THE SOUTHERN PLANTER

Devoted to 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.*

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Agriculture and Commerce.

BY CHARLES D. BRAGDON.

American agriculture is the base of American commerce. No argument is necessary to prove this. Agriculture and commerce are mutual dependencies; one cannot exist except the other thrives, and the other cannot thrive without the existence and perfection of the first. Then the relations that exist between the producer and the exchanger or conveyer should be of the most harmonious character. Neither can afford to lose the good will or good offices of the other. Charity should be exercised by the one and reciprocated by the other. He who would dissever a single bond of good feeling between them can understand little of the wants and relations of agriculture and commerce. There is necessity for the elevation of the average character of the representatives of both these great interests. Education must do it—education *alone* can do it.—Whatever tends to such result is education.—Kind of employment elevates no one—there is no caste in honest labor. The closely shaven, neatly clad merchant behind his counter, is no more refined than the roughly clad, bluff bearded plowman. Position never elevates men; capacity does. Intelligence and integrity elevate the position—elevate a class—alone can create caste. In proportion as knowledge is added to the muscular power of the farmer, in like proportion will the farmer's occupation be honored. In proportion as husbandry receives the attention of the best minds, in like proportion will the husbandman's occupation appreciate. So long as it is believed that the balance of intelligence and refinement is found in the ranks of commercial men, so long will recruits be found to swell those ranks. Men desire to rise. They will work late and hard to do it; and it matters not what they do if the peg they hang their coats on is higher in the world's esteem than the peg they took them from.—Then, in order to elevate an occupation or interest, the men engaged in it must ascend, and they must not cease to ascend. With all the sensuality of the present day, it is not the characteristics of Americans to grovel. Hard work and success are synonomous. The American farmer and the American merchant both understand this. They need to understand better how to work. The current of labor is conceded by the intelligent. But that dignity depends for degree upon the direction and channel it pursues. There is dignity in intelligent labor; there is no dignity in any other. The exercise of muscular power in the prosecution of enterprises possesses only mechanical merit. The mind that guides and controls the movements of a thousand men may be embodied in a single person. The will of a single man, backed up by his intelligence, may accomplish what the thousand uneducated men would fail to do, what they would never conceive possible, without education. It is the light which burns within, the character of that light, and the motives and influences which modify it, that give power, and add to the

wealth and prosperity of the man or a people. How then shall American agriculture and American commerce be made to prosper By the education of the farmer and merchant. It is a simple answer, yet embraces vastly more in detail than is discovered at a single glance. How educated? This is the point of moment, this is the question to solve. We have schools where letters, languages, natural sciences and mathematics are taught. How? Simply by mechanical exercises of the mind. The teacher says, "two times two are four;" the pupil repeats the teacher's stereotyped mathematical assertion, until memory refuses to let go of it. But he may repeat it for years and find no practical use for it, or discover no practical application. An apple may fall before his eyes, and the teacher assures him it is gravitation which causes it to fall. He remembers that, perhaps, but he has learned nothing of the practical effect of this force upon common objects with which he constantly is coming in contact. Mechanics and mechanical powers are defined and named; but there is no effort made to teach the value of these forces, their relations to matter, and their uses. He is taught that all matter can be divided and subdived—tha the mass becomes atomic, and that different laws govern each atom—that chemical forces affect their union—and similar facts; but he is seldom taught this with any view to practical use. It is only that he may become learned, and teach others, perhaps, the same profound knowledge. It is not that it may enter into every-day life, and control and affect common farm practice. It is not intended for the farmer; the man possessing it cannot afford to hide his talents in the country. No, sir! He must mystify and impress the rising generation with his profundity; teach them, from the professor's chair, that nature is a mys tery, and faithfully impress the fact upon them that "Knowledge is power!" This is the sum of his duties. His brow must grow broad and classical; his locks add to his dignity; and his success in gaining a reputation depends more upon his power to pull wool *over* than *off* the student's eyes.

This is what needs the attention of every philanthropist, a complete revision of our whole school system. It were better that absolutism could control this matter than that it should be neglected longer. What misfortunes has it not entailed, what mistakes is it not responsible for—this superficial, theoretical method of teaching! If we have advanced to great triumphs the past fifty years, what has caused it? If science has effected great results, great reforms, and metamorphosed the world, is it because scientific men have been content to know that certain forces existed?—or because they sought to employ them, and succeeded? The latter is the true cause, and if we maintain the superiority nature has given us as an agricultural and commercial people, it will be because *we get knowledge and make use of it.* Then here is another truth: knowledge is good for nothing, unless we *can* make use of it—unless we know *how* to use it. We want knowledge that *is* available.

Years spent at a college in the study of the classics, at the expenditure of money and health, in dissipation and inactivity, make the man less a man for life, in the greater proportion of cases. We want no such process of education for the commercial man or the farmer The first needs to learn business practically study the laws which govern trade and finance and be taught integrity, industry and frugality. The farmer needs to *learn all this, and more!* The commercial man depends upon the farmer for the material of traffic for which he pays money or its representative. The farmer depends on nature—on the earth and the God of the harvest—for this material of commerce He must study the laws which govern production and which insure it. The currency he uses to remunerate the soil for its harvests requires more extended resources than is usually supposed. We must place these resources within the reach of the farmer. This should be the object of his education, added to proper moral cultivation.—*American Merchant.*

The State of New York Regarded in the Light of an Experimental Farm.

We have frequently taken occasion to allude to the universal deterioration of the soil under cultivation, upon the system now practiced by a large proportion of farmers—that is, continual cropping without restoring to the land in manure, in some form, an equivalent for that which has been taken from it in the crop harvested and sold.

The best farming portions of New York are comparatively new. Much of it that now yields the largest crops of wheat, corn, &c., was a wilderness within the memory of the writer and yet with more regard to manuring than is practiced by our western farmers, the yield per acre is materially diminished with each revolving year. A tangible illustration of this is presented in the *Country Gentleman*, by Dr Daniel Lee, formerly an agricultural editor in that State, but now a Professor in the University of Georgia, Athens. Dr. Lee predicates his calculations upon a comparison of the census returns of 1845 and 1855, embracing a period of ten years, and notwithstanding the advantages gained in increased crops by improved cultivation and in the use of improved implements, which it cannot be denied is very great, yet the falling off in the acreable yield of every leading crop except rye, is alarming The census of 1855 exhibits the corn crop of the previous year at only 21.02 bushels per acre on an average; while that of 1844 yielded an average of 24.75 bushels, notwithstanding deeper tillage and better husbandry has mad

greater progress and improvement within the last ten years than in any former period of twice that time. Taking the whole area of land planted to this crop in the State, the calculation shows a decline in the product, of 1,600,000 bushels. In the same period of ten years, the yield of wheat has fallen off about one bushel and three-quarters per acre. The average yield in the State, according to the last census, was but 11.43 bushels per acre. Potatoes show a greater decline—about 25 per cent, or from 92½ bushels to less than 70 bushels per acre. Buckwheat also shows a material decline, while rye alone indicates a slight increase, which is attributed to the fact that some of the better land was sown to this crop in the place of wheat.

The writer, in quite an elaborate article on this subject, concludes with the following remarks, which should command the serious attention of every farmer: "There are grave errors in going over with the plow so large a surface, to the serious injury of the farming lands, not only of New York, but of all other States in the Union, for the practice is universal in this country. Feeling deeply the importance of the principle involved, which applies to agriculture everywhere, I respectfully ask thinking men to consider the following facts:

"1. When vegetable mould is consumed by tillage, it cannot be restored again except at considerable expense, either in labor or in time, by the rest of the field.

"2. Where latent elements of fertility, such as phosphoric and sulphuric acids, potash, soda, lime and magnesia, locked up in insoluble compounds, are first rendered soluble, and then removed from the soil, either in crops, or by moving water passing over and through the earth cultivated, the sterility of the land in that condition is much worse than it is where these latent resources remain intact.

"3. The natural laws which govern the decrease of fruitfulness, are at all times inexorable; and therefore, it is the part of wisdom in the good husbandman, not only to study and learn them, but carefully to obey them.

"4. Farmers ought to remember that Nature never plows the ground when she produces her largest and oldest forest trees, which sometimes grow every year for ten centuries, and every year extract from the same soil soluable salts of potash, lime, magnesia, iron and soda, which are deposited in the cells of the trees, there to remain perchance for a thousand years; and yet the soil is *not* exhausted by this millennial draft on its resources."

This process of depletion that is taking place in the soil of the State of New York, is going on at a still more rapid rate in every State in the West. It is the clearest conviction of this fact, from the experience of thirty years in the State of New York and more than twenty years in the West, that impels us so frequently and with so much earnestness, to urge upon our farmers the importance of more carefully husbanding every material upon the farm that can be converted into manure and applying it to the soil. System and care in cultivation, with a due regard to a proper rotation of crops, connected with the rearing and fattening of farm animals, which, in the main will be found the most profitable course with all, are the means to be employed to arrest this evil.

The experience of the old world as well as of all the older States of America, should teach us lessons on this point that should at once stay the progress of this exhausting system.—*Valley Farmer.*

Pasture Lands.

In the management of pasture lands, it is an excellent plan, where the nature of the ground favors the operation, to free the surface of bushes, stones, stumps, &c., and plow it carefully once every six or eight years, harrow thoroughly, and sow on the seeds of such grasses as are found to be best adapted to the locality, and the most valuable as a summer food for stock.

Herd's grass (timothy) white and red clover, red and brown top, make an excellent stocking for light pastures. The recuperative power of pasturage lands is such as to render application of manures of less consequence than on other lands; yet it will be found beneficial to apply, occasionally, a light dressing of plaster, lime, or what is better still, wood ashes—all of which have a tendency to promote the development of vegitation in the early spring, as well as to sustain it in season of severe and protracted drought. These appliances tend also to bring into action the energies of the humus contained in the soil, and to render the silicates soluble, and consequently in a proper condition to be taken up by the roots of plants.

From the inert humus, and certain other substances of a mineral character, the soil of our pastures derives the power of recuperation—or self-replenishment—which it is supposed to possess. But it is enough to remark, that, apart from the phenomena of vegetable growth and decay, in no such power is recognized nature. If we annually remove the produce of a field or pasture, without making any returns in the form of manure, we shall necessarily pretty rapidly impoverish the soil.

In fallowing—that is, in plowing and harrowing land without sowing it—no vegetation is allowed to mature; all that the

vegetable powers of the soil produce, is immediately returned to it, and as most plants derive a portion of food from the atmosphere, the air, by this process, is made to enrich the earth. The soil itself also absorbs from the same source a very considerable amount of fertilizing matters in the shape of gaseous products and when supplied with materials capable of absorbing and fixing the æriform principles which are perpetually present—and in large quantities throughout this wide spread and inexhaustible field of fertility—the accession of fecundating matter will be very large, and secure the most favorable results, both to the soil and the succeeding crops. This is, perhaps, one of the most economical and effectual methods of replenishment it is possible to adopt.

But we must not suffer ourselves to be illuded by the glitter of hypothetical conclusions: we must attribute results to their legitimate causes, and trace each one, so far as it is practicable for us to do, to its real and proper source. The demand upon the energies of the soil always exceeds the supplies derived from the air, and hence we see that there is no such thing as a recuperative power, or principle, independent of vegetable life.

The spires and blades of the grasses, and the stalks and foliage of other plants frequently decay and fall upon the ground, their places being supplied by new formations, often emanating from the same or nearly the same points. The same takes place among the roots. When a fibre perishes. it is resolved into humus, and supplies food for the new organ which nature prepares to occupy its place. This alternation of decay and reproduction, is going on continually throughout the wide range of nature, and its results are obvious at every turn.

The pastures to which we refer, must be, of course, such as are capable of being worked; such as lie near villages, or wherever land is high. The rough, rocky, mountain pastures where the land is comparatively cheap cannot be economically plowed. If they are absolutely needed, being worth more for pasture to allow them to grow up to wood, about all that can be done for them is to keep the bushes down, and sow on them occasionally plaster, lime, or ashes; and the economy of this will depend entirely upon the price at which these articles can be obtained, including the cost of transportation.

From Dr. Dadd's Veterinary Journal for July.

Back Galls on Horses.

The exciting cause of *Back Galls*, is irritation occasioned by "*bad fits*"—(harness or saddle.) The shape of the latter must be altered so as to correspond with the shape of that portion of the back with which it comes in contact; this can be done by padding the concavities with lamb's wool, and in chambering the convexities, so that there shall be no unequal pressure nor causes for irritation. Yet, after all, it may be more economical to procure a new article and a better fit; no doubt that in some cases this will be the most humane policy.

Treatment of Back Galls.—So soon as an abrasion is discovered on the back, the animal should be excused from duty for a few days; the abraded part should be lubricated two or three times, daily, with a small quantity of glycerine; in most cases, however, a few applications of tincture of aloes and myrrh will produce healthy action, and thus restore the parts to soundness.

Should there be no abrasion, yet some tumefaction, heat, and tenderness, a cold water pledget, renewed as occasion seems to require, will, in most cases, have the desired effect.

Occasionally the integuments are so bruised as to induce *induration*—hardening. Local *induration* in the region of the back is a morbid condition of parts, known to the farriers of old as "*sit-fast.*" The treatment consists in smearing the part with a portion of the following:

Iodine, ... half a drachm.
Simple ointment, . . . seven do.
Powdered blood root, . . half a drachm.
Mix.

A few applications of a portion of the above, will have the effect of removing the sit-fast, or eschar, when a healthy, granulating surface will appear.

