that there are natural safeguards enough in human nature to make the *natural* result within a Christian country, and in a matter so exclusively one of mere maintenance, mere profit and loss, a perfectly safe one, and even a desirable one. Only let the artificial interference between the buyer and the seller be done away with; let knowledge of the state of the market, whether for labour or for its produce, all over the country be general; let the price of agricultural and all other produce be the natural result of simple competition among consumers, and the price of agricultural labour be the natural result of simple competition among employers; let inteligent self-interest—and self-interest in the long run always *is* intelligent—let intelligent self-interest lead to the use of machinery and steam—in fact lead *where it will*—and the greatest happiness of the greatest number will the sooner be attained.

As, however, I have shown, if fears and lamentations have any place at all, it is in behalf of the masters rather than of their men.

One illustration more of the present value of agricultural labour in this country, and on this part of my subject I have done. In the autumn of 1849, just ten years ago, I applied, through the correspondents of a weekly agricultural paper, for information on this subject, and from most of the English counties and many of the Scottish ones I obtained answers to printed questions as to what is the present wages of able-bodied men, what is their weekly wages at harvest-time, what is the ordinary daily wages of women in the field—what is the cost of mowing clover, of mowing meadow grass, of mowing barley, of harvesting a good ordinary crop of wheat—what is the ordinary rent of cottages, and so on. Within the past month I have done the same thing again, and have been told the rate of wages by ninety-three gentlemen, residing in twelve Scottish and thirty-five English counties. There is thus the opportunity of making a very fair comparison of wages at a sufficient interval of time.

Let me quote a few instances, taking the weekly wage of an ordinary able-bodied man as the criterion, and, of course, endeavouring to do it without boring you by quotations from so many separate reports.

In Aberdeenshire, Mr. M'Donald, of Huntly, reported the wages of plowmen in 1849 to be £16 a year, with board and lodging; they are now £22, with board and lodging. Mr. Grigor, of Forres, reported ten years ago the ordinary weekly wages of an able-bodied man to be 9s. to 10s.; now he puts it at 11s. Mr. Bell, of Ferryden Farm, Forfarshire, reported it at 10s.; he puts it now at 12s. in winter, and 15s. in summer. Similarly, Fifeshire wages were 9s. and 10s.; they are now 11s. and 11s. 6d. In East Lothian the wages were worth 10s. a week, or 10s. with coals hauled free; and now they are valued at 12s. to 15s., &c. In Mid Lothian Mr. Melvin reported the annual wages of the married plowmen at 910 lbs. of oatmeal, 12 cwt. of potatoes, two meals daily during harvest-time, the hauling of four tons of coal, and £17 in money; he now reports them at 1,050 lbs of oatmeal, 8 ewt. of potatoes, four weeks of harvest food, coals carted, house-rent free, and £21 in money. Go, now, to the south of Scotland, and in Wigtonshire Mr. Caird reported wages ten years ago at 9s. a week; he puts them now at 12s. A woman's daily wage was 8d., and it is now 10d.

In Northumberland, wages, according to Mr. Grey, of Dilston, were 12s. weekly, with cottage and garden, and carriage of coals free; they now are 15s., with house and garden free; and Mr. Dods, of Hexham, gives to good ordinary labourers 15s. a week in winter, and 18s. a week in summer. Mr. Drewry's wages at Holker, North Lancashire, were 13s. 6d.; they are 15s. to 16s. 6d. Mr. Evans, of Wigan, in South Lancashire, reported wages to be 12s. a week; Mr. Twining, in the same neighbourhood, reports them now at 14s. From Lincolnshire I had four reports of the wages of able-bodied men, and they run thus—10s., 9s. to 10s., 11s. to 12s., and 9s. to 10s. I have four reports from the very same employers now, and they run thus—12s., 12s., 12s., 10s. to 12s.

Mr. Spencer, of Knossington, Leicestershire, told me ten years ago that 8s. to 10s. were the wages of the able-bodied men, and he puts them now at 11s. to 12s. Take, now, the case of Norfolk: Mr. Cubitt, of North Walsham, ten years ago, put the wages at 7s. to 8s, and the carters 1s. to 2s. extra; now it is 9s., and the carters 10s. 6d. In Northamptonshire, Mr. Grey, of Courteen Hall, Northampton, reported 8s. and 9s. as ordinary wages; he puts them now at 12s. weekly.

In Warwickshire, Mr. Burbury, of Kenilworth, who reported 8s. to 9s. weekly in 1849, reports 11s. weekly in 1859.

In Worcestershire, Mr. Hudson, of Pershore, who named 8s. formerly, now says 10s., or 9s. with two quarts of beer a day, are ordinary weekly wages.

In Oxfordshire, Mr. Druce, of Eynsham, stated 8s. weekly, the carters and

the shepherds having cottages rent-free in addition; wages now are 10s. to 12s., plowmen and shepherds from 12s. to 14s.

In Wiltshire, the worst paid county in the kingdom, wages were, some ten years ago, 6s. to 7s. for ordinary labourers a-week; they are 8s. a-week at present.

In Kent they were 9s. and 10s., and are now 11s. to 12s.

From Sussex I had three reports formerly, 8s. to 10s., 10s. and 10s.; and I have three reports now, 11s., 11s. and 12s.

From Dorsetshire I had five reports, averaging 7s. and 8s. a-week with cider or beer and with cottage free "in some cases." I have two reports now, the one names 9s., and the other says the payments make the money equal to 12s. weekly.

In Devonshire the wages were 8s. to 10s., and they are 11s. to 12s.

In Cornwall they were 8s. to 9s., and they are 10s. to 12s.

All this proves, then, that the labouring force in agriculture is better paid than it used to be, and that the enormous extension of machinery and of steam-power lately has not been to the injury of the farm labourer.

Although, however, one is naturally to know this, yet no one has any right to seek for the labourer any more than that share which falls to him as the natural result of mutual competition. It is for the national interest that food be produced at the least possible expense; and in the second part of my sub-subject, which refers to the most economical provision and maintenance of the forces used in agriculture, the cost of the labour of the farm is as much concerned as is the cost of horses or the cost of steam. It is indeed the first of these to which I most desire to draw attention. The economical application of steam-power, and whether Mr. Fowler's plow, or Mr. Smith's cultivator, or Mr. Halkett's system be the cheaper, will ultimately, by large experience, be determined. Messrs. Howard have, I understand, sold seventy or eighty sets of Smith's apparatus, and Mr. Fowler is so busy that he can hardly keep pace with his orders. Tens of thousands of acres have been this autumn plowed or worked by steam; and it will be quite within the scope of our subject if the means by which this has been done should be the point on which the subsequent discussion turns. It will also be in keeping with the subject as announced, if the most economical provision and application of horse-powers should engage the principal attention; but of all the forces used in agriculture, that of the labourer himself is the one to which I think we can most usefully confine ourselves.

On the question of efficient steam, agriculturists are willing to accept the judgment of engineers and of the outside public. On the question of efficient horses the public are not likely to add anything to the experience or the judgment of the farmer; the question of efficient labourers is one on which wide differences exist, on which the possession of mere manhood is enough to justify independent thought—on which men of different professions therefore do not

feel bound to accept one another's judgment, and on which I believe that the most good is likely to arise from a discussion at a meeting of townsmen with agriculturists. All that I can do in the short remainder of the hour is to indicate the points on which that discussion should turn.

The object is to retain—indeed I now should say to obtain—a sufficient number of well qualified agricultural labourers. The Oxford Farmers' Club met the other day, and Mr. Mein, who is, I believe, agent to the Duke of Marlborough, read a capital paper on this very subject. His method of obtaining more men was none the less sensible for its simplicity; it was just to *offer higher wages.* And this is, I presume, essentially the solution of the difficulty.

He said in effect: We have not provided constant employment nor wages at which a comfortable living can be had, and no wonder that our men have brought up their children to other trades to be better paid; we have not paid young men wages according to their ability; married men have been paid at one rate, and young unmarried men have been paid at another and much lower rate; they have thus been treated as children. But they are not children, and no wonder they have left us. Our remedy is to improve the condition of the labourers in their cottages; to give them more regular employment and better wages (it resolves itself into this, whether a farmer, upon four hundred acres, had better spend £100 more in labour, during the winter, or lose £200 at harvest-time in shed and damaged corn); to give the labourers more task-work, and allow them to earn fair prices at it, simply according to their ability; and lastly, on occasions of unusual pressure, to give unusual wages. "Even at harvest, hitherto," he said, "the prices have not been anything to compare to the daily wages of the tradesman; nay, not enough to induce Paddy to join us in this district."

But there are other points besides the amount of wages to be paid. These will indeed increase—not by the exhortations of our public speakers, but by the pressure of competition among masters, and are high or low just according to the relation between the resident-population and the employment for them, so that in Wiltshire they are 8s., while in some parts of the north they are almost twice as much.

But besides the amount of wages there is the mode of payment, which greatly affects the character and position of the labourer. It may be (1), in money solely; it may be (2), partly in board and lodging in the house; it may be (3), partly in money, along with an immense variety of perquisites. These three include, I believe, all the various systems of payment adopted. Of the last I give two instances from the extremes of the island, Forfarshire and Dorsetshire. Mr. Bell, of Ferryden Farm, Forfarshire, writes to me as follows:

"Our ploughmen receive, per annum, £17 in money, 6½ bolls oatmeal (14 lbs. a boll—present price 17s. 6d.); 1½ Scotch pint warm milk (3d. a pint), during summer six months, 1 pint in winter ditto; 15 cwt. potatoes, and house and garden, at say £3. This for married ploughmen. Unmarried: £20 and £22, 1 pint warm milk daily all the year, 6½ bolls meal, and fire and lodgings in a

bothy. At hay and corn harvest they get two bottles of beer daily, and bread and beer while leading to the stack-yard. Married men get all their fuel driven by their masters."

I value these wages at £34 6s., or 13s. weekly. The daily workers, when getting something like steady work, have 12s. a week in winter, 15s. in summer, with no beer or other allowance.

In Dorsetshire, Mr. Saunders, of Watercomb Farm, Dorchester, writes to me as follows:

"In answer to your inquiry respecting the wages of the labourers of this part, I will give you an account of what I pay my agricultural labourers of different callings. They all live on the farm near their work, where it is convenient for most of them to go to dinner every day. I have 18 cottages for which I never receive any rent, as my men all live rent free, and most of them have good gardens, besides other potato lands free. It is a very great accommodation to labourers to reside near their work, quite equal to 1s. per week to a man not to have to travel a mile to his work morning and evening, and all have their regular pay wet or dry weather, no loss of time except they are working by piece-work, which most of them get in their turn during the year, when they generally earn from 10s. to 15s. per week, according to circumstances, besides their yearly privileges, which I will state below, and which many of my labourers have said to me at different times 'is nearly half our living,' referring to a cottage and garden, potato land, and the privilege of having grist over that of buying bread of a baker, as I regulate the grist by allowing a peck a head to the family of workers in a house. I think our system is nearly equal to other counties, where they give nearly double the wages, and no house nor other privileges, nor pay for wet days. In this county we agree for a family at a certain sum from the 6th of April to the 6th of April in the following year. Some of my men have continued on my farm with me for more than 30 years without change, where they are good labourers. This, I believe, is about the general run of our county as an average. I will now state how, and in what way I pay my horse-men, as you term them:

	£	s.	d.
House, good garden, worth to let, £4 per year,	4	0	0
Weekly wages 8s., and 30 perch of potato land ploughed in with their potatoes, often growing 15 sacks, now worth 10s. per sack, and allow the seed out, would be £5,	25	16	0
200 furze fagots, carried home free to the cottage,	1	0	0
28 cwt. of best coals, carried home at 1s. per cwt. and cost to fetch from ship,	1	14	0
Extra for harvesting, cash £1, and 1 gallon of ale per day,	2	0	0
Every journey with team 1s., average one per week,	2	12	0
3 quarts of ale per day at haymaking for 8 weeks, at 9d. per gallon,	1	7	0
1 bushel of wheat per week if a family of small children, none to go to work, at 5s., not much advantage now, say 6d. per week, but when dear 3s.,	1	5	0
	£39	14	0

The whole of horse-man's wages is about 15s. per week.

My shepherd has the same as the horse-man, except he earns about £3 extra for sheep which he shears when no pay is taken up from him; and he has 1s. per score for all lambs bred, which, at about

600, is £1 10s.; and also 6d. for every ram let or sold, generally £2 10s. in all,	7	0	0
Take from this the difference of carter's journey money, which is	2	12	0
Leaving in favour of shepherd,	4	8	0
Wages and perquisites as carter's account,	39	14	0
	£44	2	0

Shepherd's wages weekly 17s., all but 2s. in the year.

Labourer 7s. per week, house as above, garden, potato land in many cases, 200 of furze, 15 cwt. of coals; grist, as I have before stated, at one peck per week for every one who works, great and small, some at 5s. per bushel and some at 6s. per bushel; and most of my labourers have piece-work at different times of the year when convenient. I consider on an average, a good labourer's place with me is full 12s. per week."

This is a most elaborate scheme of payment, and certainly a very liberal one, though I do not value the items so highly as Mr. Saunders does by about £6 a year, making the yearly wages of his ploughman £33 14s., or as nearly as possible 13s. a week. Now, over large districts in England another system obtains, of which Mr. Munster, a tenant farmer at Dumpton, near Ramsgate, gives the following very interesting account:

"Our ploughmen here are generally single, and yearly servants, and are boarded and lodged by the farmer or by his bailiff. They are hired from the 11th Oct. to the 11th Oct. each year; and though they sometimes continue for several years with the same master, a fresh agreement takes place every year. They commence as lads, at 13 or 14 years of age; their duties then are to drive the horses and attend to them in stables, and we also invariably find that the younger these boys go into service (as it is here termed) the better ploughmen and the better labourers they afterwards become. They begin at about £5 wages per annum, which is usually increased every year, as their strength and ability increases, or as master and servant agree; the increase goes on at a ratio of about £1 per year, and our head horse-man or wagoner gets from £12 to £14 per year. The cost of their board varies according to the price of provisions, and when they are boarded by a third party it is generally partly in money and partly in kind; they always have meat three times a day, and cannot be boarded, on an average, at less than 8s. per week per head. In some few instances where there are cottages near, married men are employed as ploughmen at wages of 14s. per week, and a cottage rent-free; if they have to pay rent, they are usually allowed about £5 extra for harvest, in addition to the 14s. per week." He adds—"Our labourers pay about 2s. 6d. per week rent for their cottages, and for this many get but a miserable home. I know of nothing in this neighbourhood so disgraceful as the want of accommodation for our labourers. They are (many of them) driven to reside in the worst parts of the town; many of them in hovels built—or, rather, stuck up—for the purpose of investment, without any regard to health, comfort, cleanliness, or morality. No garden attached, or anything else to make a poor man's home comfortable—completely away from the eye of his master, and all others that feel an interest in his welfare. The consequences I need not describe. With every inducement for him to spend his spare time and his hard earnings at the public-house or beer-shop, often having from two to three miles to go in all weather to his labour, never knowing the luxury of a hot dinner except on a Sunday, or a meal with his

family, the children run the streets in the worst parts of the town, and get early imbued in every vice and wickedness. With no father near to instruct or correct them, how can it be otherwise? I do hope this subject will be pressed before the public on every favourable opportunity. I find, on examining my labour account, that my best men, on an average of the year through, earn about 16s. per week, or little over £40 per year. This includes harvest and haymaking, as well as lost time from weather or other causes, and is the man's earnings independent of the rest of the family."