Some animals, owing to a peculiarity of constitution, will "*chafe,*" as the saying is, in those parts which come in contact with collar and saddle, and no human foresight nor mechanical contrivance can prevent the same; for example, we now have a horse under treatment notorious as a "*humory*" subject; if he perform a day's labour in the warm season of the year, notwithstanding he be harnessed in the best possible manner, he is sure to come home at night with galled shoulders or else sore back. For such a case as this, the harness-maker with all his skill and ingenuity has no remedy. The subject alluded to has had several runs at grass, still he is the same old "*two and sixpence,*" and the owner has, at last, decided to send him, for a season, to some fashionable watering or grazing place—Saratoga, perhaps, or the sea-shore, or else will swap him off!

Coffee.

The use of coffee has become very general throughout the civilized world, and has of late years become a necessary of life, instead of, as in the last century, merely a luxury. The events of the French Revolution had a great effect upon the growth of coffee, since Hayti, which was one of the chief places of production, was nearly ruined by the event. Nevertheless, up to 1825, Cuba, St. Domingo, the British West Indies and Java were the most important sources of supply. At that date the superior advantages of sugar in Cuba caused them to neglect coffee, and the crop of that Island has fallen from 65,000,000 lbs to less than 12,000,000 lbs, and the product in the other West Indies has declined from various causes, like emancipation in Jamaica, &c. At the same time the crop of Java, being stimulated by the exertions of the Dutch Company greatly increased. By far the greatest increase has, however, taken place in Brazil. The coffee of that region was not liked so well as that of some others, owing to defects in the mode of cleaning, until about 1845, since when the product has grown to equal that of half the whole supply.

The production of coffee has been as follows, at different periods:

	1841.	1852.	1857.
Brazil,	lb160,000,000	300,000,000	360,000,000
Java,	112,000,000	120,000,000	139,250,000
Sumatra	12,000,000	8,000,000	7,000,000
St. Domingo	25,000,000	30,000,000	45,000,000
Cuba and Porto Rico	56,000,000	25,000,000	35,750,000
West Indies	18,000,000	7,000,000	17,000,000
Mocha and Manilla	10,000,000	3,000,000	25,500,000
Ceylon	10,000,000	30,000,000	56,250,000
Laguayra and Costa Rica	27,000,000	25,000.000	45,000,000
Total,	430,000,000	548,000,000	730,750.000

The most marked increase in this production is in Brazil, and various circumstanees have conspired to produce that result. The climate was found to be most congenial, the tree yielding double that of the West Indies. The slave trade was very active, and the blacks could be sold on long credits at $200 @ $300 each, and at the same time an improved mode of preparing the coffee for market had removed some of the objections to the Brazil article in Europe. The entire stoppage of the slave trade in 1850 involved a rise of two hundred per cent. in blacks, and seriously checked the growth of the plant. Nevertheless, the growth of the crop in the Brazils is more rapid than elsewhere, under the influence of the same general causes. The supply is everywhere checked by the inefficient means of preparing the berries for market. The coffee berry contains two seeds covered with a gummy, mucilaginous substance, and enclosed in a skin, which is thick, sweet and dark red when ripe. The mode pursued by the Brazilians is to dry the beans with the skin on, and in the process the skin becomes dark, and finally black and crisp. It is then rubbed off and the bean washed. In this process great danger of fermentation is incurred. This is avoided by the English, French and Belgians, who own the best plantations, by the use of improved machinery. It may be remarked that the skin of the berries is as rich in saccharine matter as the sugar cane, and could be profitably worked by the use of appropriate machinery. The coffee plant will grow from seed, but is mostly propagated by young plants, which are taken off at two years old and planted in good soil. It bears on the fourth year, but gives a regular crop on the fifth—two to three lbs. per tree. Ten years is the average life of the tree. The picking commences in July, and concludes by the end of August.

The culture in Arabia Felix is extensive, and the crop is gathered by spreading cloths under the trees. The fruit is then shaken into them, and the berries are then dried on mats, when they are passed under a heavy roller. They are then winnowed and again dried. The Arabs make a decoction of the pulp, which they call Sultan's coffee, and it is an agreeable and refreshing beverage. The qualities of coffee as they come upon the market are in some degree known by their derivation. That of Mocha has the first rank. The beans are small in general and round. Some of them are, however, large and flat. They have a yellow or greenish color. They have a strong perfume and a more agreeable flavor than any other species. It requires an exercised taste to distinguish the true Mocha.

The manner of gathering the berry, and its preparation, is thus described in Tomlinson's Cyclopædia of Useful Arts:

"In Arabia, planters spread cloths under the trees, and by shaking the ripe berries drop on them. In the west Indies the berries are picked by negroes. In curing coffee it is sometimes usual to expose the berries to the sun's rays, in layers five or six inches deep, on a platform. The pulp ferments in a few days, and thus having thrown off a strong acidulous moisture, dries gradually during about three weeks. The husks are afterwards separated from the seeds in a mill.

"Other planters remove the pulp from the seeds as soon as the berries are gathered. The pulping mill used for this purpose consists of a horizontal fluted roller, turned by a crank and acting against a moveable breast board, so placed as to prevent the passage of whole berries between itself and the roller. The pulp is then separated from the seeds by crushing them, and the latter are spread out in the sun to dry them. It is then necessary to remove the membranous skin or parchment, which is

effected by heavy rollers running in a trough, wherein the seeds are put. The mill is worked by cattle. The seeds are afterwards winnowed to separate the chaff, and if any among them appear to have escaped the action of the roller, they are again passed through the mill."

In the British West Indies the berries when gathered are immediately fed in the hopper of a mill, which consists of two wooden rollers revolving over a third, which strips the berries of their pulp. These fall into a sieve, which sifts them from the outer skin. They are then steeped in water over night, washed and again dried, when they are subjected to the peeling mill, which is a large wooden wheel made to revolve vertically by means of a horse yoked to the end of the prolonged axis. This, passing over the beans, crushing off the parchment like skin. The whole is then subjected to a rude winnowing mill.

The quantities of coffee imported in the last official years into the leading nations were as follows:

Great Britain.....lb	34,518,555
France.....	26,325,500
United States.....	240,243,684
Hamburg	96,012,101
Bremen.....	13,700,000
Lubec.....	8,836,106
Zollverein	130,111,110
Denmark.....	16,716,741
Holland.....	167,661,014
Russia.....	7,814,865
Norway.....	682,061
Switzerland.....	12,285,000
Trieste.....	77,726,880
Spain	91,171,101
Smyrna.....	4,607,111
Galatz.....	1,421,102
Ibralia.....	281,101
Sardinia	41,352,438
Greece.	6,661 101
Total.....	968,132,571

These, of course, to a considerable extent, embrace re-imports, as the receipts in the Zollvercin and Switzerland are repetitions of the imports into the Hanse towns, Holland and Trieste. The figures indicate, however, the direction in which coffee finds its destination, and the localities which have the greatest ultimate interest in the supply. The U. States, where the article is free of duty are by far the largest consumers. The consumption is, however, elsewhere increasing. In England, in 1840, the consumption was 1 lb. per head, at a duty of 6¼d. per lb., and it has risen to 1¼ lb. per head with the duty at 3d. In Europe the use of coffee is increasing, although it has been much retarded by the use of chicory, which became extensive in Europe, under the Continental system of Napoleon, when colonial produce of all kinds was difficult to be had. The chicory coffee, as it is called, is still used, because it can be made a much cheaper coffee, and is an excellent article for adulteration.—*U. S. Economist.*

From the Maine Farmer.

Suckers Among Corn—Query.

Mr. Editor—We read that—

"Man wants but little here below,
Nor wants that little long."

The "Old Man Eloquent" expressed my mind when he remarked—

"'Tis not with *me* exactly so,
Though 'tis so in the song."

I was looking at my corn this day, and find suckers upon it, which. with the leaves straightened up, measure twelve inches. Are not these a great drawback to the main stalk? I have half an acre that looks very well; several of the hills measured, whole length, twenty-four, and a few thirty inches in height,—a half acre with sheep dung in the hill is very poor, while a half acre on "old dung" looks very fair. So much for the 2d July, 1858. M. T. B.

North Prospect.

Note.—We formerly practiced pulling off the suckers when large enough for fodder, and fed them to stock. We do not do it now for the following reasons. By chance we observed that those rows of corn which we had deprived of suckers, had, at harvest time, more ears with long snouts, as we say—or tops of cobs without any corn on them. than did those rows not robbed of suckers. Finding this to be a fact we concluded that there was a use for suckers, and that their part of the play was to furnish pollen or fertilizing dust from the spindles, later than did the main stalks. You probably are aware that as the kernels form on the cob, each one throws out a green slender thread which comes out over the top end of the husks. This is called the silk or beard. They are in fact, what Botanists call the pistil or female part of the plant, and receive the pollen which falls from the spindle, and fertilizes the kernel from which it starts. If a single thread fails to catch any of this dust the kernel from which it starts never fills out. Further observation shows you that the lower kernels first throw out threads which, when they have performed their office dry up and become brown, and that a succession of them come out all along the ear to the tip. Now those at the tip are behind the others, and some do not fairly show themselves until after the spindles on the main stalks have become exhausted. The pollen then from the suckers which come along in succession supplies their place, and thus the whole ear by their means becomes filled out with corn, plump and sound, whereas if it had not received that aid from the suckers it would have presented an ear with the corn part way

up, and the rest a long snout with blighted kernels, or mere rudiments of them upon it.

Will not our friend examine into this theory, and experiment a little, and see if we are correct?

In regard to sheep dung, it is a strong dressing, and should be fermented or composted before being used. It is then excellent.

From the Southern Farmer.

Prizing Tobacco.

The article on this subject should command the careful attention of tobacco planters. It is from the pen of one of our commission merchants, formerly a planter and who speaks from experience derived from both persuits. Considering that tobacco is one of our staple crops, it may well excite surprise that a portion of it should be brought to market in a condition not at all creditable to the skill of the planter. But that such is the fact, will be evident to any spectator who attends the breaks at the warehouses for a few days. Besides the several evidences of mismanagement which our correspondent has specified, such a degree of heat is sometimes discovered—caused by too much moisture—as not only to impair the quality of the article, but almost to destroy its value. The loss of course falls on the planter, which might have been avoided by a little more care in the handling.

Many persons have taken to growing tobacco within the last year or two who probably never raised a plant before. This may account for much of the bad tobacco which has been sent to market—for to make a successful planter requires an experience of several years.—Nevertheless a proper degree of care will overcome many difficulties in the art; and if a first rate article cannot be produced at first, it is in the power of an intelligent man to produce at least a respectable one. It yields more ready money than any other crop, and after the planter has gone to the trouble of growing it, he should not relax a moment in his diligence in preparing it for market.

Our correspondent is well able to treat the subject, in all its details, in an instructive manner, and we should be glad to hear further from him. No person can so well inform the planter what sort of an article the buyer wants, as the commission merchant; and a series of articles—for the subject is a prolific one—might render a service which many planters seem greatly to stand in need of.

In connexion with this subject we would enquire whether the planters of the south side might not be benefited by such an institution in Petersburg as the Tobacco Exchange in Richmond. We are aware that it encountered considerable opposition in the commencement, as all innovations are pretty certain to do; but from what we have learned, it works well, and large quantities of tobacco are daily sold at the board by sample, for which there is an active competition. We invite a discussion of the subject.

P. S.—Since the above was in type, we have received a communication in relation to the Tobacco Exchange from an intelligent correspondent, which will be found in our issue of this week. The writer—who is what he represents himself to be, a planter; and who has taken the pains to enquire into the working of the system—takes decided ground in its favor, and has at least given us a very readable article.

If it is thought by any that an undue prominence is given to the subject of tobacco this week, we have only to say in excuse that it excites at this time more interest than any other crop.

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Prizing Tobacco.—This operation in preparing tobacco for market—than which there is none more important, from sowing the seed to selling the crop—does not receive that attention from the larger portion of planters to which it is justly entitled. Be the crop good or bad, the planters' profits are mainly dependent upon the condition of his tobacco when it reaches market. True a planter cannot prize a good crop unless he first makes it; but a fine article may be so bungled over in prizing, put up in such order, so fangled and mixed by careless hands, as to be actually worth less by 50c. to $1 per cwt., than a more inferior one, properly ordered, straightened and well prepared for market.

The writer has been a close observor of tobacco sales for several years, and has seen a difference of $1 to $2½ per cwt. produced in crops grown on adjoining farms, cultivated in the same manner, and sold the same day, which could only be attributed to the manner of prizing.