For all these various customs of payment there must, of course, be the general assent of the labourer, and the concurrence both of master and servant, in order to their establishment and maintenance; and so long as a labourer agrees to take certain wages, there is not the shadow of a plea for interference by any other person between him and his master. The fitness of customs, however, whether in the interests of agriculturists who find that labourers are more difficult to hire, or in the interests of labourers themselves, may very properly be discussed, even by those who have no greater interest in the subject than that which they hold in the well-being of any other class of their fellow-countrymen.

[TO BE CONCLUDED IN OUR NEXT.]

The Domestic Turkey---Peculiar Habits, etc.

The domestic turkey, in some respects, is the most valuable bird that has a place in the farmer's poultry-yard. It is large, comely in appearance, and its flesh is considered one of our richest dainties. It forms the standing dish at our Thanksgiving and Christmas dinners.

To the careful observer, its habits are interesting, notwithstanding they are somewhat eccentric, and, what is greatly in its favour, the more we study its habits the more we are pleased with it. There is one trait in the male that is never unobserved by his female companion, and when calling together their broods of young, may sometimes be heard half a mile or more. It is wonderful to observe how the little progeny will respond to his voice, if at a distance of twenty or thirty rods in the rear, as led by him in their daily explorations for food—and especially at the close of day, when returning to their usual place of rest at night. It cannot be denied, however, that in this latter respect turkeys are deficient in punctuality, and not unfrequently are overtaken by night before reaching home. If so, they make an encampment wherever they happen to be. But this is not the result of indifference to home, as in the case of the tippler and the gambler, so much as to defect in the science of geometry, not remembering how far they have wandered from it; or to a deficiency of astronomical observation, not having observed how rapidly the time has sped.

The well-fed male turkey, especially if rendered social by a numerous family of female attendants, is a very important character about the homestead. No one attracts more notice than his lordship. No one is more tenacious of his rights, or more complacent in the enjoyment of them. He is truly an original

character, but has numerous imitators. The incessant pompous display of his plumage has ever been deemed an appropriate counterpart of the human being which struts and seeks by an ostentatious display of exterior embellishments to attract attention beyond any claims founded on intrinsic merit. We cannot fail to be amused on seeing either of these animals of the masculine gender thus struggling for the ascendancy; but we cherish less respect for the one in broadcloth, than for his prototype in feathers. Indeed, the latter, although not celebrated for his mental endowments, possesses more intelligence than is usually attributed to him; and, moreover, as the representative of his family, occupies no inferior rank in respectability or the elements of being useful. He is led by instinct, if not by reason, to be a pattern of devotion to the safety of the community of which he is the legitimate head. He watches over the turkey chicks with the assiduity of the most faithful shepherd when guarding his flocks. He will never leave them, and is apparently unmindful of his own wants so long as they require his watchful care. On one occasion, a flock of twenty-odd more than half grown young turkeys with the old one were overtaken by night before reaching home. The consequence was, they roosted on the fence adjoining a cornfield. In the night, eight of the young brood were killed by we know not what, and dropped on the ground. For hours in the morning the living ones remained on the spot around those that had been killed, the old gobbler and his mates making the most piteous lamentations, till we were thus drawn thither. For a long time afterwards they were not seen to go near the place of this calamity, but daily went in another direction, which previously they had not done.

It is frequently said that turkeys are very stupid. We were formerly of that opinion; but on better acquaintance with them, we have become somewhat skeptical in regard to such opinion. If they possess naught of what is usually termed reason, they have a kind of cunning much resembling it. The hen turkeys are noted for stealing away their nests; and if they do it, no little difficulty is experienced in finding the place of concealment. If followed, the probability is, should they perceive your intention, they will wander about for hours until you become wearied and leave them, when they will go to their nests and deposit their eggs. On one occasion, it became apparent that a favourite hen of ours daily left the yard by flying over the fence, to visit her nest. It was usually about 11 o'clock in the morning, and after being absent one or two hours, would return and join the flock. Her direction was toward a small wood and dense undergrowth of brush. This we noticed for several days in succession. Her course was always in the same direction. Every now and then she would stop, reach upward her head, and look around to see if she was observed. At length we concluded to follow her, at a distance of thirty rods or so, keeping behind trees; but after a while she caught a glimpse of us, and although at such a distance, then she turned about and came back nearly in the same path, and without enabling us to be the wiser for our labour.

This she did several times with similar results, and at last we gave up the attempt.

A few instances may be related, illustrating the fidelity of the male in watching over the young brood. Our practice is, in a few days after the process of hatching is completed, to put the hens into a large coop or pen, of one or two rods in extent, with one side at least open with slats or stakes, to admit ingress and egress of the chicks, while their mothers, naturally great gossips, are restrained from long peregrinations, too toilsome and hazardous for the tender offspring. On the outside and in the vicinity of the pen, the cock spends his days in becoming assiduous to the infant family, and his nights in roosting close by it. Quickly does it happen that they become more fond of his society than of their pent-up mother's. As soon as his supremacy over them is well understood, and their strength admits of it, he will abduct them, no one can guess how far, as stealthily as the unprincipled swain runs off with his improvident lass for a clandestine marriage. Search for the missing ones is usually as unsuccessful in one case as in the other. However, Mr. Gobbler is a far better protector of his treasure than the speculating lover, who steals his wife from her fond parents. The former never abandons his charge; whereas the latter frequently does, leaving his deceived fair one, after being robbed of all she possessed, to return in disgrace and poverty to her broken-hearted family. It is amusing to see how faithfully the cock turkey, when thus the sole guardian of his children, will seek to provide them with food and to protect them from injury. In the night and in stormy weather, he spreads over them his broad wings, and if a hawk is seen, the same is done to shelter them from his marauding descent upon them; if they have become too large to be thus sheltered, they collect around him as close as possible, while his gorgeous crest rises above them, not more captivating and alluring to an enemy than the expressive banner which floats in the breeze over the well-mounted and strongly-manned fort.

We annex the following anecdote of a cock turkey we once possessed. Among a brood there was one male, a long-legged fellow of a most unique appearance. During the period of incubation, or as soon as one of the hens began to set—which she, seeming to know the old fellow's propensity, was very careful to manage in a very private and secret manner—he began to grow uneasy, and mounted the fences, watching for the place of her concealment, which he usually discovered the first or second day; when he, by virtue of his authority as one of the lords of creation, immediately took possession of the nest, and from that time forward, till the period of hatching, went on with the regular process, when he brought out his brood and duly carried them forward to maturity, when the hen, poor simple wife, was allowed to trudge along at a respectable distance, in the true after-honeymoon style.

Another instance. It appears that a male turkey kept on the farm of a gentleman in Rhode Island resolved on a revolution in turkeyism. Accordingly, he drove from the nest one of his better halves, where there were twenty-one

eggs, and performed the duties of incubation himself. The duties were so well performed that eighteen young turkeys duly made their appearance. Nor was this all. He became so pleased with the female cares of domestic life, that he spurned all interference from the gentler sex. When his own brood was fairly out of the shell, and finding that others of the household had been occupied in the same labour so that there is in all sixty-seven young turkeys to be taken care of, he determined to have undivided dominion in the domestic realms of turkeydom. This he did by turning the entire female fraternity out of doors, and taking the whole care of the nursery upon himself.

[*Southern Homestead.*] C. N. Bement.

Whitewash.

Whitewash is one of the most valuable articles in the world, when properly applied. It prevents not only the decay of wood, but conduces greatly to the healthiness of all buildings, whether of wood or stone. Out-buildings and fences, when not painted, should be supplied once or twice every year with a good coat of whitewash, which should be prepared in the following way: Take a clean, water-tight barrel or other suitable cask, and put into it half a bushel of lime. Slake it by pouring water over it, boiling hot, and in sufficient quantity to cover it five inches deep, and stir it briskly till thoroughly slaked. When the slaking has been effected, dissolve it in water, and add two pounds of sulphate of zinc, and one of common salt. These will cause the wash to harden, and prevent its cracking, which gives an unseemly appearance to the work. If desirable, a beautiful cream colour may be communicated to the above wash, by adding three pounds of yellow ochre; or a good pearl or led colour, by the addition of lamp, vine or ivory black. For fawn colour, add four pounds umber —Turkish or American (the latter is the cheapest)—one pound Indian red, and one pound common lampblack. For common stone colour, add four pounds raw umber and two pounds lampblack.

This wash may be applied with a common whitewash brush, and will be found much superior both in appearance and durability, to common whitewash.

Chemical Gazette.

The Dutch Way to Salt Beef.

Take a lean piece of beef, rub it well with treacle or brown sugar, and turn it often. In three days wipe it, and salt it with common salt and saltpetre beaten fine; rub these well in, and turn it every day for a fortnight. Roll it tight in a coarse cloth, and press it under a heavy weight; hang it to dry in wood smoke, but turn it upside-down every day. Boil it in pump-water, and press it; it will grate or cut into shivers, and makes a good breakfast dish.

To twelve pounds of beef the proportion of common salt is one pound.

Personal.

DR. J. E. WILLIAMS:—The accompanying letter addressed to Professor William Gilham of the Virginia Military Institute, you will please give a place in your columns as an act of justice to this gentleman, which should have been long since rendered him, and oblige

Yours, truly,

B. M. RHODES & Co.,
Office 82 Burly's Wharf, Baltimore.

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RICHMOND, October 26th, 1860.

PROFESSOR WILLIAM GILHAM,

Virginia Military Institute, Lexington, Virginia.

Dear Sir,—In prefacing your flattering remarks, in reference to Rhodes' Super-phosphate, before the Farmers' Assembly last evening, you spoke of a discussion we had with you several years since—growing out of your discovery of "Carbonate of Lime" in Rhodes' Manure.

Not having the pleasure of your acquaintance, and the party who had charge of the manufacture of the Manure at the time enjoying our *full confidence*—and being assured by him that you were in error, we consented to take up the defence. Shortly afterwards we had complaint of the Manure from those who had used it most successfully. This lead us to examine the subject; when, to our amazement, Professor Bickell's analysis disclosed "Carbonate of Lime"—proving your correctness. We immediately suppressed the stock in market, discarded the party we had employed, and repaired the damage as far as we were able. Costing us many thousands of dollars—besides *mortification*, which money could not restore.

We also prepared communication of the facts, with apology for yourself; but yielding to personal appeals, suppressed this act of justice—although against our convictions, and which we have deeply regretted,—and while made at this late day, hope you will receive as earnest of our gratitude for your magnanimous allusions to our *present* article.

We shall be most happy for you to visit and inspect our manufacturing facilities, also meet the eminent manufacturing chemists Potts & Klett, under whose supervision "Rhodes' Manure" has been prepared for near four years past—and in the meantime has attained its present high reputation.

In the manufacture of Rhodes' Manure, no material is used which contains less than 70 (seventy) per cent. Bone Phosphate (avoiding those varieties of so called Guano containing Carbonates, Iron and Alumina, in prominent proportions). This is treated with sufficient Sulphuric Acid, (which we manufacture,) so as to yield 30 to 33 per cent. Bi-phosphate—we prefer acid in excess—as experience proves the value.

We combine no Ammonia—our object being to establish a standard for *soluble Phosphoric Acid*, the nourishing property of plants; these being, as all are

aware, a standard for *Ammonia*—the stimulating property—in dry *Peruvian Guano.*

We also urge upon Planters to make their own combinations from these standard ingredients, and not to resort to these until they have exhausted their stock of Compost Manures, but use them as adjuncts.

When agriculturists see the importance of making their own combinations of Manures, rational agriculture will have commenced.

With expressions of high respect, we remain

Yours, very truly,

B. M. Rhodes & Co.

The above communication was intended for the December number, but was unavoidably delayed.—[Ed.

How to Tame Bees—"Ten dollars worth" of Information Gratis.

Many persons while watching an exhibitor of bees in a movable frame hive, at the Fairs, taking out and returning the frames of combs covered with bees, and, as they hang in clusters from the frames, removing them by handfuls, with no more apparent fear than though they were so many flies, have regarded the process as a sort of witchery; they have thought that none but the operator, and possibly a few others, could have such perfect and fearless control over their bees. Instead of this being actually the case, it is the reverse; for no person that I have yet seen, who has followed the directions for "Taming Bees" that I purpose to give, has been unable, after a little practice, to have full and absolute control over them. I understand that a speculator in Canada has made the proposition "to instruct bee-keepers in the art of taming bees for the exceedingly low price of $10 each!" But the readers of the *Agriculturist* can save their $10 and learn the whole art by observing the following directions, which the writer has practised for years.

The whole art of "taming bees" is embodied in the following: 1st—A honey-bee filled with honey or "liquid sweets," will not sting of its own accord. 2nd—Bees when frightened will generally fill themselves with honey; and, if given "liquid sweets," will invariably accept of them. Bees may be frightened thus: 1st. By confining them to the hive, and rapping the sides of it lightly with a small stick, or the palms of the hands. At first, the bees will try to get out, but finding that impossible, they will then rush to their stores and fill themselves with honey. 2nd. By blowing upon them the smoke of punk (rotten wood), tobacco, or cotton rags.

What is termed "liquid sweets," is water well sweetened with honey or sugar. Sugar is preferable, as bees from neighboring hives, or those in close proximity, are not so readily attracted by it.