The buyer must take the tobacco as it comes from the planters' hands; he can use only a certain portion of it per day. That in safe condition he can keep for future use, and is always willing to pay for it full market rates; that out of condition he must keep until he can use it, and if he considers his interest, buys at what it will be worth to him when he shall be ready to work it up; thereby throwing on the planter the injury and loss in the tobacco from the time of purchase to that of manufacturing.—This loss is considerable. The planter has to bear it. It is right that he should. He has no cause to complain of the manufacturer. If he feels like doing so, let him come here in September or October, and walk into one of our large factories, and take a look at a hhd. then being pulled up, bearing his own name on its head, which he sold in the spring. We presume he would then feel rather more sympathy than blame for the manufacturer, and congratulate himself that he and that tobacco parted long ago. But planters can remedy this

evil. It is useless for them to talk about bad seasons for *striking*, bad winds, cold winds, too much or too little rain, &c. This will not exonerate them from the duty they owe themselves. These bad seasons are not universal. They do not affect every planter; when they do we shall believe in them. There are planters who always manage their crops properly, in defiance of too much season, too little season, or any season at all. They are men of reputation as planters, and well do they sustain it. Examine their crops year after year, and they will invariably be found in good condition, and will always bring the highest prices. How is this done? The answer simply is, that they give every attention to the ordering and prizing their tobacco. To do this it must be straightened and bulked in soft order, and heavily weighted, which preserves the shape of the bundles and makes the leaves stick together. After remaining in bulk a few days it is again hung up on much smaller sticks than those at first used. These sticks should be drawn smooth, triangularly shaped, and sharpened at one end so as to run through the bundle just below the tie. The leaves of each bundle should not be separated after coming up from bulk. Let it hang until thoroughly dry. Then so soon as the outer surface of the bundles becomes soft enough to admit of careful handling, it may be taken down and bulked again with weights, and prized at leisure. No straightening will then be necessary. The inside of the bundles will be too dry to prize when first taken down, but after remaining in bulk a week or ten days, the order will be perfect. If the quality is poor, a little pure olive oil may be used with benefit. Much has been said about oiling tobacco. We only say oiled tobacco sells best, be the quality of the tobacco good or bad. We do not advise the use of it. Planters must decide for themselves on this point. Above all things, have the order safe, and weights heavy, and you will not go away grumbling about bad markets, low prices, &c., when you ought to blame nobody but yourselves.

PETERSBURG.

From the Germantown Telegraph.

Green Crops for Manure.

Mr. Editor: There is probably no more economical method that can be adopted in communicating fertility to the soil, than that of turning in green crops. For this purpose, a large variety of plants are used, but the preference is ordinarily of plants accorded to those which are the most succulent. Buckwheat is highly valuable for this purpose on account of its rapid growth, and the succulent and readily decomposable nature of its haulm. But of all plants susceptible of being rendered available by the farmer, for the enrichment of his exhausted soils, none are, in my opinion, superior to Indian corn. An experiment made last year, with this vegetable, has demonstrated the truth of this

On a piece of poorish soil, plowed the previous autumn, I sowed three bushels of Indian corn, broadcast, and harrowed it in. A small quantity of gypsum—about two and a half bushels—and ten bushels of wood ashes (unleached) were sowed on the piece, which contained one acre. The plants came vigorously, and were not arrested in their growth, notwithstanding the season was remarkable for dryness, and just before the corn commenced spindling it was turned in The operation was facilitated by fastening the crowbar to the beam of the plow, extending several feet on the land side, so as to prostrate the plants, and lay them in a position which insured their being thoroughly buried by the furrow slice, and in this way the whole was covered, so that on the completion of the work, which was finished off with a light roller, not a leaf of corn remained to be seen.

In this condition it was left till the next spring, when it was again plowed, harrowed and rolled; a second harrowing followed, and the seed planted (Indian corn) with one gill of gypsum and wood ashes, half and half, in the hill. I have rarely had a better crop, even on good soil, with a liberal allowance of manure. The soil, on plowing it the last spring, presented a fine appearance, and looked like old soil that had long been under good cultivation, and liberally manured. Southern flat corn would doubtless give a larger quantity of decomposable matter to the soil, than Indian, and would perhaps be in some respects a better article for this use.

A Chester County Farmer.

June 28, 1858.

Capped Hock.

[*From Dr. Dadd's Veterinary Journal for July*]

The above term is usually applied to a serious abcess, accompanied by tumefaction, around the point of the hock; occurring, as it does, at a very prominent and exposed part of the limb, it is almost sure to attract notice, hence, becomes an eye-sore to every casual observer, at the same time costituting a serious defect, and if accom-

panied by lameness, the animal is undoubtedly unsound while the lameness lasts.

Pathology of Capped Hock.—The tumor occasioned by the presence of *serum*, water—which finds its way into location between the external tendinous sheath, and a portion of strong, cellular membrane, which is here interposed between the skin and the tendon for the purpose of facilitating the motions of the hock.

Cause of Capped Hock—Capped hock is generally produced by a blow or bruise. It is almost always occasioned by the whiffletree coming in contact with the parts; the animal may however, injure the point of the hock while in the stall by making attempts to kick at a chain or rope which may have been confined across the entrance of the same, as is often the practice when the animal is in the habit of getting cast; this contrivance allowing us to get rid of the halter. The parts may also be bruised while the horse is lying down in the stall; therefore, we may safely say that capped hock is the result of some external violence.

Treatment.—Supposing the injury to have just occurred; the parts being hot and tender; apply a portion of the following lotion several times daily until the inflammatory symptoms have subsided:

Refrigerating and Sedative Lotion. Take Hydrochlorate of ammonia, (sal ammonia) Nitrate of Potassia, of each one ounce, water, one quart, Alcohol, half a pint—Mix.

A cloth may be dipped into this mixture and loosely tied over the inflamed parts: so soon as it becomes dry it should be again wetted. Having continued the application of the above until the heat and tenderness have disappeared, the tumefaction if any remain, will generally disappear by making a few applications of the following:

Take, Glycerine, one ounce, Iodide of Potassium two drachms—Mix. Smear the tumor with a portion of this, twice, daily.

In chronic cases, of long standing, the oil of cantharides, is probably, the best remedy, several applications of which may be needed ere the tumor disappears.

It is not necessary that your flower garden should be full of all kinds of plants and flowers, but it should be neat and well kept.

A First-Rate Whitewash.

We have tried various preparations for white-washing ceilings, and the walls of unpapered rooms, but have never found anything that was entirely satisfactory until the present Spring. We have now something that affords a beautiful, clear, white color, and which cannot be rubbed off.

We procured at a paint store, a dollar's worth of first quality "*Paris White.*"—33 lbs, at three cents per lb.—and for this quantity, one pound of white glue, of the best quality, usually called Cooper's glue, because it was manufactured by Peter Cooper, of New-York. Retail price 50 cents per pound. For one day's work, 1-2 lb. of the glue was put in a tin vessel, and covered with cold water over night. In the morning this was carefully heated until dissolved, when it was added to 16 lbs. of the Paris White, previously stirred in a moderate quantity of hot water. Enough water was then added to give the whole a proper milky consistency, when it was applied, with a brush, in the ordinary manner. Our 33 lbs. of Paris White and 1 lb. of glue, sufficed for two ceilings, and the walls and ceilings of seven other smaller rooms.

A single coat is equal to a double coat of lime-wash, while the white is far more lively or brilliant than lime. Indeed the color is nearly equal to that of "Zinc White," which costs at least four times as much. We are satisfied, by repeated trials, that no whitewash can be made to adhere firmly without glue, or some kind of sizing, and this will invariably be colored, in time, with the caustic lime. The Paris White, on the contrary, is simply pure washed chalk, and is entirely inert, producing no caustic effect on the sizing. Any of our readers who try this, and are as well pleased with it as we are, will consider the information worth many times the cost of an entire volume of the Agriculturist. Had we known of it when we first "set up house-keeping" it would have saved us much labor, and the annoyance of garments often soiled by contact with whitewash—not to mention the saving of candles, secured by having the ceiling always white enough to reflect instead of absorbing the rays of light.—*American Agriculturist.*

From the Farmer and Planter.

Rainy Days' Employment.

MR. EDITOR:—As we should always be usefully employed, and use our time to the best possible advantage (this evening being two wet for out of doors' work), I propose to write a short article on the above subject, which you can publish if you think fit.

All must acknowledge that it is to the interest of each and every one, at all times to be usefully and profitably employed; especially if he would desire to thrive and prosper in the world. No one has any time to lose or idle away unimproved. We should work while it is day, for the night cometh when no man can work.

The farmer, as well as the man of any other vocation, can work or use his time profitably on rainy days. Because it is too wet to work *out*, it is no reason why he should not work *at all*. He may rest assured that he has a *plenty*, and more than he *can do* if he will.

Every farmer should have some kind of lumber house, or work shop, in which his tools should be kept. On wet days let him repair thither and make or repair all such tools as are needed on the farm; such for instance, as plow stocks, harrows, axe handles, and many other things that cannot be enumerated. A farmer should plan out and arrange his business so as not to be compelled to stop his hands out of the field when the weather is favorable for out of doors' labor, in order to attend to all those numerous jobs which can be accomplished as well on wet days as dry ones. He can do or have done all of his shoemaking and mending, coopering, &c., on rainy days. He can also have his corn shelled and sent to mill when the ground is too wet to plow. In a word, a farmer's labor is almost endless if he tries to manage and keep up everything pertaining to a farm. And, when he can do or think of nothing else to do on a rainy day that would be more profitable to him for his neighbor, then let him pick up the *Farmer and Planter*, and read a few articles in its pages, which will employ and invigorate his mind to do something both profitable and useful when the rain shall have ceased falling.

T. F. A.

Calhoun June 1st, 1858.

Do Potatoes Mix in the Hill.

In the Valley Farmer for June we gave our views in full on this question, based upon physiological laws and reason, yet we failed to convince some, as will be seen by our August number, that potatoes would not mix. The following communication on the subject we find in the Country Gentleman, by E. C. Goodrich. The writer has probably produced more new varieties of potatoes from the seed, and experimented with a greater number of kinds together than any other man in the United States, if not in the world, and yet from all his experience in planting different varieties he has yet detected no mixing in the hill. We publish the article for the benefit of the still unbelieving:

I. *Physiological Reasons.*

All the various sorts of potatoes cultivated in this country are, so far as I can judge, not only of one genus, but also of one species, according to botanical classification. Under this one species, however, are included almost numberless varieties. Among the many thousand that have grown up under my experiments in the last few years, I have seldom seen two whose vine and tuber looked exactly alike, or if they did, they would vary in color of blossom or position in the soil. In 1858 I sowed the seed of one ball alone, and got 10 varieties of which no two were alike, though most of them had a family likeness. The same year I got nine varieties from another ball, produced by a different variety from the foregoing.—Among these nine, no two were quite alike, though, as before, bearing a family resemblance. Among potatoes, if anywhere, we might suppose such mixing as that now contemplated might occur.

1. The first effect of blossoms on one impregnated by those of a different variety, is felt on the seed. In 1844, I crossed a seven-year pumpkin's staminate flower with the pistillate one of a green fleshed melon. The result, as a fruit, was still a seven year pumpkin, although the seed was changed, and the next year it produced that excellent variety since called the Honey Squash. Other flowers on this vine not so crossed, produced the ordinary seven year pumpkin fruit.

2. A Damson plum may be grafted with a fine variety of plums, and the fruit will

correspond to the new or grafted sort, but the roots of that tree, though fed with nutriment from the leaf of the superior sort, will yet throw up Damson sprouts, showing that the root is unchangeably Damson.

3. Now plant a Carter and Kidney potato in the same hill; each tuber will throw up a top of its own kind. The blossoms may produce cross impregnations, and the balls so produced may yield new varieties, showing a cross between the two sorts, but the roots of each plant and the tubers produced upon them, will be true to their own sort. The tubers of perennial trees, are not seeds nor anything else indicating a new sort.

4. Nor can mere juxta-position produce a cross. If the same large apple tree, grafted with fifty varieties of apples, will yet produce fifty sorts of apples, though drawing its nutriment from the same soil and through one body, and presume these fifty sorts growing side by side, and with branches intertwined, through any number of years, then surely two different trees, growing side by side, will produce regularly each its own kind of fruit.

5. Now a potato planted in the spring is like the piece of a root of the tree, or like a graft—it has the elements of sort in itself unchangeably. If it were not so, we should have security for the permanence of quality in any fruit, tuber or blossom. Every seedling plant, in its very origin, or at least in that and the circumstance of its culture for the first few years, acquires a stereotyped character which it never loses while remaining in that soil and climate, nor will its essential and specific qualities be lost even when removed to another soil and climate.

II. *Reasons from Experience.*

1. I have been raising seedling potatoes by the thousand during the last eight years. Many of them in favorable years, as 1852 and 1855, produced balls the year of their organization. Many of these sorts have been cultivated side by side, and sometimes in the same hill, four or five years, i. e., until I could judge of their value. Yet I have never found a sort that varied in its practical characteristics, such as shape of leaf and vine, color of leaf and flower, and color both external and internal, of tuber after the first year. It is only in shape of tuber that I have found them to vary.

2. I have numerous sorts that have been cross-impregnated. Thus in 1851, I had a cross between a seedling of 1849, called the Empire State, and the New Jersey Black Yam. The result was that variety since given out under the name of Black Diamond. So also in 1852, I had a cross between the Early Mountain June and a blue variety, which resulted in the sort named the Mountain June Pink eye. But in neither case did the varieties bearing the balls, i. e., the Empire State and the Early Mountain June, show any change in their tubers.

3. Variety in soil, culture and season, one or all, may make slight changes in the flesh, degree of color, both external and internal, and in the smoothness of the skin, but these changes are not essential or permanent. Thus both the Summer and the Winter Pink eye will often show hills that differ from each other in the amount of purple stripes on the tubers, nay, the tubers of the same hill will differ from each other. So the Western Red varies in depth of color with soil and season.

4. Some varieties are never fixed in color. I imported a variety from South America; in 1851, which was almost uniformly white, though the same hill would occasionally show one tuber with a bright purple stripe, or even small speck. I frequently find this same feature of varying color among my new seedlings, both externally and internally.

From all these considerations, both of philosophy and fact, I am constrained to conclude that the color or other sensible qualities of the potato, are incapable of change by being planted together, and hence that facts that seem to favor such a conclusion have not been accurately examined. C. E. Goodrich.

From the Northwestern Farmer.

Preserving Fence Posts—Striped Bugs.

Eds. Northwestern Farmer:—The time is fast approaching when farmers will be engaged in building, and rebuilding, fences. As the plank and wire fence is taking the place of the old zig zag rail protector, I ask a space in your Monthly Visitor to give my experience in setting

posts. In the year 1845 I made some new paling fence, setting the posts a portion of them top end down, and others butt end down.

After twelve years the fence was rebuilt and all those posts set top end down, were sound and took their place in the new fence, for another twelve or twenty years; while those butt end down were entirely rotted off.

Farmers, try the top end down, if not quite so large.

Now for the striped bug, that little Turk, inveterate destroyer of Cucumbers, Melons, and Squashes in their early growth.—Year after year I have combatted them with thumb and finger, sulphur, chimney soot, boxes, &c. Last Spring, I had a few fine hills of early frame cucumbers, just coming into fourth leaf, and as necessity has created the motto, "eternal vigilance or no safety," I went out as usual to examine my *patch*, and lo! and behold! not less than a thousand to a hill were working away and the air full of new recruits. I felt all was over with that planting. But my wife came to the rescue; saying she would give them a dose such as her Old Grandmother used to give. What could it be! A little bunch of cotton saturated with spirits or oil of turpentine, placed in each hill; and such a scattering I never did see.

In three minutes, not a bug was to be seen, evidently not liking to deal with *spirits*. They next attacked the Autumnal Marrow Squash you sent seeds of. I applied it again, and from five seeds, had forty fine squashes, a portion of which I sold two weeks since at twenty cents each.

J. A. P.

Bunker Hill, Ill., March 22d., 1858.

Cotton Cultivation in Africa.

Mr. Thomas Clegg, of Manchester, has published an interesting letter, describing the result of the efforts which have been made by him for the last seven or eight years to promote the cultivation of cotton in Africa, with the view of putting down the slave trade by showing the native chiefs and others "that it was their interest to employ their people, instead of making war upon each other for the sake of getting a colorable right or pretext for selling into slavery the prisoners taken in such marauding expeditions." An opening experiment at Sierra Leon failed, and he decided to go at once to interior cotton fields, and to the residence of the chiefs about Abbeokuta. Finding, however, that the European agents either died or had returned to this country, several young Africans were selected by the Missionary Society and sent over to England, at the expense of the Native Agency Committee, to be educated and instructed in the best method of cleaning the cotton without injury to the fiber. The African Native Agency Committee of London also supplied packing presses and other machinery, and Mr. Platt supplied cotton gins, goods, and money to purchase the cotton with. Up to the 1st ultimo he had sent out 175 cotton gins, costing from £3 17s. to £10 10s. each. He has entered into correspondence with upwards of 76 native and other African traders, 21 or 22 of them being chiefs, and many of them having begun to consign their cotton and other produce to him. Three manufacturers, of Manchester, have sent out 250 cotton gins, and the natives are at present, with their present appliances, able to turn out yearly 4,368,000 pounds of clean cotton, equal to 10,000 American bales. This he regards as a rare instance of rapid development of a particular trade, and, after a view of all the known facts, he "can clearly see a prospect of the slave trade being entirely starved out." The cotton, from whatever part of Africa it comes, will invariably sell in Liverpool for 2d. or 3d. per pound more than East India cotton. For some years it has never cost more than ½d. per pound in the seed; more has been offered at that price than the agents, chiefs, and dealers have been able to buy up; and it can be laid down in Liverpool at 4½d. per pound, whilst it is now worth 7d., and not long ago was worth 9d. per pound. Mr. Clegg says that, believing in the goodness of the cause, he is anxious to raise £2,040 for the establishment of four new cotton stations.—*Hunt's Merchant Magazine.*

Wonders of Boiling Water.

We live, we move and have our being at the bottom of an atmospheric ocean, whose lower strata are pressed upon by all above them. Unlike the common sea, the atmosphere yields considerably to this superincumbent spring, and like it, exercises an elastic force proportioned to the weight it has to bear. A pillar of air, with a base of one square inch resting upon the surface of the sea, and reaching to the top of the atmosphere, weighs in round numbers fifteen pounds; and this, therefore, is the pressure exerted by the atmosphere on each square inch of the sea's surface. It varies within narrow limits, according as the pressure is that of the warm, light air of the South, or of the cool dense air of the North: in the former case the barometer falls—in the latter it rises. We have heard an intelligent youth ask the following question: "Suppose a room containing people to be shut up, and every chink and cranny

closed so that all communication shall be cut away between the air within and that without. Here, although the ceiling and walls interpose to shield the people in the room from the pressure of the atmosphere, still each of them bears the same pressure as a person outside the room; and a barometric column will stand as high within the room as without it. What is the reason?" The reason is, that the air within the room possesses the full elastic force which the pressure of the atmosphere can give it; the spring was compressed before the room was closed, and its power of lifting the barometric column is therefore the same as that of the free atmosphere.

A vessel of water, with its surface exposed, yields up vapour at all temperatures, and will finally disappear; but the elastic force of this vapour will depend on the temperature at which it is generated, being greater the higher the temperature. If the heat be sufficient to boil the water, bubbles rise and sometimes float for a considerable time upon the surface.

Let us consider the cause of such a bubble, whose area is one square inch. The fragile thing bears the atmospheric pressure of fifteen pounds. Why, then, does not the film burst? Simply because the elastic force of the steam within the bubbles is exactly equal to the elastic force of the air without; so that the film is in reality placed between two gaseous cushions, which press upon it equally, in opposite directions, and therefore neutralize each other. Until the water is hot enough to produce steam of this tension, it cannot boil; the tendency to ebullition is subdued by the atmospheric pressure. Under the full atmospheric pressure of fifteen pounds per square inch, water boils at a temperature of 212 degrees, Fahrenheit; and hence steam generated at this temperature is said to have an elastic force equal to one atmosphere. But if a portion of the atmospheric pressure be removed, water will boil before it reaches 212 deg. Take, for instance, the case of a bubble floating on the surface of water at the top of a mountain.

We have seen that the existence of the thin film which constitutes the bubble, depends on the pressure against it from within being the same as the pressure upon it from without. But the pressure without the bubble on the summit of the mountain is less than at the surface of the sea, and hence the elastic force of the steam must be less in the former position than in the latter. This is the case; and to produce this feebly elastic steam less heat is required; or, in other words, the boiling point of water on the mountain is lower than at the sea level. At 18,000 feet, on Donkia mountain, in the Himalaya, Dr. Hooker found that water boiled at 180 degrees; so that tea, soup, and chocolate, which require to be made with water of nearly a temperature of 212 deg. Fahrenheit, would be of very inferior quality in this mountain region. It is not, however, necessary to ascend a mountain to satisfy ourselves that the boiling point sinks as the atmospheric pressure is diminished. If water at 180 degrees be placed under the receiver of an air pump, and the air be removed until the pressure becomes as low as it is on Donkia, the water will boil: It is not even necessary to heat the more volatile liquids to produce this effect. A beaker of alcohol, placed under the receiver of an air pump, at the ordinary temperature of our climate, will boil violently when the receiver is sufficiently exhausted. Reversing the conditions, we can by increasing the pressure upon its surface, enable water to attain a far higher temperature than 212 degrees without boiling. Thus, as is natural to expect, an external force which resists the tendency of heat to tear asunder the particles of liquid, and convert it into vapour, elevates the boiling point of the liquid. The boiling point depends also on the nature of the vessel in which the liquid is placed. Anything that resists the separation of particles, produces the same effect as an increase of external pressure. Water adheres to certain surfaces much more strongly than to others; thus it clings to glass more tenaciously than to metal; so that, to make water boil in a glass vessel, requires more heat than is necessary if it be contained in a metalic vessel.

In boiling their solutions in glass vessels, chemists have to be very careful, for the adhesion between glass and liquids is overcome by jerks; instead of the amicable ebullition exhibited in a metalic vessel, the solution boils by starts; and this in sometimes so energetic a manner, as to project the solution quite out of the glass vessel. But the most remarkable influence upon the boiling point of water is exercised by the air which it holds in solution. When water is exposed to air, a certain amount of the latter is absorbed by the liquid, the magnitude of the absorption being proportional to the pressure exerted by the air on the surface of the liquid. It is extremely difficult to expel this air, but it may be done by continued boiling. Imagine a glass tube, which has been exhausted by an air pump, to be half filled with water which has been purged of its air by boiling, and hermetically closed at both ends. This water adheres so closely to the sides of the tube, that when the latter is turned upside down the liquid will not fall downwards, but will cling to the upper portion of the tube. This experiment shows that the adhesion between the liquid and the glass is enormously increased by the expulsion of the air, for no such effect could be produced with ordinary water; but it also teaches us that the cohesion among the particles of the liquid itself is very great; for there is nothing to prevent the central portion of the liquid column from detaching itself from the portion in contact with the tube, except the cohesion between the liquid particles themselves. Now

here we have a force which tends to resist the separation of the particles; how will it affect the boiling point of the liquid? Most remarkably. Water thus purged of its air may be heated to a temperature of 275 degrees Fahr. without boiling; and when it does boil it is not with the gentle ebullition of ordinary water. The particles snap suddenly asunder like a broken spring, and ebullition is converted into an explosion.— *Westminster Review.*

Grape Vine and its Culture.

The following very practical remarks on the culture of the Grape Vine are taken from the Horticulturist, and are from the pen of one of the most practical gardeners in the country, namely William Chorlton of Staten Island.

The plain fact is, there is nothing mysterious about the cultivation of this plant, neither is there any other that will bear a greater amount of ill treatment and recover. We have said above that the grape vine is a plant of longevity; yet some of our cultivators, both in the vineyard and under glass, consider it necessary to replant after a few years of bearing, because, according to their belief, the vines are worn out. Now if we find that, under different circumstances, certain individuals that have received more rational treatment are known to be hundreds of years old, and are still as healthy as they were a century ago, also continuing equally fruitful, and that fruit of the best quality, it stands to reason that there must be a screw loose in such experience somewhere. To secure this robust old age, and the consequent profits arising therefrom, it becomes requisite to consider the nature of the plant.

First. It is always found to be most at home in a tolerably rich upper base abounding in vegetable matter impregnated with limestone, and accompanied with a well-drained subsoil. *Secondly.* It is a rampant grower in all its varieties, producing a large volume of branches and leaves, the latter of which respire and perspire very freely, and act by drawing up and elaborating the juices from the roots, and also absorbing the moisture and gases in the atmosphere. According with the amount of surface in these leaves, and concentration of action under the influence of steady heat and light, so will be the corresponding ratio of roots and wood healthy, and of parmanent structure or otherwise. Such being the case, it is easily seen, and if the extension of growth be unduly encouraged by over-rich compost (more particularly while young,) the cellular and vascular tissues will become deranged by the excitement, and neither roots nor branches partake of the indurated character they ought to. Added to this, we have, generally speaking, more close pruning practised, not only in winter cutting, but summer shortening, also, on this fast growing vine than any other fruit-bearing plant. Recapitulate the circumstances, and in the first place we force a plethoric growth by stimulating manures, and afterwards the plant is prevented from performing its proper functions by being permanently cramped into a comparatively very small superficial surface. How, we may ask, is such a being to form an increase of hardened woody fibre in the roots, or how is it possible that they can continue to have strength enough to be vigorous absorbents of the fluids around them? The finale speaks for itself. A premature imbecility, with the consequent tendency to mildew, shank, dry rot, decayed roots, and all the other known and unknown diseases we have to complain of.

To come more practically to the point: Either in the grapery border or outdoor culture, it is indispensable to secure a free passage for the surplus water from the subsoil by good drainage. Make choice of good, friable soil enriched sufficiently with decayed barnyard manure and vegetable mould, and if crushed bones are to be obtained readily, add a portion. No harm will be done by these latter, and no proportions need be given. If the flesh is not on them, they will give out very slowly and prove permanent. Much as has been written, and many as have been the arguments respecting the composts for grapery borders, I speak with confidence and from experience in stating that better grapes may be grown by simple double trenching, with good drainage, and the addition of a reasonable quantity of the above mentioned material than are frequently obtained by the most fastidiously formed and ruinously expensive beds that are too often compounded. The following will prove a most efficient bed when the best results are desired:—

Dig the border clear out from fifteen to twenty feet in width, from the base front of the house, and two feet six inches deep. Let the bottom level slope somewhat towards the outside line, along which excavate another foot deeper, and the same wide. Fill this drain with rough stones or other such material, and cover six inches of the same over the whole base. If the soil taken out, or any portion of it, be of good quality reserve it, and mix one fourth in quantity of barnyard manure and decomposed vegetable matter with one bushel of crushed bones to every cubic yard in bulk. Whatever quantity of earth may be required beside that taken out, procure it from a pasture of friable loam, and use only the upper turf sod. Cover the drainage base with these sods also, and fill in the prepared compost to one foot above the ground level.

Planting, Training, &c.—Chose for all purposes healthy vines of one or (at most) two years' growth from the cutting or bud. For outside, make a hole three inches deep, and level on the bottom; spread out the roots carefully, and fill up with well broken soil. In the

grapery, smooth the surface, and cover over the roots so as to form a small mound around each stem, which may afterwards be shortened down to two or three buds. When these buds have grown some two or three inches, take out all but the strongest. Train this carefully to the wires or poles as it advances in growth, and pinch out the laterals or side shoots to the first leaf as they continue to be produced. If the weather be dry and hot through the summer months, mulch the ground with littery manure, and give occasionally a copious supply of water to the roots. Do not stop the leader until the wood begins to turn brown in the fall.