For many years I used mainly the smoke of tobacco and cotton rags, but this season, in all my operations I have used nothing but the smoke of punk. This is not so pungent as that of tobacco.

In order to make the foregoing directions a little clear, I will now set forth the *modus operandi* of taming the most irritable colony of bees, in the Langstroth hive; which will answer, somewhat modified, for all colonies in all kinds of hives.

Set the punk on fire, and blow a little smoke into the entrance of the hive. This will cause the bees at and near the entrance, to retreat and go among the combs. Now, take off the top cover, and blow enough smoke into the holes or slats of the surplus honey receptable cover, to cause all the bees to go below the tops of the frames, when this cover may also be removed. Blow sufficient smoke upon the bees to keep them below among the combs. Unless the colony be very populous, the bees will now nearly all be found hastily filling their sacs with honey, and, will generally be ready to operate upon in from five to fifteen minutes. Should the operator desire to commence taking out the combs as soon as possible, he may sprinkle the bees with the sweetened water. Those not filling their sacs from the cells of honey, will commence at once to gorge themselves with this preparation. I seldom have occasion—except at the Fairs—to use the "liquid sweets." I would advise beginners to use a bee-hat until they have had some experience—which may then, at times be discarded.

Reader, just operate upon a colony in the way described, you will probably be surprised to find that you can more easily and readily subject the most irritable colony of bees to your control, than can Rarey an ordinary animal of the equine race.

M. M. BALDRIDGE.

NIAGARA, Co., N. Y. *American Agriculturist.*

The Persimmon, and its Uses.

Perhaps there never was a more abundant crop of persimmons than is witnessed this year. In some parts of the State, if not in all, the fruit is highly esteemed, and is indeed of considerable value. There is probably as great a variety as we find among apples. The best persimmons ripen soft and sweet, having a clear, thin, transparent skin, without any rough taste. A good ripe persimmon is a delicate, delicious morsel; most animals fatten on them; the chicken, duck, turkey, goose, dog, hog, sheep and cow, all eat them greedily. The fruit, when mashed and strained through a course wire sieve, makes delightful bread, pies and puddings. When kneaded with wheat-bran, and well baked in an oven, the bread may be put away for winter use in making beer, and used when wanted.

The following, which is Mr. Jefferson's receipt for making beer, is among the best:

Sweet ripe persimmons mashed and strained, . .	1 bushel.
Wheat bran, ...	½ bushel.

Mix them well together, and bake in loaves of convenient size; break them in a clean barrel, and add 12 gallons of water, and two or three ounces of hops.

Keep the barrel in a warm room. As soon as fermentation subsides, bottle off the beer, having good long corks, and place the bottles in a low temperature, and it will keep and improve for twelve months.

This beer, when properly made in a warm room, and bottled as above, is an exquisitely delightful beverage, containing no alcohol, and is, to the connoisseur of temperate taste, not inferior to the fermented juice of the vine.

The ordinary way of making it is more simple, and the drink is relished heartily by most persons. A layer of straw is put in the bottom of the cask, on which a sufficient quantity of fruit, well mashed, is laid; and the cask then filled with water. It should stand in a warm room; and if the weather is cold, fermentation will be promoted by occasionally putting a warm brick or stone in the barrel. The addition of a few honey locusts, or apple peelings, will make the beer more brisk. Wheat bran always improves the quality.—*Farmer's Journal.*

From the Country Gentleman.

Principles of Road-Making.

Where so much prejudice and ignorance exists regarding the location, construction and repair of common roads, it seems almost a herculean task to introduce any improved system that is at variance with our preconceived notions or education. In general character our common roads are very inferior; is it from motives of economy, or ignorance of the principles of road-making? We are inclined to think the latter, as there is money enough expended to make our roads good, if done under the direction of one skilled in road-making. That a system of road-making infinitely superior in every respect to that generally practiced in this country, does exists, and has existed for a long series of years, no one can deny, and that we can profitably adopt such a system on all our principal thoroughfares, is equally true.

The original blunders of location, many of which were accidental, cannot at this late day be easily remedied, still very much may be done to reduce the grades, perfect the drainage, and improve the surface of all our common roads, and the sooner an intelligent system of road-making is adopted, the better it will be for our comfort and our pockets. Under the present legal system of road-making and repairing, no innovation of this kind can be easily introduced. There are too many men who cannot be made to understand the importance of good roads; why a long level road is better than a short up-hill one; why they should do any more work on the road than the law compels them; why, as a matter of pride, the public road in front of their own premises should not be well made and always kept in first-rate repair at their own expense, and why it is not highly honorable and just to cheat the roadmaster and public out of as many hours of their assessed time as possible. We have heard men boast of the shabby way they pay their road tax. I am, says one, assessed eighteen

days' work; I send my man, or boy if I have one, with my team—they go on to the road between 9 and 10 o'clock, come in at noon, out again at 2, and quit at 5, and count me three days' work. Such is the working of a miserable law for the benefit and comfort of the community. It may be urged, however, that extra time is assessed to cover all such delinquencies; but then all men are judged by the same standard, and in repairing roads, perhaps the law is right in assuming that all men are equally honest, or rather dishonest.

Repairing a road once a year, instead of doing it when it should be done, is adding very much to the labor and expense. The lack of all system in management, owing to the uncertainty of force that may turn out, and the wholesale ignorance of road-making that exists among the road-making community, are glaring defects in our present plan of operations.

Any law that would compel the payment of road tax in money instead of services, would be strongly opposed, and yet there is no more reason why a road tax should not be cash than the State tax. Perhaps instead of adopting any new system, a better plan would be to remedy the defects of the old, and insist on a thorough qualification in all departments of road-making as a requisite for the office of roadmaster; let merit be the controlling influence in such an appointment, and the exactions of labor be the same as if hired and paid for. Pay such a roadmaster a good salary, and let the business of road-making be the business of his life; give him a district large enough to occupy his whole time; make all repairs when they should be made, and if men cannot turn out in harvest time, or when otherwise engaged, let them pay their tax in money. Any intelligent man can now make a handsome sum by keeping the roads of any town in as good repair as they are now kept, if he were paid in cash one-half the present assessed annual road tax, and he would do upon the principle that a "stitch in time saves nine," and "anything that is worth doing at all is worth doing well."

A good road is a recommendation to any locality or neighborhood, and speaks well for the enterprize of its inhabitants; it attracts attention from all who use it, and pays in pleasure, comfort and business; it is a part of the machinery of transportation, and the more nicely the curvature and gradients are adjusted, and the surface even and well kept, the more closely we approach ease and economy in movable machinery.

In this go ahead age, time is the great element that must enter into our calculations. Not the road that is the shortest, but the one that can be travelled the quickest; not the water-washed gullies of a hilly road, but the hard smooth surface, and the light grades that can always be found in any habitable locality. A waste of power and a waste of time is very poor economy, and in the course of years will count heavily; every one who travels an ill kept hilly road, must pay these tributes to the ignorance of its projectors, and hope for private enterprise to remedy the blunders. We drive our horses as we drive our business, or anything else we undertake; we buy them for their endurance and

a business-like speed and we know from experience that a good horse has a keen appreciation of a good road, and our belief in universal salvation undergoes a decided change when we see a good horse abused.

GEO. E. WOODWARD,
Civil and Landscape Engineer, 29 Broadway New York.

On Sombrero Guano and other Commercial Varieties of Phosphate of Lime;

And in reference to their capacity for Manipulating and Super-phosphating purposes.

BY CAMPBELL MORFIT.

A friend has sent us the following article published in The American Farmer, with the request that we would give it a place in our columns. This we most cheerfully do, as we are as much personally interested in any light which can be thrown on the subject of manures of any kind, as any farmer can be. For years past we have been trying with all our energy to improve a poor farm; and we are very anxious to continue our operations in this line, with as much economy as may be consistent with the necessities of the soil. We consider it a matter of great importance that every farmer should be well posted on the subject of Guanos of every kind—the *Phosphatic* especially—that we may all know *whether it will pay to use them;* and the quantities which should be applied per acre in order to reap the best return for our money expended in their purchase. Therefore, we are inclined to publish everything of interest on this subject, *although we do not recommend the use of Guano to any farmer except as an adjunct to the manures made on the farm.*—[ED.

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The two prime elements of a successful cultivation of soils are nitrogen and phosphoric acid. The best and most available source of the first, in this connection, is, undoubtedly, Peruvian Guano; which contains, also phosphoric acid. Its phosphoric acid exists, too, in active condition for fertilizing utility; but the quantity is very disproportionate to the amount of associate nitrogen compounds —so much so, that the use of this Guano *alone* produces abnormal stimulation of growth, resulting in rank, but unsubstantial vegetation, as well as premature exhaustion of the soil. In other words, the plant under culture with this Guano not unfrequently lacks the vigor of constitution requisite to carry it to a healthy maturity. To impart this constitution then, the deficiency of phosphoric acid must be supplied from sources which combine economy with efficiency of material.

The sources of phosphatic material are of two kinds—*mineral* and *animal.* The mineral comprises the different varieties of *Apatite;* the *Phosphorite* of Estremadura, in Spain; the plastic clay of Antcuil, near Paris; and a peculiar, rust-looking substance of this market, which I shall speak of directly as *Cooperite.* They contain their phosphoric acid as bone-phosphate of lime, except when alumina and iron may be present, in which case it is partly phosphate of iron

and phosphate of alumina. With better and cheaper materials at ready command, our experience in the use of these substances, except the last named, is consequently little or none; so we cannot speak from our own knowledge in regard to them. Phosphorite, however, is a commercial article in England, and is largely employed there in the manufacture of super-phosphate of lime.

The animal phosphatic materials are *Bones*, *Phosphatic Guanos* and *Coprolites*. The latter, so called from two Greek words, *kopros* and *lithos*, signifying *dung-stone*, may be considered fossil Guano—being the excrements of Saurians and Sauroid fishes in a state of petrifaction. They contain 40 to 50 per cent. of phosphate of lime, with nitrogenous organic matters and carbonate of lime. We have no practical knowledge of them in this country, as they do not appear in our commerce even by sample. In England, where large strata exist, quantities are used advantageously for manurial purposes; and Baron Liebig, in his "*Letters*," speaks of them "as a substitute for recent bones," and "as a means of restoring and exalting the fertility of her fields." Still, notwithstanding all this, phosphatic Guanos continue to be imported into England; and the Sombrero Guano, especially maintains there a successful competition with Coprolites, on account of its greater phosphatic strength and other advantages.

The term "Guano" is of Peruvian origin—being a corruption of *Huano*, the Peruvian word for dung. Guano consists of the droppings of sea-fowls, intermixed with their eggs and skeletons, and the debris of marine animals frequenting the Islands where the Guano is found. When it is in its original state and is more or less rich in ammonia, the Guano is designated *Ammoniacal Guano*. On the other hand, when the Guano has lost all or nearly all of its ammonia by time and chemical changes, and assumed a modified condition, characterized by a liberal content of phosphate of lime, it is distinguished as *Phosphatic Guano*.

The ingredient of value, then in Phosphatic Guanos, is phosphate of lime; and it has three distinct chemical states. The proportion of phosphoric acid varies with each state; and corresponding with each state is a different degree of solubility for the phosphate of lime, and consequently, also, of its value to the planter. By disregarding scientific forms and writing so as to be intelligible to the unprofessional reader, they may be expressed as follows, in the usual order of their occurrence in nature:

1. *Basic or Bone-phosphate*—containing ONE of phosphoric acid with THREE of lime;

2. *Neutral or Common Phosphate*—containing ONE of phosphoric acid with two of lime;

3. *Acid or Super-phosphate*—containing ONE of phosphoric acid with ONE of lime.

In this gradation, the phosphoric acid rises from 46 per cent. in the *bone*-phosphate, to 56 per cent. in the *common*, and 72 per cent. in the *super*-phosphate. With each rise there is also a change of chemical and physical habitudes. Thus, for example, the acid or super-phosphate is wholly and readily soluble in water;

and the common, though not directly soluble, yields easily to the assimilating agency of the vital force of the plant. Bone-phosphate, per contra is under ordinary circumstances insoluble, and consequently slow in its action. This slowness of action varies, however, in degree, with the composition of the phosphate material—density, physical structure, and associated substances having, more or less, a controlling influence. It should be rendered soluble, therefore, by treatment with acid, previous to being used on soils. This preliminary treatment converts it into—

Super-phosphate.—Soluble phosphate does not exist ready formed in any natural compound, except the Peruvian and kindred Guanos, which may contain, one or two per cent., partly free and partly as phosphate of ammonia. When manufactured, by the action of acid upon phosphatic material, the physical nature and peculiarities of that material do not affect the quality of the resulting super-phosphate. Whatever the source of the product, the latter, if properly made, is the same kind of super-phosphate to all of the purposes for which it is intended; provided, however, that the raw material is not debased by an excessive presence of iron, alumina, or other equally undesirable components.

As before noted, all fertilizers should contain a due proportion of their phosphoric acid as soluble phosphate, so as to have the power of prompt action upon soils. In this way, while the soluble portion is doing immediate service to the growing plant, that other or bone-phosphate portion, which may be associated with it, is being transformed by atmospheric and other inducements in the soil, and prepared for assimilation as fast as shall be needed for accomplishing the vegetation. This is particularly necessary when the phosphatic material is to be "manipulated" with Peruvian or similar Guano, for the purpose of regulating its ammonia-energy; for the maximum effect would not be secured unless the phosphoric acid is present in soluble form and sufficient quantity to keep pace in activity with the fertilizing power of the ammonia. More than a due proportion, however, is neither requisite nor expedient—for if all the phosphate-lime should be in a soluble state, the internal change in the fertilizer may cause its reconversion into bone-phosphate ere the plant has had time to assimilate it, and thus interfere with the economy of its application.

Common or Neutral Phosphate.—The White Colombian Guano, so favorably known in this market a few years since, is the prototype of this phosphate. It contained a large quantity of neutral phosphate, and hence was a superior phosphatic manure. The supply has been wholly exhausted; but the reputation and even the name of the Guano are still appropriated to substances for the purposes of deception, with few or none of the true qualities of Guano. Dr. Bickell was the first to announce and establish the fact of its presence in Colombian Guano. (*Silliman's Journal, vol.* 23, *pp.* 121, 122.) There is no longer any rich natural source of it. True, the *lumps* from Jarvis Island Guano contain it in association with bone-phosphate of lime, &c., as was first proved

by me in my analyses of that Guano, as reported in the "Supplement of the Farmer" for September, 1859, and as has been reiterated by Baron Liebig, in a recent letter upon the same subject. But, unfortunately, these *lumps* form but a limited portion of the whole Guano, the larger part consisting of mealy sulphate of lime. The total of joint phosphates of lime varies, too, in different cargoes from 12 to 45 per cent.—the latter being the highest quantity I have yet obtained. This Guano is unprofitable, then, for manipulating purposes; though, as an independent manure, it will fertilize well to the extent of the phosphoric acid which it may contain. The question in its use is only one of profit in relation to its cost.