One of the best methods for future training, outside, is to conduct two shoots horizontally, one on each side of the main stem, and eighteen inches from the ground level. This may be secured for the present by cutting down to two buds above that height. These, in the spring, will push out the desired branches, which may be allowed to grow as the single one did last year. Next fall, cut them in, to four or six feet, according as they have grown strong, or the reverse. The third year from commencement they will develop side shoots, which are to be trained up perpendicularly to the trillis at the distance of eighteen inches apart. More than enough will be produced, the surplus of which should be rubbed off as soon as it can be seen which are the most suitable to leave. One bunch of fruit may now be allowed on each of these uprights without injury. The following fall, every alternate cane is to be cut down to one bud, the others being shortened in to five or six feet, and left to bear. And now begins a regular course of pruning. Those that have borne the last year are to be cut down to an eye, and the others that have emanated from the previous single bud left for fruiting next year. It may also be mentioned that a greater longitudinal surface can be gained in after years by extending the horizontal branches in like manner.

Michigan Farmer.

From the New York Observer.

A Chapter on Strawberries.

The best season for making summer plantations of this delicious fruit is near at hand. Those who neglected to plant in the spring, and have been regretting such neglect, should now make thorough preparations for planting during the month of August. It is important that you make selections of the best varieties in cultivation. It will cost no more to grow the best than it will the most inferior.

We have recently visited some of the best fruit gardens in Connecticut, for the purpose of examining the strawberry crop. We are surprised to fine this crop so rapidly increasing, and the great number of varieties already under cultivation. In the villages and cities in the eastern part of the State, where nothing but the small berries of the New York market were seen five years ago, you now find an abundant supply fresh from the neighbouring gardens, and at prices so low as to put them within the reach of all. Even at the lowest prices they ever bring, they are found to be one of the best crops the horticulturist can grow, and many of the farmers are beginning to make their ventures in the business.

Deacon A. Smith, of Lebanon, was among the first to introduce this crop in that town, and now a large quantity are grown there for the Boston market, as well as for the supply of the home demand. They cultivate here principally the *Hovey's Seedling*, *Virginia Scarlet*, and *Boston Pine*, varieties that were very popular eight or ten years ago. The soil in this region is very moist, and abundantly furnished with vegetable matter. It is admirably adapted to this fruit, and good crops are realized on any land that will grow good corn. This town also grows considerable quantities of peaches of excellent quality. The trees are much longer lived than in Jersey, frequently continuing twelve or fifteen years. The pear also flourishes here, and a variety called the *Summer Virgalieu* or *Lebanon Pear*, is raised in large quantities. It is about the size of the *Bartlett*, and though less showy in appearance, is scarcely inferior to it in quality. It has a saccharine, aromatic taste, that many would prefer to the *Bartlett*. It is not yet much known to the public, and has not been propagated extensively out of New London county.

In Colchester, strawberry culture is yet in its infancy. E. Carpenter has some fine beds of the *Longworth's Prolific*, and *Walker's Seedling*. He prefers the first on account of its size, the latter for its high pine flavour and richness. *Hovey's Seedling* is in favour, and is sometimes sold as low as fifteen cents a quart.

Norwich is the largest market for this fruit in the country. A large number of varieties are brought in from the neighbouring towns, and a still larger number are cultivated in the private gardens. We have never found this fruit in greater perfection than in the gardens of this city.

The old favourite, *Hovey's Seedling*, and its mate the *Virginia Scarlet*, is still retained by many, though it has formidable rivals in some of the new varieties. It does better here than in any other region where we have observed it. Dr. Daniel T. Coit has one of the largest and best gardens in the county, and his strawberry beds this year present a magnificent appearance. With him the *Longworth's Prolific* is a great favourite for size, productiveness and quality. At I. N. Perkins' we found the *River's Eliza*, which is the first English strawberry we have ever known to succeed well in our climate. We noticed it in several other gardens, and in every instance it surpassed all others for size and productiveness. The plants were loaded with very large berries, three, four

and five inches in circumference. They have been grown here six inches. The vine is large, hardy, and a hermaphrodite. The berry is light coloured, of excellent quality, and tolerably firm. There would be no difficulty in cultivating it for the home market. Mr. Forbes, the very intelligent gardener of Mr. Perkins, also cultivates this fruit on his own account. We found here *McAvoy's Extra Red*, which is a very remarkable berry for size and productiveness. There could not have been less than a quart on many of the single vines. But this showy fruit has a pungent acid flavour, which must make a very large drain upon the sugar bowl. *McAvoy's Superior* is a much better fruit, and almost as productive. The only objection to it is, that it is too soft for a market berry. *Scott's Seedling* is a long, cone-shaped fruit, of good quality, and productive. This, we are informed is a favourite in the Boston market. *Burr's New Pine*, which stands so high for quality, is discarded by Mr. Forbes as a poor grower, and shy bearer. The fruit is not large, and indeed has nothing but its excellent quality to recommend it. *The Goliath* is a seedling of *River's Eliza;* much like the parent in all respects.

Rev. J. P. Gulliver has within a few years sought health in a garden, and has already one of the best selections of small fruits in the city. He has near a dozen varieties of strawberries. Among them is the *Moyamensing Pine*, a late berry, much cultivated for the Philadelphia market. The vine is very large and productive, the berry among the largest and of good quality. It is an excellent variety for preserving. We found here, also, the celebrated *Peabody's Seedling*, which has been sent out so extensively over the country the last two seasons. We were particular in testing this berry, in three other gardens, and have had good opportunities to compare it with other good varieties. We must say, that so far, we see nothing in it to pay for the fifty thousand dollars it has cost the country. We were disappointed at its productiveness. Well-grown plants do not yield anything like the quantity of *Hovey's Seedling* or *Longworth's Prolific*. This, perhaps, may be partly accounted for, in the fact that the plants have been severely taxed in making new runners to sell. But the quality does not meet our expectations. The first berries we tried grew upon a bed that had been purposely left thick for supplying plants. The fruit was insipid. The next was upon plants having the full advantage of sunshine and good cultivation. The berries were of higher flavour, but stringy; not better in quality than a *Longworth*, and not equal to a *Burr's New Pine*, with which we compare them repeatedly, picking both berries fresh from vines that grew side by side. It is a little remarkable that this berry and the Dioscorea Batatas of Prince, had the advantage of plates and official notice in the Patent Office report. The *Walker's Seedling* flourishes here, and is preferred to all others for its luscious pine flavour. Compared with Peabody's Seedling, Walker's or Wilson's Seedling is vastly superior in firmness, flavour and productiveness. We hazard nothing in saying that the Walker and the Wilson Seedlings which have been noiselessly disseminated, will in a short time take the place of the boasted Peabody. The latter, owing to its want of firmness and flavour, will never become a market berry. Amateurs may retain it as a variety.

At New London, strawberry culture has been longer established, and the plantations in the suburbs not only supply the city, but send off large quantities to other markets. They receive only field cultivation, and the varieties are not well selected for size or productiveness. With the gardens of amateurs here we are not particularly acquainted.

Stonington is just beginning to grow its own strawberries. Of the private gardens, that of J. I. Day comes nearest to our ideal of what a fruit garden should be. Both the large and small fruits are abundantly represented, with the best varieties. It has the prime advantage of shelter, being situated on the Southern edge of a piece of woodland, and all fruits are about a week earlier than the same varieties in gardens, within a mile's distance, upon the sea shore, in exposed situations, he still cultivates the *Boston Pine* and *Hovey's Seedling*—the latter doing well with him, while it has been discarded from two gardens in the vicinity more exposed to the sea breeze. We have rarely seen a finer display of strawberries than in this garden.

The gardener of J. F. Trumbull, Esq., is beginning to grow them for market. He has the *Longworth's Prolific*, *McAvoy's Superior*, *Jenny Lind*, *Brighton Pine* and *Walker's Seedling*. The *Jenny Lind* is a strong grower, prolific, and of fair quality. It wants the full advantage of the sun-light, and of good soil, to bring out all its good qualities. The *Brighton Pine* is a new variety, sent out only two years since. It is hardy, prolific, and of excellent quality.

Of all the varieties that we have seen in this trip, we give a decided preference to the *Walker's Seedling*. It has more of the points of a good strawberry than any other with which we are acquainted. As to flavour, which is the main thing with a strawberry, in a private garden, it is decidedly better than *Burr's New Pine*, which is a standard of excellence. It is hardy, a strong grower, and very prolific, ripening its berries in succession through a long season. It is a solid berry, and bears carriage well. It retains its form, after preserving, more perfectly than most berries. It is already so widely distributed among nursery men and amateurs, that the plants can be furnished in any desired quantities as cheap as the more common varieties. We trust Wilson's Seedling, which so nearly resembles the

Walker, will soon be found in these various gardens. In size and productiveness it excels the Walker.

It is cheering to see the increasing enthusiasm of the cultivators of this healthful and luscious fruit. It was recently declared, at a meeting of the Farmers' Club, at the American Institute, that strawberries could be cultivated at less expense than potatoes, bushel for bushel. They unquestionably are a surer crop than potatoes, and at present prices are much more profitable. There is no good reason why they should not have a place in every farmer's garden. They would prove an agreeable variety at the season when salt junk and old potatoes are in the ascendant.

WILSON'S SEEDLING STRAWBERRY.

We had the pleasure, a year since, of supplying to our worthy friend, Jonathan Odell, Esq., of Yonkers, a hundred plants of Wilson's Seedling strawberry. We knew that he would bestow upon them careful attention; and in visiting his grounds in June we were not disappointed in their cultivation or product.

The beds were loaded with masses of fine fruit which astonished every beholder. For quantity, average size, or beauty, we doubt whether they have been equalled.

We saw dozens of the berries within a yard square, measuring from four to four and three-quarter inches in circumference, and a great number of others of nearly as large size. On one single plant we counted one hundred large berries, many of which were over four inches in size, and on several other plants we counted seventy-five and eighty berries of similar size.

The fruit was also fully ripe at the time of our visit, bearing a dark mahogany appearance,—and the flavour, on careful examination and comparison, was found to be excellent. The brisk acid which is so noticeable in Wilson's Seedling, on its first becoming red, seemed to give place to a very rich, pleasant flavour, when fully ripe.

Exceptions have been taken to the short footstalks of this variety, but here we measured some of them that proved to be of six and seven inches in length.

The plants were about eighteen inches apart each way, and were cultivated in usual garden soil, with a fair quantity of well-rotted manure.

We think this variety will bear higher cultivation than many others; while its production is amazing with only ordinary soil and attention. It is hardy, vigorous, and invariably productive in all instances where it has come under our observation. James W. Falkner, Esq., of Stamford, Ct., an amateur cultivator of the strawberry, who has, within the few years past, at no little cost of time and money, procured from headquarters, in their purity, all the best varieties, informs us that among *thirty-nine* varieties cultivated this year, the Wilson is regarded by him as greatly superior to any other variety.

We shall esteem it a favour to receive from any one who has grown it, their frank and candid opinion of its merits, whether favourable or otherwise. We early commend it to public favour, and we shall be pleased to know how far it has been found worthy of it.

We hope our friend of the Magazine of Horticulture has been permitted to test its qualities during the present season, and that he will favour his subscribers with an opinion of its merits, and of its claims to popular regard.

STRAWBERRY TRADE OF NEW YORK.

The quantity of this fruit sent to the New York market has largely increased within the few years past. Few are aware of its importance to the producers. The season lasts but a few weeks. Those engaged in the trade have to bestir themselves, and hundreds of thousands of dollars are paid for the crop.

New Jersey is the great field of strawberry culture. Monmouth and Middlesex counties furnish the earliest supply, while Hackensack and Upper Jersey yield a later and a superior fruit. These are brought to the city chiefly by private conveyance, are fresher, and command a better price than others. Among those cultivated to any extent, the Crimson Cone is the finest variety to be found in our market. Some of the recent varieties, like Walker's and Wilson's Seedlings, when they are better known and in supply, will take the place of many of the old and inferior sorts.

The Express says that after a careful inquiry made among the commission men, it has been ascertained that over six millions of baskets have been sold in the New York market the present season.

Large quantities are sold outside of these commission men. There is no doubt that *more than a quarter of a million of dollars* are paid, in a single season, for strawberries in this market.

S. G. Pardee, who is now considered by most people to be the highest authority on things pertaining to the culture of strawberries, remarks on the

MANNER OF MANURING STRAWBERRIES.

I am opposed to all stimulating manures for the strawberry, or land over-enriched, as some portions of the gardens are, but I have always preferred land in the best possible condition for a crop. Then apply a moderate coating of unleached ashes, lime and salt—say three bushels of ashes, one of lime, and four or six quarts of salt, and, if need be, prepared muck, or leaf mold, or turf. Always keep them clean, and not only uniform large crops may be expected, but superior fruit, and all at a

cost of less than fifty cents per bushel for the mere cultivation, as my own and others' observation and experience abundantly attests. If you mulch your beds with tan, the mulch will keep down the growth of weeds near the plant. I would let runners grow, and in the Fall take a fine rake and pull up the weak plants of the runners. This is cheaper than any plan of cutting off the runners, and does not injure the plants. In setting plants, use the plants from the first end of the runners, as the roots are stronger than at the little end of the vine.

S. G. Pardee.

Progress of English Agriculture.