Artificially, the neutral phosphate is not produced except incidentally in the manufacture of the super-phosphate fertilizers, which almost always contains several per cent. of it; more particularly when alkali, or ammoniacal Guano forms a part of the composition.

Bone-phosphate.—This phosphate is typified in bone-dust and bone-ash. Bone-dust is the natural bone freed from grease, by boiling, and reduced to a coarse powder. It contains gelatin, which is a nitrogenous substance, promoting, by its putrefaction, the evolution of ammonia and the disintegration and ultimate solubility of the bones. When any grease in retained by the bones, this disintegration is materially impeded. Their content of lime-phosphate varies from 48 to 58 per cent.; and therefore, though very serviceable for independent use on soils, they are not profitable for manipulating purposes. Besides, bones have so many more advantageous applications in the arts, that the supply is rather limited for agricultural use. In South America, where they are more abundant, the custom is to calcine them or burn off their organic portion so as to render them convenient for exportation. They reach us then as bone-ash, which is richer in phosphate of lime than bone-dust, proportionately to the amount of volatile and organic matters destroyed or driven off during the calcination. The analyses of a number of cargoes which have come under my professional examination, prove that its amount of phosphate of lime varies all the way from 68 to 80 per cent., but is more frequently nearer 70 than 80 per cent. Thus, on this score, bone-ash is as objectionable for manipulating purposes as bone-dust; besides being so in regard to its cost and other conditions affecting the economy of its use, which need not be stated at this time. The present price of "Manipulated Guanos"—$50 per ton—would not justify the use of bone-ash in a quantity to give the requisite ratio of phosphates to the ammonia.

Of the phosphatic guanos, the remaining representatives of this class of phosphatic material, there are known to us the white and brown Mexican from the Carribean Sea and its neighborhood; Baker's Island Guano from the Pacific Ocean, and the Sombrero, from the island of that name in the West Indies. For the sake of making this paper more comprehensive, I will include, also, the so-called Navaza Guano, from an island off the coast of Hayti.

The Mexican Guanos vary in phosphatic strength from 20 to 65 per cent. of bone-phosphate of lime, reaching in rare instances as high as 70 per cent. The supply is limited and unreliable. The physical temperament of the phosphate of lime constituent, well adapts it for fertilizing action. The Guano, however, is objectionable and unprofitable for manipulating purposes. Baker's Island Guano is a new article, only three or four cargoes having been imported. It has yet to establish a reputation for uniform richness in phosphate. A sample from one cargo which I examined gave 73 per cent. of phosphate. The present discussion, at this point, then, is narrowed down for the moment to the two remaining materials, viz: Sombrero and Navaza Guanos. Their relative composition is therefore to be considered.

Having obtained reliable and impartial samples—three of each kind—of different dates of importation, and put them scrupulously through a course of analysis, it was found that their nature, respectively, is as expressed in the following table:

TABLE No. 1.

CONSTITUENTS.	SOMBRERO GUANO.			NAVAZA GUANO.		
	"Done."—Cargo 1859.	"Seguin."—Cargo 1860.	"Belle."—Cargo 1860.	Average of six cargoes 1859.	"Ocean Belle."—Cargo 1860.	"Condor."—Cargo 1860.
	*Sp.Gr.*2.74	*Sp.Gr.*2.67	*Sp.Gr.*2.58	*Sp.Gr.*2.50	*Sp.Gr.*2.52	*Sp.Gr.*2.72
Water	3.52	3.20	7.38	2.20	2.10	3.50
Sand and Silica	.68	.60	1.50	5.60	3.20	5.70
Organic matter, insoluble	...	.08	....	1.48	.63	.50
Organic matter, soluble	5.36	5.52	3.43	10.20	7.92	7.65
Fluorid Calcium	....	....	....	traces.	....	....
Sulphate Lime	.86	1.27	3.87	2.49	traces.	1.15
Lime, (with Alumina, Silica, and Organic Acids	6.97	3.41	4.70	12.47	13.33	18.72
Carbonate Lime	5.34	6.55	4.32	2.00	1.91	2.50
Bone-phosphate Lime	64.67	71 42	65.97	37.72	41.77	19.83
Phosphate Magnesia	2.39	1.72	1.80	2.70	1.30	.98
Phosphate Alumina	3.62	2.16	2.20	10.56	6.35	8.47
Phosphate Iron	1.95	traces.	....	2.20	6.40	3.74
Chlorid Sodium	.09	.45	.10	traces.	traces.	.24
Silicate Potassa and Lime	.76	....	....	....	....	....
Oxid Iron	1.10	1.28	1.90	3.50	2.50	6.80
Alumina	3.13	2.24	3.69	7.04	12.77	20.93
Total	100.44	99.90	100.86	100.16	100.18	100.71
Commercial and Agricultural Expression.						
Actual Bone-phosphate	67.96	73.77	68.14	40.44	43.57	21.17
Or, Calculated Bone-phosphate	73.78	76.02	70.39	50.76	56.96	33.95

The above results show an absolute superiority for the Sombrero and a meagre exhibit of the Navaza Guano. In the best sample of the latter, the actual bone phosphate is barely more than half the amount existing in the best sample of Sombrero; while in the worst or "Condor" sample of Navaza, it runs down to one-third,—the iron and alumina compounds amounting at the same time to nearly 40 per cent. This unprofitable mixture incapacities it for super-phosphating purposes, is fatal to its character as a Guano, takes it out of the category as such, and transfers it to that of the mineral phosphates. Its iron rust appearance and physical characters generally, and its allied chemical nature with certain phosphatic earths, indicate that its classification among *them* is the proper one. It therefore deserves a specific designation, and I propose for it the name of *Cooperite*, in honor of its enterprising proprietor.

The Sombrero Guano shows a remarkable uniformity of bone-phosphate as well as an absence of any material amount of wholly valueless substances. Those cargoes coming in now, are several per cent. richer than the average phophate of the Guano at the time these samples were imported; and I am informed by a recent letter from Mr. Jullien, the resident chemist at the island, that the deposit contains plenty of even 80 to 85 per cent. richness in bone phosphate. We may therefore, expect from the new regime instituted by him in the selection and shipment of cargoes, that future importation of the Sombrero, will contain even more than 70 per cent. actual bone-phosphate of lime.

No chemist should hesitate to vindicate the truth of science from sympathy with private disappointment or misfortune, and therefore with a becoming sense of professional obligations, I find it proper not to drop the examination of Navaza Guano at this point, but to carry it further through a course of experiments upon its solubility compared with that of Sombrero Guano. Taking the "*Done*" sample of Sombrero, and the "*Condor*" sample of Navaza, because of their closely corresponding densities and subjecting one hundred grains of each in impalpable powder to contact with three ounces of nitric acid liquor of specific gravity 1,015 (containing one volume of nitric acid to 29 volumes of water), for seven days, at a summer temperature, it was found that the proportions dissolved were as follows:

TABLE No. 2.

Matters and proportions dissolved by dilute nitric acid.	"Done" Sombrero.	"Condor" Navaza.
Lime,	22.00	16.80
Phosphoric Acid,	12.71	9.73
(Or Bone-Phosphate,)	(27.54)	(21.08)
Alumina and Oxide Iron,	2.10	7.30

Here it will be seen that the Sombrero sample has given up to solution one-third more phosphoric acid than the Navaza; and with this advantage, that it still retains nearly sixty per cent. of its original amount for the further action of the acid; while the Navaza has been very nearly exhausted of all that ingredient, in the experiment, as is shown in Table No. 1. Moreover, the Navaza solution has, per Table No. 2, the depreciating feature of 7.30 per cent. alumina and oxid of iron, while that of the Sombrero contains only 2.10 per cent.

These essays were conducted with observed precision, but it would be unprofessional in me to impose them upon the confiding reader as the counterpart of that action which would take place upon the Guano in the soil. It is true that nitric solution does occur there, but not as with the force of the liquor which I used in these experiments, and which solution, though containing comparatively little acid, is very much stronger than it would be under the circumstances of its natural incidence in the soil.

With the object of imitating more accurately the solvent influences in the soil, a further set of experiments was instituted with carbonic acid water of specific gravity 0,990; and this time those samples of Sombrero and Navaza Guanos richest in bone-phosphate were selected for the purpose, so as to make the conditions as favorable as possible. Fifty grains of the "*Seguin*" Sombrero and an equal quantity of the "*Ocean Belle*" Navaza, in impalpable powder, were put in glass-stoppered bottles with eight fluid ounces of carbonic acid water, and there left for fourteen days, at the end of which time they were filtered, and the filtered liquor carefully evaporated to dryness and weighed. These weights show that the Sombrero Guano had given up to solution 6.40 *per cent.* of its substance, while the Navaza had yielded only 1.40 per cent.: thus establishing beyond question that the solubility of the Sombrero under atmospheric influence or, in other words, in the soil, is four times greater than that of Navaza Guano. The Navaza solution exhibited appreciable quantities of iron and alumina, whereas the Sombrero barely held traces of them. The Navaza Guano having shown itself to be intrinsically so inferior, I took the trouble to extend the investigation to the inquiry whether its agricultural applicability could be improved by association, and to that end put through careful analysis representative samples of certain "*Manipulated Guanos*" well known in the market, and which I happened to have in my laboratory. To avoid disparaging distinctions in name, I will not give them their commercial designations, but tabulate them Nos. 1, 2, 3; only remarking that they all contain Navaza Guano as their phosphatic material in chief; superiority being particularly claimed on that account for Nos. 2 and 3 by their proprietors.

TABLE No. 3.

Manipulated Guanos.

COMPONENTS.	Navaza and Bones.	Navaza.	Navaza.
	No. 1.	No. 2.	No. 3.
Water, accidental - -	9.26	7.86	6.40
Sand and Silica - -	2.14	4.64	10.40
Organic matter, insoluble -	.46	.86	.48
Organic matter, soluble yielding AMMONIA -	32.55 (8.40)	30.03 7.40)	30.39 (6.56)
Sulphate Lime . - -	5.25	3.08	5.38
Lime (with Alumina, Silica and Organic Acids) - - -	4.95	8.69	13.76
Carbonate Lime - - -	3.18	1.79	1.60
Soluble Phosphoric Acid (as Phos. Ammon.) - - -	1.40	1.27	2.95
Bone-phosphate Lime - -	30.98	21.53	9.32
Phosphate Magnesia - -	1.90	1.90	1.80
Phosphate Alumina - -	1.10	4.16	5.31
Phosphate Iron - - -	traces.	traces.	——
Chlorid Potassium - -	.53	traces.	traces.
Chlorid Sodium - - -	.25	.13	.30
Sulphate Potassa - -	traces.	.21	.52
Sulphate Soda - - -	——	.05	traces,
Alumina - - -	3.70	8 14	8.39
Oxide Iron - - -	1.30	5.60	3.80
Total - - -	99.25	99.94	100.80
Equivalent of *total* Phosphoric Acid in Boneplate Lime - -	38.07	31.13	23.60

The results in this Table are very interesting, confirming my previous experience as to the want of uniformity of the per centage of ammonia in Peruvian Guano, its variable degree of moisture, and also its very small proportion of alkaline salts. While the inspection generally gives over 16 per cent. of ammonia for Peruvian Guano, it often runs under and down as low as 13 per cent., so that justly it cannot be allowed an average higher than 14 per cent. The large per centage of ammonia in No. 1, as well as the much lower amount in No. 3, may be considered as accidental. So also, is there, doubtless, an absence of intentional fraud in the low amount of phosphates particularly in Nos. 2 and 3, the cause being, probably, an injudicious selection of the kind of phosphatic material with which their manipulation is effected, or in other words, mistaking the quality of Navaza Guano. No. 3 is peculiarly unfortunate in being composed of one of the poorest of Navaza cargoes. No. 1 escapes reproach, in a measure, by the partial presence of bones, which brings up its amount of bone-phosphate to a fair proportion. It may be added that the 8 to 10 per cent. of ammonia and the 55 per cent. of bone-phosphate claimed for Nos. 2 and 3 in the proprietors' adver-

tisements, are purely hypothetical, as there are no available raw materials to afford such strength of ammonia and phosphates, at the present selling price of Manipulated Guanos.

Passing now from the foregoing Table to the following, the latter (No. 4) shows the analytical results from two fertilizers made with care in the selection of all the materials; the phosphatic element being Sombrero Guano. They are very well known in the market, but I shall designate them as A and B, with the explanation that *A* is a *soluble* Phospho-Peruvian fertilizer, while *B* is a Manipulated Guano:

TABLE No. 4.

Manipulated Guanos, made with Sombrero Guano.

Components.	A.	B.
Water, accidental	9.60	4.72
Sand and Silica	2.60	4.40
Oranic matter, insoluble	6.70	6·00
Organic matter, soluble	17.42	24.50
yielding Ammonia	(7.25)	(7.44)
Sulphate Lime	20.00	7.18
Lime (with Alumina, Silica, and Organic Acids)	1.12	2.05
Carbonate Lime	2.27	3·82
Phosphoric Acid, soluble	4.54	2.80
Super-phosphate Lime	6.88	——
Bone-phosphate Lime	20.17	38.16
Phosphate Magnesia	1.36	1.80
Phosphate Alumina	.34	.50
Phosphate Iron	——	1.60
Soluble Silica	.80	——
Chlorid Potassium	1.95	.52
Chlorid Sodium	.82	——
Sulphate Potassa	.33	——
Sulphate Soda	——	.33
Alumina	2.26	64
Oxid Iron	.84	1.20
Total	100.00	99.82
Equivalent of *total* Phosphoric Acid in Bone-phosphate Lime	41.28	48.88

Analytical results could not be more conclusive than those presented in the foregoing tables as to the degrading association of Navaza Guano on the one part, and the exalting quality of Sombrero on the other,—in regard to fertilizing mixtures. The poverty and objectionable features of the Navaza mixtures are seen in 1, 2 and 3, of Table No. 3, as compared with the results in *A* and *B*, of Table 4, from Sombrero Guano. No other phosphatic material than the Sombrero could be made to yield a fertilizer like *A* of Table 4, so affluent and yet so well

adjusted in all the elements for profitable fertilization: while, the employment of Sombrero in *B* gives also as rich a "Manipulated Guano" as can be probably made at the price charged for it by the vender. With its remarkable capacity for superphosphating and manipulating purposes, the Sombrero Guano vindicates, throughout, not only its superiority over other phosphatic Guanos, but also its title to be considered the phosphatic institution in agriculture, just as Peruvian Guano is now known to be the ammoniacal institution in that service. Readily accessible; uniformly rich in lime phosphates; of inexhaustible supply and at low cost; its existence is a boon of large value to agriculture, and its discovery marks an epoch in the history of fertilizers.

The progress of experience and research allows frequently only a temporary position to what is esteemed the best of the day; and so Sombrero Guano has to run its risk of the future. But having been among the first to discern and make known its worth, and now after much laboratory experience with it and other phosphatic Guanos, being confirmed in my first views of its value, I shall continue to recommend it as the best, until it is suceeeded by something that, if possible, may be superior.

No. 19 E. 12TH STREET, New York, November 23, 1860.

[*American Farmer.*]

Tact and Good Judgment in Farming---How the Profits Accrue, &c.

The farmer, who takes a correct view of his position, and assigns to each of the circumstances which surround him the prominence each deserves, and who wisely distributes his energies among his varied interests, according to their relative importance, is called a successful farmer. Such he surely is. Success is the iuvariable reward of well directed energy.

The converse of this proposition is as forcibly true. The cultivator who, in ignorant or willful defiance of every principle of success, withholds his energies, or misdirects them by applying to unprofitable subjects, or unwisely distributes its relative force to each, becomes an unsuccessful farmer.

This is about all that constitutes the difference which we observe in farmers. Money does not make it, for one will commence with wealth and end in poverty, while his neighbor will commence in poverty and end in competence. It is not in education, for the educated man (educated in schools,) will frequently run his race to financial ruin, while his ignorant contemporary (ignorant of scholastic trash,) will pave his way to fortune. Wealth, learning, zeal, position—all yield in this struggle for success to simple tact, or the judicious application of energy to the right object.

"What interest demands a larger portion of my attention?" This inquiry each should make for himself, and measurably each must answer for himself. Herein lies our skill. Herein is the key to our success. No special rules can be given, applicable to all localities, and all circumstances; but each must look around him and discover his "lead." If we live a hundred miles from market,

it will not be wise to grow strawberries for it, especially, if equally distant from rail or water conveyance. There are a thousand other things we might do, which would be equally silly.

Without reference to particular localities, we may assume in general, that *stock raising* is our leading agricultural interest, and that the most successful grower of horses, cattle, sheep, &c. will be the most successful farmer, and, conversely, the farmer who comes the nearest to failure in this department of industry comes the nearest to being frustrated in his hopes and aims. It is true regarding only the immediate present, and reckless of the years that lie a little way beyond, a farmer may sometimes realize gains a little faster, by raising grain exclusively, yet in the stretch of a very few years, he learns to his sorrow that the race is not always to the swift.

And why is this? We think the truth is found in these simple considerations: 1st. A supply of stock is necessary to answer an imperious demand founded in our necessities—horses and oxen for our carriages and plows, cattle for our beef, cows for our butter and cheese, sheep for our mutton and wool. These demands are based in absolute necessities of our condition, and must be supplied independent of any whimsical caprice of fashion of the times. 2d The materials for enriching our soils are principally supplied by our stock, and such must ever be the case. Guano, superphosphate, etc., and even green manuring are, in our opinion, but temporary and questionable expedients, and can never supply the continued absence of animal manures. These considerations are sufficient to justify the assertion made in the preceding paragraph.

Shall we all become exclusively devoted to stock raising? Not at all. None are so stupid that they cannot easily foresee the result of such a procedure. Only let us give the prominence to this department of our business that legitimately belongs to it, and prosecute it with that degree of skill and energy which is attainable by all, and which leads to success.

What constitutes success in stock raising? This is made up of two elements. 1st. When by the skillful application of principles and combination of elements, we succeed in producing the desired result, independent of pecuniary considerations. This is gratifying to pride, and is the legitimate calling of the amateur. 2d. When by the exercise of judgment and economy, we succeed in raising a horse, at an expense of fifty or seventy-five dollars, which will sell for one hundred or more, or is good for that amount to wear out; to make a pound of beef for four cents, and sell the same for six cents; to grow a pound of wool at a cost of twenty-five cents, which will bring forty cents in market; in other words, to produce marketable commodities at a less cost than they will bring. This constitutes success in the pecuniary view of the matter, and is what we, as farmers, are striving for; and having done this, our success or profits will be proportioned to the capital invested.

We may be indulged, perhaps, in one more inquiry. How is the thing to be done? Ah, that is the nut that is to be cracked! Our space in these columns is

limited; we have not room to swing a ponderous sledge, even if we possessed one; so a few taps with our little hammer is all that remains for us to do.

1st. Begin at the beginning. Well begun is half done. Let us select the best breeders within our reach, but *not* regardless of expense. Profit is our object, and only a few, very few, can buy five hundred dollar bulls, or one hundred dollar rams, and realize on the investment. Ten have lost money in such speculations where one has made it. But let us do the best we can do safely.

2d. Animals in embryo are subjects for profitable attention. The characteristics of the parents will develop themselves in the offspring, and if starvation and general neglect are prominently exhibited in the former, we may look as confidently for their manifestations in the latter.

3d. It is a decided advantage to have the young come early. They must have milk, or its equivalent, a certain period of time, before they are ready for pasture, and if sufficiently forward to take the first fresh bite, much is gained for their subsequent growth.

4th. We must never let a day pass, summer nor winter, without improving the condition of our animals. This can be done, and must be done, or we become losers. The moment we feed without accomplishing an increase of weight, we feed at a loss. Circumstances must determine how rapidly it is profitable to push this improvement. It is a very easy matter to feed too much grain; we must feed as little as will suffice for our purpose.

5th. We must have the right kind of fixtures. We can do nothing right without them. Stables and sheds, warm, dry, ventilated and convenient; water, good and abundant. The difference between these and the absence of them cannot be explained to the uninitiated; they must be tried to be appreciated.

6th. Strict economy of fodder. There must be no waste. If a farmer feeds 20 cows, or their equivalent, for 180 days, and allows each to waste one pound of hay each day, the waste amounts to over one and three-fourths tons, which at twelve dollars per ton, amounts to the interest on three hundred dollars, at seven per cent. A few such leaks would sink a pretty large ship, or at least keep the navigators hard at the pump.—*The Rural American.*

Discussion About Sheep.

AT THE NEW YORK STATE FAIR.

Mr. John Wade, of Canada, was asked to state what sort of sheep he raised for mutton. He said he preferred the long wool sorts, because they are more hardy. The mutton sells readily, and the wool, though not worth so much per pound as the fine wool sorts, produces so much more than the value of the fleece, is equal. We don't grow much corn, but we feed a great many roots, and feed well. It is foolish to try to keep any animal upon low diet. We feed anything that sheep eat best, and I fatten principally upon turnips and hay, with a little meal. The long wool sheep are better adapted to Canada than the fine wool.

We shear eight pounds of clean wool per head. The Cotswold variety are preferred; they have stronger constitutions than the Leicester sheep.

Mr. Pettibone, of Vermont—If a man keeps but few sheep, he should keep a mutton breed. If he keeps a large flock, or say 200 or 300, he should keep the fine wool sorts. The trouble in sheep-breeding is in letting them run down in October. I Winter 300 head, and 100 ewes will give 100 lambs. I use 400 acres, but many of them are on the mountain, and are valued at only $7 an acre. I do not let all my ewes breed. I keep my sheep in very close winter quarters, on hay. I feed breeding ewes one peck of corn a day to 100 head. In eleven years I have not had a lamb die, and they are kept without grain, but always with water and salt by them. There is a material difference in the value of the fleece, according to the way the sheep are kept. I prefer to have my sheep always fat. In January I select my ewes, and never sell the choice ones. I have an ewe that has produced eighteen lambs, and shears four pounds of wool. I do not select the most gummy sheep for my use; they are much more tender than those less gummy. Still, you must have greasy wool if you have fine wool. I feed generally twice a day—sometimes only once.

Mr. Baker, of Steuben Co., N. Y. I commence in October, after hard frosts, to feed grass to the lambs, and when winter commences I put them in yards and feed hay twice a day in broad racks. I never kept coarse wool sheep. My flock average 4 to 4½ lbs. per fleece—not of the gummy sort. I stable my sheep in winter. I keep 400 head, divided into three flocks, by two partitions. The gross sales average about $2 a head for wool and sales of sheep. I feed very regularly as to the time and quantity. I recommend the increase of our flocks, as they greatly improve our farms. I feed roots to ewes 20 days before lambing. I have kept 800 sheep a year on less than 200 acres in the farm, both summer and winter feed. I have raised 120 bushels of corn on an acre of sheep manured land. The water on my farm is limestone.

Gen. Hammon, of Monroe, Co., N. Y.—I commenced with fine wool sheep, 40 years ago. I then tried Leicestershire, and then came back to Merinos. I have less than 200 acres, and grow 30 or 40 acres of wheat every year; the land improves by sheep. My average lot of fleece is 5 lbs. I keep 330 head, and get over $700 a year for wool and increase. I stable 50 sheep in a room 14 X 40 feet, without change in the winter. I wash my sheep clean and let them run six or eight days, and then shear. I don't breed from gummy sheep. I feed in board racks, with straight sticks, so that the sheep can put in their heads. There are about 25 acres of reclaimed land on my farm that will keep sheep alive, but will not fatten them. My farm is limestone, and I prefer fine wool sheep to any other for profit; and I consider sheep twice as profitable as cattle on any grain farm. I never breed from ewes less than three years old. I do not like the cross of the Leicester bucks upon fine ewes. I have sold of wool and sheep over $900 a year.

Lewis F. Allen, of Black Rock, N. Y.—I have kept sheep 25 years upon a

clay loam, natural to sweet grasses, limestone formation, on the Niagara River. There is no rule as to the profit of keeping sheep. All depends upon circumstances. In Canada I have seen the best long wool sheep I ever saw, but the sheep are too fat for eating. You might as well dine off a cake of tallow as such meat. Such sheep may be as profitable in the United States. With me, those sheep require good shelter. They are not kept warm by their long fleeces. My sheep sheared 5 to 8 pounds of wool. I do not approve of feeding many roots excepting to breeding ewes. They are likely to scour sheep, at least they do mine.

Mr. Brown, of Orleans Co., N. Y.—I have bred both coarse and fine sheep. I have yearling coarse wool sheep that weighed 150 pounds each at one year old. I find the coarse wool breed the most profitable. My sheep average 5 pounds of wool, that sell at 31 cents a pound. My sheep are a cross of Cotswold, and are close wooled and hardy. I live on gravelly loam, wheat soil, and I think it desirable to increase the stock of sheep in this State. A field of clover fed off by sheep, will yield more wheat than if not fed off.

Lewis F. Allen—On some soils it may be best to plow in clover; on other soils it is not. As to mutton sheep, I have fed Southdowns, and the cheapest way that I can make mutton, is upon grass, and wethers of 150 pounds bring 5 cents a pound gross at Buffalo. I would keep mutton sheep if I had a good farm on a rail-road. I can always sell my lambs at $2. My Southdown fleeces bring $1.50 average. Southdown mutton is the best we have, and the sheep always sell well for mutton. The fine wool sheep mutton is apt to taste of the greasy wool. The Merino sheep are a hardy race of sheep, but they are not a good breed to keep, where mutton is the main object, and I would not keep a breed for mutton that produce carcasses all fat, like some of the long wool sorts.

Solon Robinson, of N. Y., was called upon to state what sort of sheep sell best in the New York market, which he has so long reported for the *Tribune*. He stated in substance as follows: Southdown sheep always outsell every other variety in New York to our first-class butchers, but they are not appreciated by the wholesale butchers, who are mostly Irish and Jews. There is always a good demand for choice Southdowns, particularly lambs, and the half-blood ones bring about as high prices as full-blood ones would, if brought in early in a first-rate condition. Samuel Thorne, of Dutchess county, buys good common ewes every year, and breeds them to his full-blood Southdown bucks, and gets early lambs, which sell at $4 or $5 a head. He clips the ewes, and fattens and sells them, and the sales of lambs, fleeces and ewes average about $7 a head over the first cost. This makes a very pleasant and profitable stock business, and should be largely increased, as the market is good now, and improving every year for such choice and fat sheep. The most profitable breed for the New York market is the long-wooled, heavy-carcassed sheep. This sort always sells well by the pound; it does not matter that the carcasses are loaded with fat; the mass of mutton eaters in the city are not such as appreciate the finest sorts of meat. Sheep generally sell by the head, and those

which are the heaviest, not the best, bring the most money. Early lambs will average $5 a head, the latter ones $3, if fit for the market.—*Rural American.*

Recipes, &c.

PUDDING.

Compounded of eggs, beaten up in a splatter;
A quart of new milk and a wee bit of butter;
Baked brown in an oven, and eaten while hot,
Is a pudding, than which, nothing's better, I wot.

Nelly Eyster, Harrisburg, Penn.

CONTENTMENT PUDDING.

Pare dozens of apples, or less, as you need them;
Then try, without breaking, to both core and seed them.
Fill each excavation with sugar and spice,
(Either nutmeg or cinnamon taste very nice.)
Place the apples in rows in a well buttered platter;
Pour over them lightly, a delicate batter.

ICING FOR CAKE.—Beat the white of one egg perfectly light; then add eight tea-spoonfu'ls of loaf sugar, pounded fine and sifted, very gradually, beating it well; after every tea-spoonful add one drop of the essence of lemon or rose water to flavor it. If you wish to color it pink, stir in a few grains of cochineal powder. Lay the frosting on the cake with a knife, soon after it is taken from the oven; smooth it over and let it remain in a cool place till hard. To frost a common-sized loaf cake, allow the white of one egg and half of another.