In our August issue we published a very interesting and lucid synopsis of an article contained in the April number of the London Quarterly Review, entitled "The Progress of English Agriculture." Much to our mortification, credit to the Boston Journal—the source from which it was derived—was omitted, and we were thereby placed in the unenviable position of appropriating the labors of others without due acknowledgement. It is true we had endorsed it with the name of that paper, but the printer being unused to that mode which in our want of experience we had thoughtlessly adopted, failed to observe it, and we became aware of the omission only when it was too late to remedy it. We have read the article in the London Quarterly with much satisfaction, and would gladly lay it before our readers *in extenso* did our limits permit; but, on account of its length, we must content ourselves with the presentation of the extracts which follow:

* * * * *

The first great epoch of modern agricultural improvement began with Lord Townshend, who demonstrated the truth embodied in the adage,

'He who marls sand
May buy the land,'

showed the value of the turnip, and, as we presume, must have been a patron of the four-course system, which had its rise in Norfolk about the same time. The second epoch was that of Bakewell, whose principles of stock-breeding have ever since continued to raise, year by year, the average value of our meat producing animals. The third epoch dates from the exertions of such men as the Duke of Bedford and Coke of Holkham, the latter of whom, combining usages which had been very partially acted upon, brought into favour drilled turnip husbandry, carried all the branches of farming as far as was permitted by the knowledge of his time, and did the inestimable sevice of inoculating hundreds of landlords and tenants with his own views. The fourth epoch, if we were to take each advance from its earliest dawn, would comprise the various dates of the opening of the first railroad, the importation of the first cargo of guano, the publication of Liebig's first edition of the 'Chemistry of Agriculture,' and the deep draining of the Bonesetter's field on Chat Moss; but in general terms it may be said to date from the first meeting of the Royal Agricultural Society at Oxford in 1839, when farmers began to be familiarized with men of science, and men of science learned not to despise agricultural experience. This last era is almost the birth of yesterday, and already, as compared with any former period, the results read more like a page from the Arabian Nights than like a chapter in the history of agricultural progress. Deep drainage, artificial manures, artificial food, improved implements, and railroad conveyance, have been the leading means by which the change has been wrought. Deep drainage has brought into play the unexhausted fertility of our strong clays: portable manures and purchased food have increased the crops on land of every degree. Mangold and swedes have been made to flourish on stiff soils, and cereals on sieve-like sands. Downs have been transformed from bare pastures to heavy root and rich grain-bearing fields. The visitors to Salisbury Plain at the agricultural show of 1857 were surprised to find a large part of it converted into productive corn-land—a change which has been almost entirely effected within the last twenty years. The scientific mechanic has provided the tools and machinery for breaking up and pulverizing the ground, for sowing the seed, for gathering the crops, for preparing it for market, for crushing or cutting the food for the stock, with an ease, a quickness, and a perfection unknown

before. The railroad is the connecting medium which maintains the vast circulation, conveying the agencies of production to the farmer, and the produce of the farmer to the market. The steam-cultivator is, perhaps, about to be added to the triumphs of mechanism, and then will be realized the expression in the fine lines of Mr. Thackeray on the Great Exhibition of 1851—an expression which was premature if it was intended to be historic, but which we hope, and almost believe, will prove to be prophetic.

'Look yonder where the engines toil;
These England's arms of conquest are,
The trophies of her bloodless war;
Brave weapons these.
Victorious over wave and soil,
With these she sails, she weaves, she *tills*,
Pierces the everlasting hills
And spans the seas.'

The spirit of the old agriculture and the new are diametrically opposite—that of the old agriculture was to be stationary, that of the new is to progress. When Young made his tour through the east of England in 1771, he remarks as a peculiarity that the turnip cabbage of a Mr. Reynolds, which had a special superiority, was gradually adopted by his neighbours—'a circumstance,' he adds, 'that would not happen in many counties.' His works are, in fact, a narrative of individual enterprise and general stupidity. A Mr. Cooper who went into Dorsetshire from Norfolk could only get his turnips hoed by working himself year after year with his labourers, and refusing to be tired out by their deliberate awkwardness for the purpose of defeating his design. After he had continued the practice for twenty years, and all the surrounding farmers had witnessed the vast benefits to be derived from it, not a single one of them had begun to imitate him. Mr. Cooper, with two horses abreast, and no driver, ploughed an acre of land where his neighbours with four horses and a driver ploughed only three-quarters of an acre. Yet not a labourer would touch this unclean implement, as they seemed to think it, and no farmer, with such an example perpetually before his eyes, chose to save on each plough the wages of a man, the keep of two horses, and the extra expenditure incurred by the diminished amount of work performed in the day. No longer ago than 1835, Sir Robert Peel presented a Farmers' Club at Tamworth with two iron ploughs of the best construction. On his next visit the old ploughs with the wooden mould-boards were again at work, 'Sir,' said a member of the club, 'we tried the iron, and we be all of one mind that they made the weeds grow.' On Young recommending the Dorsetshire agriculturists to fold their ewes in the winter they treated the idea with contempt; and on pressing them for their reasons, they replied, 'that the flock, in rushing out of the fold, would tread down the lambs,' though no such accident had ever been heard of, 'and that the lambs would not be able to find their dams in a large fold,' though certainly, says Young, 'a lamb in Dorsetshire has as much sense as a lamb elsewhere.' Whether the method had been beneficial or not, the grounds for rejecting it were equally absurd. Of two neighbouring counties one was sometimes a century behind the other. A lazy desire to creep with sluggish monotony along an established path, and a feeling of impatience at being pushed into a novel track, helped to maintain hereditary prejudices, and tenants invented fanciful excuses for not doing what was plainly advantageous to be done, because they preferred present sloth to future profit. They were like a man who had lain upon one side till he shrunk from the trouble of turning over to the other, though when the process was performed the new posture might be easier than the old. But once roused and put in motion, and the inherent reluctance to stir being overcome, the gain in interest as well as in pocket was felt to be great. He who has profited by one innovation is ready to try another, and his pride and his pleasure is to improve where his fathers gloried in resisting improvement. There are still large districts of England which have yet to be converted to a rational system of agriculture—landlords who are ignorant of the principles of management which attract or create intelligent tenants—and tenants who are ignorant of the methods by which the land is made to double its increase. But the wave of agricultural progress has acquired irresistible might, and they must mount it or it will sweep them away. The best thing which can be done for these laggards in the race is to persuade them to take an agricultural newspaper, to get

them to consult the commercial travellers who collect orders for the manufacturers of artificial manures, to talk them into replenishing their worn-out implements from the mart of the great makers, to prevail on them to visit the annual shows of the Royal Agricultural Society, to throw them, in short, in the way of seeing the products of advanced husbandry, and of hearing the ideas of enlightened cultivators. By some or all of these means they may be put upon the high-road to improvement, and when they have gone an inch there is little fear, unless they are afflicted by a hopeless incapacity, that they will refuse to go the ell. He who lives within the diameter of a little circle has ideas as narrow as his horizon, but the influence of numbers and skill together is irresistible, and no impersonation of ignorance or bigotry has probably ever visited a single great agricultural exhibition without returning a wiser and a better farmer.

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If it be asked what has been practically gained within the last twenty years by the investigations of the agricultural chemist, we would answer, *certainty*. We knew years ago that farmyard manure was excellent; by the light of chemical science we learn why it is 'perfect universal manure,' we learn how to manufacture and employ it best, and we learn why on clay soils it may be safely, nay advantageously, left for weeks on the surface before being ploughed in. Chemical science again teaches us why lime, which is not an active manure, although valuable as a destroyer of elements hostile to fertility, produces great effect for a series of years, and then not unfrequently ceases to show any profitable results; it teaches us to what crops guano, to what superphosphate of lime, to what farmyard manure may be most profitably applied, and when a mixture of all three. Chemistry settles the comparative value of linseed cake, cotton cake, and karob beans; shows when pulse should be used for fattening pigs, and how to compound a mixture of Indian corn and bean-meal which shall produce fat bacon neither hard nor wasteful. The conclusions of science were previously known empirically to a few, but their range was limited and their application accidental. They have been reduced to order and rendered universally available for the use of plain farmers by the investigations of men like Lawes and Voelcker. As the latter observes, 'there are too many modifying influences of soil, climate, season, &c., to enable us to establish any invariable laws for the guidance of the husbandman;' but the more we can trace effects to their causes and ascertain the mode in which nature operates, the nearer we are to fixed principles and a sure rule of practice.

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[Description of Three Farms in different *districts of England, one consisting of light self-drained land, another of clay, sand and good pasture, and the third of stiff clay.*]

To give some idea of the modern system of English agriculture, we subjoin a brief description of three farms in three different districts of England—the first, a light land self-drained; the second, clay, sand, and good pasture; the third, stiff clay; and all cultivated by tenants who have not expended money to purchase glory, but who have invested capital in order to earn a profit.

Mr. John Hudson, whose name is familiar to all English, and many French and German, agriculturists, began farming half a century ago. In 1822 he entered upon his now celebrated farm of Castle Acre, which consists of self-drained land, and is a fair specimen of the Norfolk light soil. At that period the only portable manure was rape-cake, which cost about $65 a ton, and did not produce any visible effect upon the crops for a month. The whole live-stock consisted of 200 sheep and 40 cattle of the old Norfolk breed. He adopted what was then the new, now the old, and what is perhaps destined to become the obsolete four-course Norfolk system—that is to say, 250 acres pasture, 300 wheat, 300 barley; or, in dear years, 600 wheat, 300 roots, and 300 seeds, the rest being gardens and coverts. On these 1200 acres he at present maintains 10 dairy cows, 36 cart-horses, a flock of 400 breeding ewes, and fattens and sells 250 Short-horns, Herefords, Devons, or Scots, and 3000 Down sheep. The crops of swedes average from 25 to 30 tons, the mangold-wurzel from 30 to 35 tons per acre. His wheat had,, in 1855, averaged, for the previous five years, 48 bushels per acre; the barley 56 bushels. Of the seeds, the clover is mowed for hay, the trefoil and white clover

are fed down by sheep, and there are no bare fallows. The purchased food given to the cattle in the straw-yard and sheds, and to the sheep in the field, consisting of oilcake, meal, and beans, cost 2000*l.* a-year. The greater part of this oil-cake is charged to manure, which it enriches in quality as well as increases in quantity; but the direct expenditure on artificial manures—guano, nitrate of soda, and superphosphate of lime—amounts in addition to 1000*l.* a-year. Wages absorb from 2600*l.* to 3000*l.* a year. Seven or eight waggon-loads per acre of farmyard-manure are ploughed in on land intended for roots, besides above 30*s.* worth per acre of superphosphate of lime drilled in with the turnip-seed; while wheat has a top-dressing of 1 cwt. of guano, ½ cwt. of nitrate of soda, and 2 cwt. of salt, mixed with earth and ashes. No weeds are grown. The turnips are taken up in November, and a troop, called by the vile name of a 'gang,' consisting of 'boys and girls,' under the care of an experienced man, traverse the ground, forking out and burning every particle of twitch or thistle. The same 'troop' is called in during the progress of the root-crop whenever occasion requires, and immediately after harvest they go over the stubbles with their little three-pronged forks, exterminating the slightest vestige of a weed. The expenses of cleaning are thus kept down to 1*s.* an acre, a price which excited the admiration and doubts of that admirable agricultural essayist the late Mr. Thomas Gisborne, and which proves that, by stopping the evil at the source, and never allowing the enemy to get ahead, land may be kept wholly weeded more cheaply than half weeded. Lord Berners mentioned as recently as 1855 that he found in Leicestershire hundreds of acres netted over with twitch as thick as a Lifeguardsman's cane, and studded with clumps of thistles like bushes. Such neglected land required an expenditure of 5*l.* to 6*l.* an acre to put it in heart. The farmer who saw a thief daily stealing from his dung-heap would soon call in the aid of the policeman. The weeds are an army of scattered thieves, and, if the pilferings of each are small in amount, the aggregate is immense. The wise and thrifty farmer, therefore, keeps his constabulary to take up the offender, and consign him as quickly as possible to death. He who allows himself to be daily robbed of his crop, and the community to the same extent of food, and all the while looks helplessly on, is not only a bad farmer, but in effect, though not in design, a bad citizen also.

Mr. J. Thomas, of Lidlington Park, our second example, farms about 800 acres of a mixed character under the Duke of Bedford, of whom it is the highest praise to say that he is a landlord worthy of such tenants, consisting in part of clay, which has been rendered profitable for arable cultivation by deep drainage, and in part of what is locally called sand, which has been reduced from rabbit-warrens to corn-fields by the Norfolk system. This intelligent cultivator read a paper some time since to the Central Farmers' Club, in which he stated, with the assent of his tenant audience, that, under very high farming, it was not only possible but advisable to reduce the fertility of the soil by the more frequent growth of grain—as, for instance, by taking barley after wheat, and returning to the once fatal system of two white crops in succession. He said that, under the four or five-course he began to find his 'turnips subject to strange, inexplicable diseases; his barley (where a large crop of swedes had been fed on the ground by sheep, with the addition of cake or corn) laid flat on the ground by its own weight, and in a wet harvest sprouted, thus rendering the grain unfit for the maltster, the straw valueless as fodder, while the young clover was stifled and killed by the lodgment of the barley crop.' Thus, while Roman agriculturists, with all their garden-like care, were tormented by a decreasing produce on an exhausted soil, we, after ages of cropping, have arrived at the point of an over-abundant fertility—an evil to be cured, not by any fixed rule, but 'by permitting the diligent and intelligent tenant-farmer a freer exercise of judgment.' In this speaker we have another specimen of the invaluable class of men by whom, during the last ten years, on tens of thousands of acres, the produce of meat and corn has been doubled.