JUMBLES.—Weigh half a pound of butter, three-fourths of a pound of flour, half a pound white powdered sugar; put by a little of the sugar to roll them in. Beat two eggs well, add a little nutmeg; this must be made into a soft dough; do not roll it on the paste-board, but break off pieces of dough the size of a walnut, and make into rings; lay them on tins to bake, an inch apart, as it rises and spreads. A moderate oven.

PARISIAN MODE OF ROASTING APPLES.—Select the largest apples; scoop out the core without cutting quite through; fill the hollow with butter and fine, soft sugar; let them roast in a slow oven, and serve up with the syrup.

How to Extract the Bitter Quality from Yeast.

Bake a small piece of bread quite black and drop into the yeast; or, if it be very bitter, put a small quantity of bran into a small sieve, and strain the yeast through. These remedies have been tried and never have been known to fail.

Or,—Pour cold water over the yeast some time before you require it. The yeast will sink and the bitter quality remain in the water, which pour off.

For the Southern Planter.

Letter from Dr. Higgins, of Baltimore.

MESSRS. EDITORS:

Dear Sirs—In an editorial of the August No. of the Southern Planter, on Manipulated Guano, you expressed the idea that the "father of the theory" had not been fully recognised, and that he would be entitled to the lasting gratitude of the agricultural public. In your September No. is a communication from John Kettlewell, of Baltimore, Md., in which he claims to be "the sole and exclusive originator of Manipulated Guano, in name and substance."

How far this claim of Mr. Kettlewell's can be substantiated, I leave it for the public to judge, after considering his certificates and the facts which I shall offer in relation to the matter. The certificates testify that in 1857, Mr. Kettlewell used a mixture of Peruvian and Mexican Guano, with good effect, on wheat. Some others testify to his having mentioned it to them before his connection with Mr. J. S. Reese, and one, (J. J. and F. Turner's statement,) that Mr. Kettlewell, in December, 1855, or January, 1856, asked them to join him in the mixing of Guano by machinery. The Messrs. Turner, therefore, gave to Mr. Kettlewell "whatever particular merit" might be due to him from "making (mixing, I suppose they mean,) Guano by machinery." Another certificate states that Mr. K. had made some Manipulated Guano in February or March, before his connection with Mr. Reese. None of these proofs, adduced by Mr. K. to prove his claim as the "*sole and exclusive originator of Manipulated Guano, in name and substance*," extend further back than January, 1856, or at most to December, 1855. He adduces, I naturally presume, the best evidence he can to support his claim, but no one proves, or attempts to prove for him that he was the originator, in name and substance, of the mixture of Peruvian and Phosphatic Guano, known as Manipulated Guano, before December, 1855.

My claims to the origination of the use of the mixture of the two diverse kinds of Guanoes, now sold as Manipulated Guano, are the following, which I submit to the judgment of the public.

In September, 1852, in an article published in the Baltimore Sun, I deprecated the use of the enormous quantity of Peruvian Guano then recommended in the Agricultural paper of the State, and recommended for each farmer to mix for himself Peruvian and Mexican Guano, with the addition of oil of vitriol, to increase the solubility of the Mexican Guano. Here, at once, was the principle enunciated of the superiority of a mixture of the two Guanoes over the Peruvian alone. The use of oil of vitriol being troublesome, many persons, by my advice, used the mixture without it with successful results. In my Report to the House of Delegates, made early in the winter of 1853, of which some fifteen thousand copies were printed for general circulation, I laid it down as a fundamental maxim that Peruvian Guano should not be applied alone, but mixed with Mexican Guano, then the only Phosphatic Guano in our markets, or

some other substance, known to be deficient in the soil. My attention was first directed particularly to this subject on account of the excellent action of some Patagonian Guano, which containing only half as much ammonia as did the Peruvian, yet acted equally well. Many persons asked my advice in relation to it, and I advised them to use a mixture of Peruvian and Mexican, as furnishing the same material at less cost. Here, then, was the principle published to the world, and the very thing itself recommended.

But not only this. In my Third Report to the House of Delegates, of Maryland, of which fifteen thousand copies were published for general circulation, I recommended the mixture of Peruvian and Mexican Guanoes under proper conditions, these conditions being "the absence of a knowledge of the proper quantity of Phosphates in the soil." See page 106, Third Report of James Higgins, State Agricultural Chemist to the House of Delegates, of Maryland, and on page 107, of same Report, when speaking of Peruvian Guano, I further state, "That its efficacy is greatly promoted by the addition of other saline substances, such as Mexican Guano, &c." On page 105 of same Report, I recommended "the mode of preparing Guano for use," that it be in a fine state of division, as a thing of almost vital necessity. In a table of "analyses of soils, from various parts of the State," page 121, of same Report, the almost constant deficiency of phosphoric acid is shown, and on these, and similar soils, of course the mixture of the two Guanoes is recommended. This advice was given to the owners of these soils in 1852, or as soon as they called after the making of the analyses.

In my 4th report made in 1854, I state that "the use of Peruvian Guano without any mixture with other common phosphates as it is so frequently applied, is costly and useless," and that a rational husband-man should use "a mixture of Peruvian and Mexican Guano, or other phosphates," and the reason for such advice clearly given. The causes of the excellence of this mixture and the rationale of its operation are distinctly set forth, and more strongly and thoroughly than had been before. See 4th report of St. Ag. Chew, to House of Delegates, page 56. In the same report, page 59, I expressly state that Peruvian Guano should not be applied alone, but its use should be accompanied by other substances absent or deficient in the soil, and show by facts and figures that its use alone will impoverish some soils and so reduce them, that Peruvian Guano alone cannot possibly be used with any profit. Furthermore, on page 61, is a letter from Mr. Richardson, who purchased a farm of Mr. Gossnell, a near neighbor of Mr. Kettlewell, and in the Custom House with him, detailing the result of an experiment, which he made with a mixture of Mexican and Peruvian Guano and Peruvian alone, the result being very greatly in favor of the mixture. This result was made known to me in 1853, with some others, and very many used the mixture of the two guanos on their wheat, more generally that perhaps from the great scarcity of Peruvian Guano in the Summer and Fall of that year. In the Fall of 1854, an increased number of farmers in various parts of the State,

used it, and the employment of the two guanos had become very general. It was not until the Spring of 1855 that the guanos ready mixed, were offered for sale in this market, under the name of "Manipulated Guano," by John S. Reese, Mr. Kettlewell being a silent partner and mixing the guano at his mill, where for several years before he had been mixing various substances and selling the mixture under various names as fertilizers. The recommendation for the use of the two guanos instead of the large quantities of Peruvian, was continued by me during my whole term of office, in each report of which, about 25 thousand copies annually were printed and circulated, until a different political party came into power and I was removed from office by the Governor of the American party.

The above is a full history of the origination, in theory and practice, of the use of the two guanos, from which it will be seen that by *my recommendation* it was *successfully used years* before Mr. Kettlewell or his partner Mr. Reese, either made, sold or used it; and, that it was after farmers and planters had again, and again; year after year tested its value, that Mr. Kettlewell, having a mill in which he had before mixed and ground various substances, mixed, ground and sold, a mixture of Peruvian and Mexican Guano, under the name of Manipulated Guano, to meet a public demand. Mr. John S. Reese disputes with him the credit of having first mixed these guanos by machinery, and between them I shall not attempt to decide, because there was nothing new in the mills or machinery used by them.

Let now the public judge from the above statement of facts, how much "devotion of the best years" of Mr. K.'s life, what "pecuniary sacrifices and difficulties" and the "amount of patient toil, of which no man can know but myself" (Mr. Kettlewell's own self), it cost for *him* to be the originator of the mixture of the Phosphatic and Peruvian Guano! * * * *

Since Mr. Kettlewell's publication, some other individuals have claimed for themselves or others the credit of the origination of the mixed guanos, and amongst them are Mr. Samuel Sands, the publisher of the Rural Register in this city, and Mr. B. M. Rhodes who is the agent for a Philadelphia manufactured Super-phosphate of Lime. Of the former I will only state that his own paper, the American Farmer, refutes all that he says about the matter, and that now Mr. Sands is selling a *refuted* Manipulated Guano by the aid of an analysis of Dr. Charles Bickell, who never made an analysis for him.

Messrs. B. M. Rhodes & Co., in a late number of your journal, claims that Dr. Bickell originated the mixture, and attempts to prove it from a book, belonging to me, which one of that firm holds unjust possession of. Now Dr. Bickell never claimed this merit for himself, as many persons here can testify to. Mr. Rhodes has again and again proclaimed *me* to be the originator years ago. In the pamphlet which he published in 1857, advertising his Super-phosphate of Lime made from my formula, on page 7, he says: "To Dr. James Higgins, the State Chemist of Maryland, is due the credit for his bold opposition to the exces-

sive use of Peruvian Guano, and for his introdueing into praetiee the eombined use of Peruvian and Phosphatie guanos, now so generally adopted by our farmers." And again, on page 23, of same pamphlet, we find the following: "The propriety of using mixtures of Peruvian and Mexiean Guanos, on many soils, is no new invention, but was recommended several years sinee by Dr. James Higgins, our State Chemist, and sinee then has been practised among farmers in various parts of the State, before the words "Manipulated Guano" were ever heard. This we ean prove by a host of witnesses, "eopyright seeured" notwithstanding. Yet, now Mr. Rhodes, with what sense of justice I am at a loss to eoneeive, attempts to deprive me of what is justly my due and give it to Dr. Bickell. Dr. Biekell himself, would, I am assured, have seorned to appropriate it to himself—the honor whieh he knew was due to me.

Let Messrs. B. M. Rhodes & Co., hereafter strive to introduee their Northern goods on Southern lands, as best they may, but let them not attempt to dishonor the name of a noble gentleman, by elaiming for him, that which he never claimed for himself.

With the above statement of incontrovertible facts, I leave the matter to the judgment of an honest and intelligent public.

JAMES HIGGINS,
Analytical and Consulting Chemist,
No. 91, Second st., Baltimore.

For the Southern Planter.

New Process of Curing Tobacco.

DEAR SIRS,—Deeming it expedient that the Tobaeeo growers should know that the euring of Tobaeco is no longer a mystery, or a work of ehanee, but a seienee, I am indueed to make this eommunieation. The proeess of euring is an invention of a well known gentleman living in my county by the name of Drummond; a son of a former contributor to your paper, who styled himself "Cold Mountain."

The curing is done by means of a furnace, whieh is of the simplest strueture possible, while at the same time it eombines every advantage to be desired; is free from danger of burning the Tobaeco barn, requires less fuel, less time and labour, and has the quality of euring any colour desired.

I witnessed the curing with this new invention, and it was a most happy sueeess; the Tobaeeo eured was lot Tobaeeo, very watery and green, and it was eured to an orange colour by design. I verily believe this invention is destined to supersede all others in the way of Tobaeeo euring, and were it not for the faet that the inventor has applied for letters patent, I would give a full description of the invention and manner of euring, but not wishing to infringe his rights, I will say no more, as he in due time, no doubt, will set it before the people.

AMHERST.

From the Working Farmer.

Under-Draining---Will it Pay?---Its Cost per Acre.

Nothing should interest the progressive American farmer, in the present state of agriculture in the United States, more than the subject of under-draining. There are many acres of useless land in each State that might be made productive by opening ditches, or a system of drainage, to carry off the surplus water that now remains on the surface, a barrier against improvement. Many fields now yielding pitiable returns, may, by a judicious expenditure in thorough under-draining and deep disintegration, be made to at least double the present results, besides putting at defiance climatic changes. In the month of September we received a letter from a friend in Cecil County, Maryland, informing us that his crops were nearly burned from the ground by the drouth, except a small under-drained piece, where the vegetation was luxuriant, showing no signs of being at all affected. This is but one of the many accounts received, showing the efficiency of drainage as a protection against drouth. "But," said a farmer to us a few days ago, "the operation is too expensive, we cannot afford to expend from $36 to $50 per acre in under-draining, it would be better to move West and buy fertile land at half that cost."

Five years ago, we under-drained a piece containing seven acres. The soil was clay and a hard pan sub-soil. This lot was wet and cold in spring, and some seasons could not be plowed until June 1st. The drains were opened four feet deep and forty feet apart. We used for parallel drains the two inch sole tile, and covered the joints with salt hay. The tiles cost us $12 per 1000; for these drains the entire cost was $350. The field was then in grass. The second year after draining, it was plowed and sub-soiled and moderately manured, and four acres of the seven, planted with late cabbage (a crop that could not be grown on the field before it was drained).

The cabbages succeeded, and besides paying cost for manuring, culture, &c., returned a net profit exceeding the expense of draining the whole field. The profit would not have been as large if the crop had been oats, potatoes, or corn, but it is very certain that with any crop the increase would have been sufficient to warrant the under-draining.

One year ago last September, we drained another lot containing four acres. The drains were three and a half to four feet deep, and forty-two feet apart, using two inch sole tile. The ground was loosened with a large lifting sub-soil plow to nearly the depth of the drains. By this means the opening of the drain cost only sixteen cents per rod. The cost of the work was as follows, per acre:

Digging 62 rods of drains, at 16 cents per rod,	$ 9 92
1023 feet of tile, - - - - - -	10 23
Laying the tiles and covering with salt hay, -	1 00
Filling in drains, using plow and pair of horses,	1 50
Miscellaneous expenses, - - - - -	1 00
	$23 65

It will be seen by the figures that the work was performed for less than half what it had cost five years ago. The protracted drouth of last summer injured many crops to a considerable extent; this lot showed no indications of want of moisture; it was planted with potatoes and yielded over 200 bushels to the acre.

Thorough drainage will not be practiced to the extent it should, until it can be done at an expense of less than $20 per acre. Farmers of limited means will not generally adopt it, until some such change takes place, and from what has already been done in reducing the cost, there is little doubt that this desirable state of things is near at hand. Already we have a tile machine, inexpensive and portable, and said by those who have used it, to give good satisfaction, making a tile of a superior quality. When such a machine is in market, if several farmers in a township would club together and purchase one, the tiles could be made at home, and at one half the expense they now are.

In conclusion, we beg our readers to consider this matter fully, and if they have not heretofore been forced to improve their land by their own observations, to act upon the well ascertained and plainly stated profits of others; above all, whatever is done in under-draining, let it be done well, for it costs more to keep a poorly made drain in repair than to build a new one. P. T. Q.

Drain Tile---Number per Acre.

J. Herbert Shedd gives the following rule, in the *New England Farmer*, for calculating the number of drain-tile required for an acre:

"In estimating, to include main drains, divide 48,000 by the distance apart in feet. Thus: if the drains are to be 30 feet apart

30)48,000

1,600 the number required.