At Lidlington, where there is strong clay to deal with, and more good grass-land than exists at Castle Acre, it is not necessary to purchase so much food to keep live-stock for manure. But there are about one hundred and fifty beasts and one thousand sheep sold fat, besides a

choice breeding-flock of four hundred Downs, the result of twenty years' care. By these sheep the light land is consolidated and enriched. If they are store sheep they are allowed to gnaw the turnips on the ground for part of the year; if they are young and to be fattened for market, the turnips are drawn, topped, tailed, and sliced by a boy with a portable machine. Thus feeding by day and penned successively over every part of the field at night, they fertilise and compress, as effectually as any roller, the light-blowing sand, and prepare soil which would scarcely feed a family of rabbits for luxuriant corn-crops. The cattle, consisting of two-year-old Devons, Herefords, or short-horns, or three-year-old Scots or Anglesea runts, purchased at fairs according to the supply and market-price, in spring or summer, are run on the inferior pasture until winter, then taken into the yards or stalls, fed with hay, swedes, mangolds, ground cake, linseed or barley meal, and allowed an unlimited supply of clean water. When the spring comes round they are put on the best grass, and sent off to market as fast as they become ripe, having left behind them a store of manure, which is the capital from which everything else must spring.

Ten years ago four miles of rough bark fences were cleared away on the clay half of this farm, and replaced by single rows of blackthorn, dividing the fields into square lots of forty or fifty acres. Under the old system two hundred acres were poor pasture; now under the rotation system the strong clay feeds four times as much live-stock as before, and bears wheat at least twice in six years. According to the latest experience, the most profitable system in its present light condition would be, to devote the farmyard dung to growing clover, to eat down the clover with folded sheep, and then to use the ground fertilized by the roots of the clover, without home-made manure, for cereal crops, assisted by a top-dressing of guano, to be followed by roots nourished with superphosphate of lime. Good implements come in aid of good methods of cultivation. Mr. Thomas has eight or nine of Howard's iron ploughs—both light and heavy—iron harrows to match the ploughs, a cultivator to stir the earth, a grubber to gather weeds, half a dozen drills, manure distributors, and horse-hoes, a clod-crusher, a heavy stone-roller, a haymaking-machine, and horse-rakes. Reaping-machines are to follow. To deal with the crops, a fixed steam-engine, under the care of a plough-boy, puts in motion the compendious barn machinery we have already described, which threshes, dresses, and divides the corn according to its quality, and raises the straw into the loft, and the grain into the granary, besides working a chaff-cutter, a bean-splitter, a cake-crusher, and stones for grinding corn or linseed. With machinery no large barn is required in the English climate; the corn can remain in the rick until required for market. About twenty men and thirty trained boys, under an aged chief, are constantly employed.

No land is here lost by unnecessary fences; no food is wasted on ill-bred live-stock; no fertility is consumed by weeds; no time or labour is thrown away. One crop prepares the way for another, and the wheeled plough, under the charge of a man or boy, follows quick upon the footsteps of the reaper. The sheep stock is kept up to perfection of form by retaining only the best-shaped ewe-lambs, and hiring or buying the best South-down rams. The profit of keeping first-class stock was proved at the Christmas market of 1856, when twenty-five pure Down shearlings, of twenty months old, which were sold by auction at Hitchin, made an average of 4*l.* 8*s.* each, being nearly double the usual weight. The large produce, whether in corn or meat, is the result of a system the very converse of that practised by the Belgian peasant proprietor, or French metayer, whose main object is to feed his family, and avoid every possible payment in cash. As for laying out sixpence on manure, or cattle food for making manure, no such notion ever crosses the minds of those industrious, hard-living peasants, and the diminution in the means of subsistence in consequence is almost past calculation. He who puts most into the land, and gets most out of it, is the true farmer. The bad cultivator gives little, and receives accordingly.

When the Central Farmers' Club discussed the advantage of returning to the plan of more frequent corn crops, which before the days of artificial manures was found to be utterly ruinous, the then chairman said that he 'had for several years

taken a crop of wheat every other year; and that on such soil as that of his farm, as long as he manured accordingly, he considered that he was not using the land (one-half of which is his own freehold) unfairly.' This Weald of Sussex farm shall be our third example; and we adduce it to show what may be done with the most intractable class of retentive soils. A few years ago it was divided into enclosures of from four to eight acres each by broad hedge-rows, many of them with ditches on both sides. It was among the evils of these small enclosures that they facilitated the old make-shift plan of draining by surface furrows to shallow sub-drains of bushes, because the water had not far to run. A partial cure postpones completer remedies. In the numerous hedges, according to the custom of the country, the landlord grew oak timber and the tenant underwood for fuel and for mending fences. Before railways had made coal cheaper than hedgerow cuttings, the labourers were employed in fine weather during the winter in trimming the hedges, and clearing out furrows and ditches; in wet weather they retreated to a large barn and threshed out wheat or oats with a flail, in a damp atmosphere the most unfavourable for the condition of the corn, and a time of the year most convenient for pilfering it. The usual course of cropping was—1, fallow; 2, wheat; 3, oats; 4, seeds. The seed crops were fed until the beginning of June with all the stock of the farm, and then broken up for a bare fallow with a wooden turnwrist plough. The crops were about twenty bushels of wheat per acre once in four years, about forty-eight bushels of oats the year following, and hay and seeds in the third year. The stock consisted of about twenty-five cows, and ten young beasts, which were sold half-fat. The horses ploughed four at a time in a line, and were usually the plumpest animals on farm. Sheep there were none, nor was it believed possible to keep them without Down feed. Lime was the only manure purchased, and hay the only winter food. The present owner and farmer of Ockley Manor, after travelling through England to study the best specimen of modern tenant-farming, began by reducing a hundred enclosures to twenty, and by borrowing enough money from the public loan to drain the whole of his clays, the stiffest imaginable, three feet six inches deep. He would have preferred four feet deep, but the expense lopped off six inches. This indispensable preliminary process enables him to grow roots and keep a large stock of Southdown sheep on his clovers and seeds, with plenty of cake, running them on the land almost all the year round. To assist in disintegrating the drained clay he avails himself of 'Warne's box-feeding' system, manufacturing a large quantity of long straw-dung, which, when ploughed in, exercises a mechanical as well as a fertilizing effect.

There are three modes of feeding cattle in use—open yards, stalls, and boxes. Well-built yards are surrounded by sheds for shelter, the open space is dish-shaped, thinly sprinkled with earth, and thickly covered with straw, which is renewed from time to time as the cattle trample it into manure. The roofs of all the surrounding buildings are provided with gutters, and the rain is carried into underground drains. The liquid manure is pumped back upon the prepared dung-heaps. These yards are attached to all root-feeding farms, and by their appearance and the quality of the cattle fed in them a fair opinion may be formed of the management of the tenant. In stalls the cattle are tied by the head under cover, with more or less straw under them according to the proportion of arable land. On the 'box system' each beast is penned in a separate compartment under cover, and supplied from day to day with just as much straw as will cover the solids and absorb the liquid dung. By the time the beast is fat his cell is full of solid well fermented manure, of the most valuable description for clay land. The cattle, whether in yards, stables, or boxes, and all are often to be found on the same farm, ought to be bountifully fed with sliced or pulped roots mixed with chaff, hay, oil-cake, linseed, or corn. The extra buildings make boxes the most expensive plan, but in no way do the animals thrive better, and where there is an ample supply of straw it is the most advantageous method of manufacturing manure. Box-feeding affords one more instance of the antiquity of many modern agricultural practices. In Sir John Sinclair's 'Statistical Survey of Scotland,' published 1795, we read that in the Shetland Island of Unst, 'The method of preserving manure is by leav-

ing it to accumulate in the beast-house under the cattle, mixed with layers of grass and short heather, till the beasts cannot enter. When the house is full the dung is spread over the fields.' Doubtless the islanders of Unst found, in their damp climate, that dung collected out of doors lost all its fertilizing value. At Ockley farm, with the assistance of the grass-land, from one hundred to one hundred and twenty of the best class of Sussex, or Devons, or Scots, are fattened every year in boxes, built cheaply enough of the timber from the condemned hedgerows, interlaced with furze and plastered with Sussex mud. Though not very sumptuous externally, they are warm and well ventilated. Twenty Alderney cows eat up what the fat cattle leave on the pastures (each cow being tethered), and supply first-class butter for Brighton—a market which requires the best description of farm produce. In manufacturing districts quantity pays the grazier or dairyman the best, in fashionable quarters quality. Eight hundred fat Down sheep and lambs, and about eighty pigs, which are sold off cheaply in the shape of what is popularly called 'dairy-fed pork,' complete the animal results on this Weald of Sussex farm.

On four hundred and fifty acres devoted to arable cultivation wheat is grown every alternate year, at the rate of from forty to forty-eight bushels per acre. The sheep and lambs, which get fat on the clover or other seeds, assisted by cake, prepare the soil for the alternate corn crops, and have doubled the original produce. The roots fatten the cattle in boxes, and, while they are growing ripe for the butcher, they manufacture the long straw manure, which both enriches the tenacious soil, and by its fermentation assists to break it up. Space, light, and air have been gained by clearing away huge fences, which, besides their other evils, harboured hundreds of corn-consuming vermin. By these and such-like methods, all novelties in Sussex, the produce of the farm has in ten years been trebled, and the condition of the soil incalculably improved; and all would have been vain, and much of it impossible, without the adoption of deep, thorough gridiron drainage. This has done in the Weald of Sussex clay what sheep-feeding and drill-husbandry did for the warrens of Norfolk, the sands of Bedford, and the Downs of Wiltshire and Dorsetshire. The result, however, is not so satisfactory in a profitable point of view as in light land counties, because, as Talpa has shown in his 'Annals of a Clay Farm,' it is almost impossible on a retentive soil, with any paying number of horses, to get through more than one-third of the ploughing before winter sets in, with its rain and snow. The cultivators of the farms which from their natural fertility in dry seasons were in favour for centuries, while what are now our finest corn-growing districts were Moorland deserts, are often beaten by time, prevented as they are by the wet from getting on the land, and obliged to work slowly with three or four horses. Yet on autumnal cultivation depends the security of the root-crops—and the root-crops are like the agricultural 'Tortoise' of Indian mythology, the basis on which rests the rent-paying corn crop. Much, therefore, as deep drainage has done for advanced farmers, on retentive clays, it has not done enough, and they look anxiously forward for the time when a perfect *steam cultivator* will make them independent of animal power, and enable them, if needful, to work night as well as day during every hour of dry weather.

Sugar—Theory of High Prices.

The high prices which have ruled for sugar in the last few years have developed some singular circumstances in relation to production. It seems to have been the case, judging from the results in the countries of largest consumption—United States, Great Britain, and France—that the usual influence of high prices in diminishing production, has not been felt in sugar, since the consumption has been rather increased than otherwise. Thus 1852 was the low year for sugar, New Orleans (in New York) averaging then $4.84, and Havana brown $5.75. Prices continued to rise, with some fluctuations, all over the world, until 1857 New Orleans sugar in New York was $9.04, and Havana $9.69. These prices indicate the rise all over the world, nevertheless, the consumption of cane sugar in the three countries named was in 1852, 707,000, and in 1857 it was 802,000. Thus, at prices nearly doubled the consumption was greater, apparently, though an immense

fall has since taken place, involving much loss and heavy failure in the trade all over the world. The value of the sugar consumed in the three countries in 1852, was $77,000,000, and in 1857 $160,000,000. This fact is at variance with the theory that high prices diminish consumption. They do so, no doubt, in some degree, but the mere advance in the figures for the sale of an article does not really constitute a higher price—the real price consists in the relative ability of the buyers. In a time of activity of trade and improved general business, the ability of all consumers to purchase necessaries and comforts is greater, and they do so if the price is higher than it formerly was. In the case of sugar, which is always an accompaniment to other articles, the demand for it depends upon those other articles. The Island of Cuba is the largest consuming country in the world, because its natural and spontaneous supply of fruit is immense, and sugar added to these for preserves becomes an important item of food. So in the Northern United States, the consumption of sugar depends very much upon the supply of fruits, peaches, strawberries, &c., for which it is the custom of every family to preserve quantities every year. When these are abundant and cheap, the price of the sugar is far less an object than when they are scarce and dear. Thus, a basket of peaches weighs about 50 lbs., which will be reduced to 20 lbs. when ready for the sugar, which is used pound for pound. In some years a basket of peaches can be had for 50c.; in others $5 are given. If sugar is 5c. and peaches are 50c., the 20 lbs. of preserves will cost 50c. for the former and $1 for the latter. At the higher prices for the peaches the cost will be $5 for the fruit and $1 for the sugar, but when the fruit is dear the sugar is obviously likely to be cheap, and the reverse. It follows that the condition of the fruit crop has an important relation to the consumption of sugar, whatever may be its price. The use of coffee or tea, in greater or less quantities, has also a great influence, and not a less important one is the use of that article in drinks of wine or spirits, all of which are affected by other causes than the price of sugar. It follows that the extended use of any and all of these articles throughout Europe and America, makes rapid demands upon the supply of sugar. In Germany, in particular, where until very recently the use of sugar was hardly known among the masses of the people, the custom was, instead of putting sugar in the drinks, to hold a piece of hard candy in the mouth while drinking. With the improved condition of the people, this habit changes to the American custom. The use of sour salads and sauces in Germany in some degree supplied the want of sweets, and the custom is changing. The whole consumption is, therefore, rapidly outrunning the supply of cane sugar, of which the production is everywhere closely restricted by the want of labour. In all sugar-raising countries the cry goes up for labour. The British West Indies have been confessedly ruined for the want of it. The demand for it in Cuba has fed the slave trade in spite of all efforts to restrain it. A rise in the value of a hhd. of sugar is always an extra premium for a hand. The Brazils have almost abandoned sugar raising for want of hands. The Mauritius and Reunion lost large quantities of cane last year, because there were no hands to harvest. In Louisiana the effect of the same cause is self-evident. The use of beet-root sugar is not amenable to the same difficulties. It is as good a paying crop as the farmer can have, and is not restricted for want of labour. Sorghum will not produce sugar profitably, but it will distill to greater profit than beet-root, leaving that article free for sugar making. Chemistry is, however, busy with a new effort at transmutation, with much promise of success. The famous chemist, M. Braconnet, of Nancy, has succeeded by the help of sulphuric acid in transmuting certain woods, straw, hemp, and flax, into sugar, pound for pound, but not of a quality that will granulate. There is every hope from what has been done that science may yet enable a housekeeper to fill his sugar bowl from his old straw beds, and convert the baskets in which fruit has been kept into sugar to preserve them!