"If forty feet apart,

40)48,000

1,200 the number required.

"The per centage of tile to be used in the main drains, varies with the length of the laterals and with their distances apart. The above-given rule supposes the laterals to be 40 feet apart, and to have an average length of about 400 feet each.

"If it is required to know how many tiles would be used for lateral drains only, divide 43,560 (the number of superficial feet in an acre) by the distance apart. Thus: for lateral drains, 36 feet apart,

36)43,560

1,210 the number required."

When you know the length of a drain, provide a tile for every foot, since, after deducting for breakage and bad tiles, a thousand in number will just about lay a thousand feet in length.

Editor's Department.

Guano for the Corn Crop.

ABINGDON, VA., December 10th, 1860.

MESSRS. EDITORS:

My Dear Sirs,—I want to know in what quantities and what manner guano should be used upon corn? Whether it should be put in the hill with the corn when planted, or on the hill after the corn has come up, or sown broadcast? Whether the increase of the crop is large from its use, and whether it is better to use it pure or mixed with ashes or gypsum, and in what proportions? I would be glad also to learn whether guano is good for meadows and pastures, sown broadcast? You will confer a favor by answering me in the Planter.

Yours respectfully, JOHN W. JOHNSTON.

We very cheerfully comply with the request of Mr. Johnston, and will give him our personal experience on the subject of his enquiry. We hope some of our readers will also respond.

We have applied pure Peruvian guano mixed with equal parts (by weight) of plaster to corn, at the rate of 400 pounds to the acre. A deep furrow was opened every four feet, and the guano and plaster sowed in it—after which two furrows were lapped up on each side over the one containing guano. The land was then checked off in the opposite direction four feet, and the corn planted on top of the checks, so that the hills were four feet apart each way, and contained two stalks to the hill. The season was propitious, and the crop yielded well. At the same planting we applied the same quantities of guano and plaster broadcast to the land before breaking it up—plowed it in deeply, and had the land well harrowed. The corn was planted at the same distance apart each way, (four feet,) and the yield was *supposed*, by persons who saw both experiments, to be rather better than the first. Of this we had our doubts. We could see little if any difference between the two lots.

Another experiment we tried was a most complete failure, and resulted in the entire loss of the cost of the guano. In this case, the corn was planted five feet apart one way, by three feet the other—the land was well ploughed and harrowed—and the corn planted without manure. As soon as the corn was high enough to throw the dirt to it, we sowed one hundred pounds of unmixed Peruvian guano at the sides of the hills, and lapped the dirt over it. We had a severe drought and the chinch-bug both to contend with that summer, and the corn consequently *could not* do anything. The whole field was a dead loss.

Last summer we tried somewhat the same plan, with better success. We mixed guano (dissolved in sulphuric acid) with double its weight of plaster: sowed it at the rate of 300 lbs. of the mixture to the acre, and immediately

lapped two furrows on each side of the corn rows over it. A seasonable rain pushed the corn right along, and the field yielded four barrels (20 bushels) to the acre. This corn had previously been greatly damaged by drought, and we think would have easily doubled the yield but for that fact.

Next season, if we live, we intend to apply 200 lbs. of Manipulated guano and the same quantity of plaster to each acre of corn, when we throw the dirt to it, and to lay the corn by with peas. Our object in doing which is to secure a strong growth of green vegetable matter to the soil, so as to make the guano applied to the corn available for a crop of wheat or oats, if the season should be such as to make it not available to the corn crop. Guano is so expensive as to render the expediency of its use exceedingly doubtful, except in such manner as to give the farmer another chance at it, if the crop to which it is applied should fail. We think this plan a safe one, as it has, so far, proved so with ourselves.

We think that Southern farmers *must*, in self-defence, use either concentrated or home made manure upon the corn crop, as labor is so expensive with us that we cannot employ force for our farms and pay their expenses with the old fashioned average number of barrels to the acre.

We *must* put each acre of our corn land in proper condition to bring eight or ten barrels to the acre, *or we must every year become worse and worse off, by sinking money in the folly of cultivating poor land without a rational prospect of being paid for our labor.* It takes no more labor to *work* an acre of rich land than it does of poor, and while it might require more time and exertion to gather the crop from the former, we should at the same time have a very pleasant stimulant for our exertions in the shape of *profit.*

With regard to *manuring in the hill*, we must reply that *we* have never tried it in any manner; but we know farmers who have used guano in the hill for the purpose of giving their corn a lively start. A tablespoonful put in the hill, and well mixed with the dirt upon which the corn is dropped, is a plenty *for this purpose.*

We are opposed to mixing ashes with guano, because they are chemically incompatible, and the result of such mixing is to "set free" the ammonia the guano contains. *If the two could be mixed in a perfectly dry condition, and be at once put under ground*, there is no objection to using them in combination. We have seen this experiment tried *on wheat* with profitable results.

We have once tried the experiment of sowing guano and plaster broadcast upon clover, upon a limited scale. The experiment was tried during a light drizzling rain, and the clover was greatly improved by the application. We do not *know positively* how it would pay to sow guano broadcast over our meadows, but we are inclined to think that it would pay to apply it in small quantities mixed with plaster, occasionally to sod land, particularly if the latter was lightly scarified, and the top-dressing was given while the ground was moist.

We hope, any of our agricultural friends who have had experience in these

matters, will reply to Mr. J.'s queries, so that we may gain all possible information on the subject of guano, as it is a matter of great interest to farmers, and we should know the best means of using it economically.

To Our Readers.

We send copies of our present number to many persons who are not subscribers, and to others who have been in the habit of reading the Planter in by-gone years, but who are not now on our subscription list. It is needless to say that we shall be glad to have the influence and patronage of all these gentlemen, if they are inclined to give it, either on account of the good cause which we are trying to promote, a regard for their own benefit or for ours.

We believe that we shall make the Planter more useful than ever to every man engaged in tilling the soil. We are sure that Major Gilham will be able to give our readers much information of a perfectly reliable character, on all chemical and geological subjects, which it would be difficult for them to procure by investigations conducted on their own hook.

We promise for the Major and ourself, that we will conscientiously discharge the duties we have assumed, by endeavoring by all honorable means, to lay before our readers everything we can procure of value or instruction in agriculture, rural, and household economy, that we will not advise others to follow plans on their lands, which we would be afraid to carry out on our own, and we ask every man who reads these lines to aid us.

Some of our oldest subscribers are talking about discontinuing their papers on the ground that the general pecuniary distress of the country demands of them the observance of the most rigid economy. Granted, but let economy begin at the proper place. What would be thought of the economy of a miller who would not give a small sum of money to keep in proper repair the conduit of the stream which afforded to his mill nearly all its power, because from bad roads or confusion of plans on the farms of his neighbors, there was a temporary stoppage of his grist.

These cases are similar gentlemen, for the man, who in our present enlightened age, attempts to make a living by tilling the soil, and who cannot afford to take an agricultural paper, will never have enough of liberality towards his farm, to keep it from going downward every year; and he cuts off the stream of knowledge, thought and reflection, which keeps up to the standard of wisdom, his mind, which must be in a condition to work, or go to decay.

We neither advise nor expect any man to farm literally "by the book"—but reading one very subject connected with the successful practice of agriculture, *is a necessity;* and the benefits which are derived from judicious agricultural reading are sufficiently patent for everybody but a blind man to see. *"The papers"* present subjects for thoughts and reflection, as well as the practical experience of thinking and acting men: they afford a channel of communication between the farmers, and every one who has tried but one single experiment,

which he thinks would prove advantageous if carried out on the plantation of a brother farmer, owes it to his common brotherhood to make it known. If every man who reads an agricultural paper, will only act on this hint, we should soon find a rapid improvement in every one of them, and a reflex benefit would result to all our farms and farmers.

We invite all friends of agriculture to make the "Planter" the medium of publishing their agricultural thoughts and acts. Give us a report of what you are about in your cattle pens, your gardens, orchards, meadows and fields. *We shall open a column especially for enquiries*, and we promise all the aid we can give or borrow, to accommodate, or benefit every friend who will oblige us by accepting this invitation.

Salutatory.

In the December number of the Planter, its patrons are made aware of the fact, that with this number, I am to assume the responsible duties of Associate Editor. I have long been an occasional contributor to this journal, on various subjects connected with the applications of science to agriculture, and am proud to be able to say, that through this connection I have raised up for myself many friends in almost every quarter of the State. I am for the future, besides being a regular contributor, to take an active part in its editorial management; in the outset of my editorial career, I ask some of the indulgence and favor which have been extended to me as a contributor.

The institution to which I am attached, has, by the munificent bestowal of funds by a few individuals—one of whom is a Virginia farmer—been enabled to establish a school of Agriculture, wherein we hope to train young men in those arts and sciences, upon which successful agriculture so much depends; and I have been honored with a chair in this school. Henceforth my time and labors are to be given to the advancement of the cause of agriculture—to building up this school, to aiding in building up the fabric of scientific agriculture, and to spreading its principles far and wide over Virginia, and the other States of the South. The Planter is the only journal published within the borders of Virginia, devoted entirely to agriculture; I connect myself with it in the hope, that through the combined efforts of its present accomplished Editor, Dr. Williams, myself, and the numerous friends who are now, and of others whom we hope will become its contributors, we may make it pre-eminently useful to our farmers, and secure for it such a measure of favor, as to ensure its welcome entrance into the homes of many thousands of them. I may remark in this connection, that through the enlightened liberality of the Board of Visitors of the Institute, I expect to spend a large part of the present year in Europe, for the purpose of studying its agriculture, &c., and after my return to have the opportunity for mingling freely with the farmers, and for visiting various quarters of the State from time to time; the results of my observations and experience, whether at home or abroad, will of course be made public through the pages of the Planter.

It is not my object to discuss at this time, the various means by which the Planter may be improved; at the same time I cannot refrain from calling attention to one of the most important, if not the most important of them all. It is, that our farmers, instead of waiting, as far too many of them do, to see what the Editors may have culled from other sources, or have written themselves, would give their friends and fellow-farmers the results of their own experience, or of that of others, which they know must be of more or less value to the agricultural community. Or, if any would like to be informed upon any particular subject connected with their calling, let them ask for information through the pages of the Planter; if either of the Editors are able to answer the querics satisfactorily, they will take great pleasure in doing so; if not, an appeal will be made to those who can. Almost every farmer, if he is an observing man, must have found *something* in his experience that is worth recording, or that might be useful if made public; if not, he must have some questions to ask of those who have more experience than himself, he must desire some information in relation to various matters connected with his vocation. If he could meet his brother farmers at regular intervals, and had time to converse freely with them, he certainly would ask and be asked many questions; now since this is not practicable, let him make the Planter his vehicle of communication between himself and the hosts of others who follow the same noble pursuit, and let him, with the coming in of the new year, resolve that the year shall not pass without his imparting or asking information through its pages.

Let the Planter in this way become the common medium of communication between farmers, so that anything which is valuable in the practice of one, may become the common property of all, and then it will exert a revivifying influence upon agriculture, which will be felt wherever it circulates.

We are entering upon a political revolution, and a commercial crisis is upon us; that the agricultural, in common with the other great interests, must suffer more or less, there can he no doubt; let us not, however, be discouraged, let us rather labor on in the hope that our present difficulties may be followed by a season of unexampled peace and prosperity, and let us all remember, that no matter what may be the aspect of the political horizon, we have the sure promise that, "while the earth remaineth, seed-time and harvest shall not cease."

WILLIAM GILHAM.

PLANTATION BOOK.—We return our thanks to J. W. Randolph, Esq., for a copy of this book, with which we are much pleased. It is at once, an account book for the farm, and an efficient instructor to every farmer who may not have the necessary knowledge of book-keeping to be able to keep an accurate and record of his business operations. This book supplies a real want on every plantation, and we think we are serving the interest of our friends in presenting them with the table of contents, which, from the value and arrangement of the subjects treated in it, speaks for the book all that need be said in its commendation:

PLANTATION BOOK.

Plantation and Farm Instruction, Regulation, Record, Inventory and Account Book, for the use of Managers of Estates and for the better ordering and management of plantation and farm business in every particular. By a Southern Planter. "Order is Heaven's first law."

New edition, with additions, cap folio, price $1 50, also a larger edition for cotton plantations, price $2 00. Sent by mail, post paid. Published by J. W. RANDOLPH, Richmond, Va., and for sale by booksellers, generally.

This Book is by one of the best and most systematic farmers in Virginia, and experienced farmers have expressed the opinion that those who use it will save hundreds of dollars.

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PAMPHLETS RECEIVED.—*Journal of Transactions of U. S. Agricultural Society.* Benj. Perley Poore, Secretary.

Journal of Transactions of New York State Agricultural Society. Col. B. P. Johnson, Secretary.

De Bow's Review. This excellent Southern magazine has lost nothing of its interest. It is a work which has always well deserved the support of every Southern man, and we sincerely hope its editor may continue to receive the encouragement and support of all our citizens, for whose benefit he has labored so zealously and efficiently.

We transfer to our columns, from *De Bow's Review*, the following article. The present time is a suitable one for us again to impress upon our readers, the importance of encouraging, by all honorable means, our home industry, in *every department.* We do not have to advance into the arena of politics to do this, or to appeal to sectional prejudice or passion; but we urge it upon every good citizen, as a duty he owes to himself and his neighbor, to try, with all his might, to build up the commercial, agricultural, and mechanical resources of our own section of country, that in all our wants we may be independent of any supply from any other source. The man who faithfully discharges all his duties to his own family, is sure to prove a valuable, reliable, and agreeable neighbor.

Let those whose charity and patronage have been bestowed on places far from home, read and consider.

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Southern Patronage to Southern Imports and Domestic Industry.

Our indifference to the encouragement of domestic industry, and the ease with which our people may be induced to purchase inferior articles brought from a distance to compete with the honestly-made home article, cannot too often be repeated, and we therefore trust that even *small matters* may be set forth as profitable examples. As straws indicate the direction of the wind, so may small things serve to indicate the course which trade and custom are drifting us, and the body economic, commercial, and body politic of the whole South.

What we want now, and have always wanted, is a broadcast public sentiment, which shall reach every mind and stimulate every bosom to action—not weighing the little inconveniences and slight pecuniary considerations in the balance with our permanent good. The public mind must be imbued with the importance of living more within ourselves, and anything that is calculated to move public sentiment in that direction, we trust will be excused, even if we should descend to what might be termed *small potatoes.*

Some twelve years ago, when manufacturing was the rage in South Carolina, we purchased from a neighbor a home-made well-bucket. The maker had a high reputation in that line of business, and supplied the country for many miles around, and it was the general opinion that his buckets would last from twelve

to fifteen years, and some even affirmed that they had been used for twenty years without replacing. The bucket made for us in 1847, was in use about eleven years, when it suddenly gave way. As our neighbor did not keep them ready made, a member of our family went to town and purchased a Yankee made bucket, which did not last a year. We went in person to endeavor to procure a home-made one, but looked in vain over Augusta, and through the stores of a village close by. We inquired of a prominent merchant, why he did not keep a supply of our neighbor's well-made buckets, instead of the Northern trash he offered us. His reply was, that he could make nothing on them; and, besides, they would *never wear out*. Not being able to do without water, we abandoned the rule of action we are recommending, and purchased a Northern-made bucket, highly praised by the merchant, but not guaranteed. He advised that it should be filled with water and left to soak for a day and night, lest it might fall to pieces; and he might, with great propriety, have extended the caution to keep water in it all the time, and not expose it to the sun. Feeling quite confident that the last purchase was no better than the one which had just fallen to pieces, another of domestic make was immediately ordered, to be held in reserve.

Now, here is an example which strikingly sets forth our apathy in regard to patronizing our own people and encouraging home industry. See this honest, hard-working South Carolina cooper, who, by diligent application, has earned an enviable fame in his line by the production of faithfully made and cheap articles. He is poor, and for want of patronage, not half his time employed at his trade, from the fact that it is to the interest of the trader that he should remain idle; and it is a convenience and a seeming economy to the unthrifty man to pay a dollar every year for a new, *cheap* Yankee bucket, rather than to employ this industrious mechanic to supply a good home-made article at a dollar and a half, which will last half a life-time. This certainly manifests an improvident, careless and wasteful spirit, that *patriotism* (if not our own interests) ought to prompt every individual to try and overcome. We remember the time when it was a common thing to see our merchants trading with country coopers for their cart loads of home-made ware—tubs, pails, churns, &c., manufactured of the best material—well-seasoned juniper or cedar. But now such a sight is rarely seen, the home-made article being obliged to stand out of the way and make room for the better finished, finer looking woodenware of the North.

Laudable efforts have been made at the South, in various places, particularly in Charleston, Columbia, and Augusta, to manufacture such articles by machinery; but the hot opposition from Yankeedom, and the never-ceasing desire of that people to *cheapen* goods and make fortunes by the profits, before the *cheat* is detected, together with our own indifference about being well-served, has driven those Southern manufactures out of the market, making, in most instances, a sacrifice of the entire capital so invested. And now we are over-run with Yankee buckets, tubs, etc., painted inside and out, to hide the sappy, inferior material they are made of. Northern work of this kind, polished and painted up, may be

seen in every village or country shop, and composes part of the household furniture of every mansion and cottage throughout the South. If you engage a mason to build a chimney, the first preliminary is to buy half a dozen Yankee blue-painted buckets, to carry water and mortar in, and if they hold together till the job is done, they will scarcely be worth preserving to be used on another job.

If we break a carriage tongue, instead of going to the woods and hewing out a tough piece of wood and working it into shape, to save trouble, we send to town and get one ready shaped, worked so by a labourer in the State of Maine.

If we break a buggy-shaft, we find it more convenient to apply to the same source for a pair already reduced to shape, if not finished, painted and trimmed ready for use. If you chide a man with a lack of patriotism in purchasing such articles of foreign make, he will tell you at once that if he takes his vehicle to the nearest village carriage-maker, the result will be the same, for he imports his carriage-tongues, buggy-shafts, and, indeed, *every* part is made at the North, except putting together, painting and trimming.

It is not an unusual thing for our wagon-makers to import their *hubs* already morticed; and, in some instances, the fellies and spokes. Even our timber log-carts, in many cases, are partially made at the North. Nothing is more common now, than to see at our store doors, hubs for log-cart wheels, which are often carried fifty miles into the country, after having travelled perhaps a thousand miles from the maker's hands, while it would be easier for the cart-builder to get the wood and turn them, than to go ten miles for them.

This all results from the want of *home patronage*, of which wagon and cart-makers get so little, that they cannot afford to keep the materials on hand; and when a job does come, to be done in haste, the only way for him to get seasoned hubs, fellies, and spokes (if not axles and tongues), is to post off to the nearest town, and purchase those of Yankee make.

The question now arises, how are we to cure this growing evil? It can be accomplished in no other way, than by liberal encouragement and patronage of all varieties of *domestic industry*. All can see, in a crisis like the present, that our entire dependence on others for the commonest necessaries in use, is a national evil.

If we turn from the Yankees and rely on Europe, for the supplies we ought to furnish for ourselves, can we reasonably look for a better state of things? It is well known to the mercantile world, that all nations reserve the best goods for home consumption, and send away the refuse; and we need not flatter ourselves that we shall fare better in the hands of English traders than those of other countries supplied by that nation.

The Yankees are not the only people who make good articles for home use, and manufacture trash expressly for export. Englishmen wear better broadcloth than is sent to this country. Good judges can procure the best English cloth, but that sent out here for general traffic is of the most inferior quality, highly finished, but not such as would be offered in the English market for home use.

The English also excel the Yankees in cheating, in the manufacture of cotton goods and hardware. They make good, substantial cottons for home use, but when they are to be exported there are deceptions practised, which few men here are aware of, and which some would hardly credit. Their consummate skill enables them to work up cotton without fibre. From the commonest short American cotton mixed with East India, together with card waste, they make a handsome looking article of shirting, sheeting and drills, and are not content with using poor cotton, but resort to the artifice of filling the yarn with *porcelain clay* to the amount of 20 to 30 per cent. of its weight.

The dressing of yarn for the loom in England is a business separate from the manufacture of the yarn and weaving it into cloth.

The spinner, when he sends a ton of yarn to the dresser, contracts to have it returned with the weight increased a quarter or a third of a ton. By the aid of steam and machinery made for the purpose, clay can be forced into the fibre of the thread, and so completely incorporated with it, as to remain while it is passing through the loom into cloth.

This may seem incredible to some, but it is nevertheless true. We had it from an extensive English manufacturer himself, who made no secret of it, and the process has also been witnessed by one nearly connected with us, while on a tour of inspection in England and France. The clay used is similar to that which abounds in our chalk-hills, and is finely pulverized and mixed with the sizing. Still the English are not satisfied with clay, but are now experimenting, and confidently expect to mature a plan, by which *white sand* may be reduced to a liquid, and used for sizing and weighing yarn. If they succeed, the weight may be increased fifty per cent., and stand the process of washing.

All dealers are aware of the impositions practised on us by Germany in hardware, fire-arms, watches, toys, &c., which are all the merest trash, made to sell, not to use. England has for many years been cheapening her articles of hardware, until she has come down to nearly a level with Germany in the manufacture of cheap hardware, cutlery, and fancy goods, to administer to the taste of the American people for cheap articles.

There are large towns in England engaged wholly in manufacturing goods for America and other foreign countries; while other towns employ a different class of mechanics to make for home consumption.

Sheffield, for instance, makes plated ware for home use; Birmingham makes a cheaper article for export.

If you wish to purchase a watch from a London jeweller, he will ask you fifty or sixty guineas, for what an American will expect to purchase here for a hundred or a hundred and fifty dollars. It is much the same in every other branch of business. An article made to sell in England for a dollar and a half, must be made so much inferior and cheaper, as to enable the American consumer to supply himself at a dollar, after government duties and other expenses are paid;

with an English or German manufacturer anything is good enough for the American market.

It is fortunate for us that the Northern and Eastern people have embarked in manufacturing. For although they cheat us of the South in many ways, there are various articles made by them far superior to those imported. In many articles in the hardware line, the American article has nearly driven out the European altogether. The Yankees excel in the manufacture of cross-cut, mill, and circular saws, axes, hatchets, planes and plane-irons, knob-locks and latches, brass and iron hinges, wood-screws, hammers, chisels, augers, gimlets, drawing-knives, nails and spikes, brads and tacks, shovels and spades, pitch-forks, rifles, pistols and swords, hoes of the finer kind, pitch and grubbing hoes, scythes, mathematical instruments, surveyor's compasses, theodolites, scales and weights, coffee and corn mills, andirons and fenders, shovels and tongs, cast-iron hollow ware, frying pans, besides a thousand other things in the hardware line, and a multitude of articles in the dry-goods trade, amounting to millions of dollars per annum, which we do not make, and which they supply cheaper than they can be imported.

We mention these facts in order to show that non-intercourse with the Northern States is impracticable, and will not be our true policy. But while we use every possible effort to diversify industry, and promote the growth of commerce and manufactures at the South, we should continue to buy what we cannot make of ourselves, from those who purchase from us, and from the people who will serve us with the best and cheapest article.

Every Southerner should feel the importance of putting his own shoulder to the wheel of progress in the right direction, and give us his help in creating such a change in our habits and sentiments, as will ultimately fill all our mercantile and trading channels with *Southern men.* Let our politicians and fire-eaters turn their swords (if not into ploughshares) into yard-sticks and distaffs, and enter the field of domestic industry prepared to fight against our worst enemy—*Northern industry and commercial enterprise.*

Show Brother Jonathan that we have changed our tactics, and that, in future, we are to meet him in battle array—in the great field of commerce and home industry, where we intend to fight to the death against every attempt at usurpation. This, and this alone, will be the means of rendering us independent of the North, and secure us against their further crusades in the cause of emancipation. A strong demonstration in that direction would cause our Yankee brother to put on a longer face than was ever produced by the most heart-rending and fabulous stories of negro wrongs and Southern cruelty.

When the anvil and the loom begin to slacken their motion, and lose their exhilarating influence, for the want of Southern patronage, he will wake up, and probably discover that the colored gentlemen, shoe-blacks, pets, paupers, and vagabonds, collectively, are nothing less than a common nuisance, and will at last prove to be a blight on Yankee prosperity.

New York and Philadelphia will find, too, that their Ethiopian philanthropy has been wasted in the wrong direction; that their degraded, vicious, and helpless black population would be much happier and better off in the cotton fields of the South, under Christian masters, where the lines are so distinctly drawn between the two races, as to leave no heartburning aspirations, or cause of disturbance to (which we believe) the most happy state of society that can exist, where the superior and inferior races inhabit the same country.

"Truth is mighty and will prevail." This is the anchor of our hope. But while we place our reliance on the justice of the world, let us not forget that in order to secure our independence and safety, our watchword must in future be—diversified labor and *home patronage* to domestic industry.

(TO BE CONTINUED.)

Cultivate the Basket Willow.

The cultivation of willows has been a subject of much ridicule in this country for a few years past; but when it is known to what extent they are imported into this country, the immense quantity grown and used in the old countries, and the great variety of uses to which they can be applied, and especially since it has been proven that from *two to three hundred dollars per acre* can be realized from their cultivation, ridicule has given way to facts, and plantations are being started throughout the country. Some who have attempted to grow willows have failed to make it profitable, but such failures are caused by a lack of knowledge as to the proper manner of cultivating and preparing them for market.

It is but a few years since anything was known of their cultivation in this country. A few men started the business on a small scale, merely as an experiment, and when they had proved that the best French Osiers would thrive in this country, and that a very large profit could be realized from their growth, they published this information, stating the great profit of their cultivation, and the advantage of growing them in this country instead of importing. Thereupon many rushed into the business—some quite extensively—without any knowledge of the different varieties of the osier, or of their cultivation and preparation for market.

In this country, as it was once the case in England, ash and oak baskets are much in use. But the time is fast approaching when willow baskets will drive them out of the market. In England, formerly, all light goods were packed, for transportation, in light boxes, and in mats, and so were vegetables. Now baskets are in universal use, except for goods that will be injured by getting wet. Willow package baskets are in use for almost every purpose of transportation, by farmers, gardeners, wholesale dealers of all kinds, and by all classes in the community, for every possible purpose.

The cultivation of willow is not difficult nor expensive, if properly understood. The first thing necessary, is to choose a proper piece of land, which should be rich and moist, but not *wet*. Many suppose that willows require a wet place or

they will not thrive, but it is not so. If you will notice where native willows thrive best, you will find it is not in wet places, but close to the banks of some stream where the land is always *well drained*, but never suffers from drouth. Consequently, the best land for a willow plantation is rich alluvial interval, that is flowed occasionally; or a mucky swamp, naturally moist, but well drained. If the land is naturally rich, it should have a liberal dressing of manure, which should be spread on and plowed under as deep as possible, then harrow and fit it as you would a garden. There is no danger of doing it too well, as you have it to do but once, and it will affect the crop for years.

When the land is prepared, mark it off as you would for corn, or use a line to set by, and set the cuttings in rows 2½ feet apart, and about one foot apart in rows; stick them perpendicular, and leave but one or two buds above the ground. If it is green sward, use an iron spindle to make a hole for them. On mellow land, it is no more work to set an acre of willows than to plant an acre of potatoes, but it is very important that it be well done, as they are not set over every spring, and if badly started they will never produce a full crop.

They should be cultivated the first year, so as to prevent all grass and weeds from growing among them, and keep the ground loose, and the second year until they get up so as to shade the ground and not be injured by working among them.

Cuttings should be procured in the winter, and set as early in the spring as the ground can be prepared.—*Scientific Artisan.*

Liquid Glue.

The following recipe, the discovery of a French chemist, is selling about the country as a secret at various prices from one to five dollars. It is a handy and valuable composition as it does not gelatinize nor undergo putrefaction and fermentation and become offensive, and can be used cold for all necessary purposes of glue in making or mending furniture or broken vessels that are not exposed to water.

In a wide mouthed bottle dissolve eight ounces of best glue in a half pint of water, by setting it in a vessel of water and heating it till dissolved. Then add slowly constantly stirring two and a half ounces of strong aquafortis (nitric acid.)

Keep it well corked and it will be ready for use. This is the "Celebrated Prepared Glue," of which we hear so much.—*U. S. Journal.*

SALLY LUNN.—Three ounces melted butter, a half tea-cupful sugar, one beaten egg, yeast, a pint of milk alternately with the flour, making a batter too thick to pour. Put the mixture into two Turk's Heads, and keep them covered and warm until light, then bake one hour.