U. S. Economist.

A large number of American oaks have been planted on the Quai de Tuileries, Paris, and are flourishing.

From the British Farmers' Magazine.

Vegetable Physiology.

Professor Henfrey of King's College, London, delivered before the WEEKLY COUNCIL of the *Royal Agricultural Society of England* the following lecture on Vegetable Physiology, in reference to the kinds, races, and organs of plants:

Mr. President and Gentlemen:

In preparing to execute the task with which you have honored me, I felt considerable difficulty from the peculiar circumstances of the case. The occasional lectures which have been delivered in this room have been for the most part given with a view to promote practical agriculture, and they have had a more peculiar interest here from the circumstance that these experiments have generally been undertaken at the instigation of the Society. Now, scientific men, called upon at short notice, are not always in a position to furnish new facts or new conclusions, or to bring forward series of researches which are capable of practical application. In my own case, my recent work has been devoted especially to subjects whose application to science, or whose relation to science is at present remote, and in fact to subjects which are so abstract that they scarcely admit of popular treatment: I was therefore thrown more on the general subject. Here again a certain difficulty met me in the circumstance that vegetable physiology may be said to be still in its infancy. Hence it is in possession only of a few well-established generalizations, and these are too well known and too commonplace to form the subject of a lecture; while the objects of its present activity consist chiefly of questions still in a state of debate, overloaded with unclassed, unsatisfactory, and even contradictory evidence, the attempt to discuss which could only have led to a kind of controversial thesis. It appeared to me, therefore, better, especially in consideration of circumstances to which I shall presently allude, to occupy your time with a few illustrations of the nature and objects of the science of vegetable physiology itself, selecting these illustrations, as far as possible, from departments of the subject which either do at present or hereafter may admit of a practical application. The circumstance to which I have just alluded as especially influencing me in the tendenc or the direction of agricultural physiolog of late years—the tendency which rath leaves vegetable physiology, properly s called, in the back-ground. If we loc back for a few years at the literature agricultural science, we find that th works which have made most impressio those which have been most valuable, an are best known, have been written b chemists. I need scarcely allude to th works of Liebig and Mulder; even in th writings of Boussingault, and of Law and Gilbert, vegetable physiology, prope ly so called, has been recognised; still th vital qualities of plants have been rathe looked upon as secondary consideration than as primary. The chemistry of th subject has been that which has principa ly occupied attention. Far from com plaining of this, far from regarding it as mistake, I regard it as desirable, inevita ble, if we would make secure progress because vegetable physiology does reall depend upon chemistry for some of it most important materials. Vegetable phy siology is not merely organic chemistry but organic chemistry is required to ad vance to a certain degree of perfection before we have the material upon whic vegetable physiology, properly so called can work. It is hardly necessary to re mind you of the views which have bee entertained by those who have presse the chemical theory of physiology too far with the notion that the life of plants o animals consisted merely in a successio of chemical changes. Such a view ca only be entertained by those who take a extremely one-sided view of the subject The old illustration of the duck's egg an the hen's egg are sufficient to show tha there is something more than chemistry in the difference of species, and the same argument may be carried throughout al the details of life, throughout the whole phenomena of organization. Chemists will scarcely be able to distinguish, by any means belonging exclusively to the chemist, between the germ of the hen and the duck; but in those germs, undistinguishable from one another, lies the energy which results in the product of a totally different organization. The line of argument thus illustrated shows at once that we must, in order to cultivate vegetable physiology, advance a step beyond the

mere examination of chemical conditions and changes, and take into account the phenomena of life. The phenomena of life as regards plants may be called the phenomena of organization—that is, the phenomena presented by the conversion of mineral or dead matter into organs.—Now, the difference between organs and substances—those parts or constituents which distinguish live things from mineral or dead substances—lies in the circumstance, that while in substances we have what we may call merely qualities, in the organs we have what are called functions. The qualities are, as it were, passive characteristics; and functions are active characteristics—manifestations of constant, or at all events, periodical activity, in the presence or manifestations of which we distinguish the force which we call the vital force. This continued activity, more or less independent of external causes resulting in continued or periodical change, is the sign of the existence of this vital force—that force whose laws form the subject of vegetable physiology. The collective functions of a plant or animal constitute its life. I will now confine myself to the consideration of the life of plants, consisting in the performance of their collective functions by the different organs. Now, these functions collectively constituting the life, exhibit what we call the constitution. When we say that a plant has a particular constitution, we mean that it performs its functions in a particular way. It is to the examination of the constitution not only of plants, but of the organs or parts of plants, to which vegetable physiology has especially to direct its attention; and I wish to-day briefly to indicate some points of importance in regard to this subject—the constitution of plants or their organs.

In the first place, I would direct attention to the phenomena illustrating the existence of constitutions in species or kinds of plants. The phenomena which prove these are familiar to every one. Every one knows, for example, that Chickweed flowers in the winter season, when the great proportion of the plants growing in this country are unable not only to form a flower or seed, but even to put forth their leaves. The irritability (to use a somewhat hypothetical expression) or the vital activity of this plant is evidently very different from that of the majority of plants in this climate; the particular irritability there denotes its constitution; it is the constitution of the plant which causes it to pass through these changes under different conditions from other plants, scarcely distinguishable probably in the majority of their characters. There is nothing known, and probably nothing to be known, in the case of Chickweed, to distinguish it chemically from many other common weeds, but it is the peculiarity of the constitution of that species, that it passes through these changes under different conditions. Abundant illustrations of these peculiarities might be readily furnished, with which it is scarcely worth while to take up your time; for instance, the late flowering of the Ivy in November, the flowering of the Hellebore or Christmas Rose in January, and so on, as contrasted with the summer and autumn flowers, forming the great mass of our native and cultivated vegetation. These peculiarities of constitution are not entirely explicable by the view which has been taken by some authors, that plants are dependent for their growth upon a certain supply of heat given to them.—Some years ago M. Boussingault published some interesting researches, in which he showed that many plants, especially cultivated plants, required a certain sum of heat for their perfect development;—that between the time of the germination of the seed and the ripening of the fruit, or the production of the grain, the plant required to receive a certain amount of heat. He measured this heat by taking the daily mean temperature and multiplying it by the number of days, and he found that the plants received pretty nearly the same amount of heat in very different climates. Where the heat was greater the plant was perfected in a smaller number of days; where the heat was less a greater number of days was required. For instance, in Alsace, where his own property was situated, he found that Barley would be perfected in ninety-two days, where there was an average temperature of 19 deg. of the French thermometer, giving a total of 1,748 deg. He then obtained the Date from Cumbal, situated under the equator, where the plant was grown between June and November, instead of between May and August; the daily temperature was there (it being in the colder

season) between 10 and 11 degrees, and 168 days were required for the perfecting of the plant, giving a total result of 1,797 degs. In many cases the numbers came out very satisfactorily for this hypothesis, showing that the plants required a certain sum of heat, and that that heat might be given in small proportions during a large number of days, or in higher proportions in a small number of days. However, there were many important exceptions to this rule, those depending on certain matters of detail which were overlooked in the first experiments. For instance, Boussingault did not pay attention to the omission of useless heat. Many plants do not move at certain temperatures, even far above the freezing point. No plant, probably, will vegetate or perform any of its vital functions under the freezing point; many require several degrees above freezing point before they begin to start into life. That must be ascertained in each individual plant before we can calculate the useful heat which it receives, as we must omit all degrees below the point at which the plant moves. Then it is important to take into account the temperature of the soil, upon which the development of plants very greatly depends. We have no more striking illustration of that than was furnished by the records of last year, when the temperature of the soil in this country was found far above the average during the later months, the result of which was the flowering and even the ripening of seed in many plants, which very rarely perfect their fruit in this country. Though the consideration of the constitution of many plants may be reduced practically to a consideration of the climate—the supply of heat varying with the length of time during which the plants grow—still there are limits to these conditions. Supposing the calculations to be carried out with the precautions to which I have just referred, there are certain limits beyond which they cannot be admissible.—Over-supplies of heat do not produce the same results in a shorter time, but produce disease; and cold below a certain tempeture will prevent the performance of the vital functions at all. It is well known that in the Feroe islands and in Iceland the amount of heat is never sufficient to produce the ripening of the seed of grain, even though the vegetation of the plant be prolonged to a much greater extent than in this climate; there is not a sufficient stimulus ever given to the plant, so that the natives are obliged to import their seed, though they grow the grain year after year. Again, we may note the information furnished by travellers in regard to vegetation on the island of Madeira.—There, in the season when the mean temperature approaches that of our own summer, our Beech looses its leaves and remains without them for 149 days; the Oak remains without its leaves 110 days, the Vine 157 days. The Vine again affords an example of the noxious results of excessive heat, because in climates near the equator the plant scarcely produces fruit, or only fruit of a very imperfect character, running away to vegetation, and losing those qualities for which it is most valued. The constitution of particular kinds of plants is a subject of great importance both to the agriculturist and the horticulturist, and its practical influence has strongly attracted attention in those valuable experiments which have been carried on at Rothamsted by Messrs. Lawes and Gilbert. There they have found most important differences, not only between such plants as Turnips and Grain crops, but also differences of constitution between Barley and Wheat—plants belonging to the same natural families, and differing (scientifically speaking) only in slight peculiarities from each other.

We cannot doubt the existence of this peculiar constitution in species of plants. But going a step beyond this, we find that individual plants have their constitutions, and the result of this variation within the limits of particular species is to produce plants having characters considerably different from each other, and yet referable all to the same specific type. Species of plants are subject to variations according to external conditions, variations which not only affect their structure, but declare themselves in a difference in constitution. Some of these differences of constitution are transmissible, as also the differences in the details of the minor parts of their organization. The preservation of peculiarities of this kind, transmitted through generations, results in the formation of what are called races of plants. When we see a variation of species, a particular modification, falling within the specific

type, which presents desirable qualities in regard to structure or constitution, we endeavour to preserve it, and cultivation is, to a great extent, devoted to the preservation, the continuance and improvement of races established in this way. It is because the constitution of these variations of the original form is favourable that we endeavour to preserve them; and when we have firmly fixed these peculiarities in a series of forms, generation after generation, we have produced a "race." The varieties on which these races are founded may perhaps be attributable, in the first instance, to physical conditions; these conditions may have produced the original modification from which the race takes its character. By this I would not admit, for a moment, that the external conditions may transform one species, properly so called, into another; but every species has a certain range of differences, and external conditions may call out one or other of these modifications under particular circumstances. I think it probable that most variations of particular species may have been produced by external conditions in the first instance; it is true also that the external conditions have great influence in preserving these characters in races; but we find that in old-established races the character is preserved with a certain obstinacy in spite of external conditions, and that the running back or reverting of such races is slow. The races which are cultivated chiefly in this country—races of Wheat, plants belonging to the Cabbage tribe, Turnips, Cauliflower, and so on—are most of them very old, and we have little information as regards their origin. Gardeners prosecute this part of cultivation—the formation of races—very actively; and with florists especially the production and establishment of races is one of the most important departments of their art, being as important to them as the importation and introduction of new species. They obtain these different races by sowing large quantities of seed, selecting the specimens which come up of the form which they require, saving these alone, and repeating the process generation after generation, getting rid of all the forms which are most like the original parent. It has been observed by cultivators that there are certain peculiarities in the product of these successive sowings, which can scarcely be called unexpected, because we see the same thing illustrated in the races of animals and even in the human race. Two general rules are derived by gardeners from the observation of the phenomena presented in this production of races by successive sowings.—The first is that like produces like. They save the seed only of the variation which they wish to preserve, and the probability is that it will produce like. This, however, is by no means certain, as every one knows. The seed of any variety produces a great number of varieties, of which only a part are like the immediate parent. It is found that there is a tendency for several generations to run back to some of the former generations, in contradistinction to the rule that like produces like, and this is called by physiologists *atavism*, or a "taking after" their ancestors. M. Vilmorin, a distinguished Belgian florist, thinks that the best way of breaking this tendency to run back to the ancestral type—to take after their grandfathers or great grandfathers, instead of their fathers—is to select for a number of generations those forms which are least like the original parent; to get the forms as far as possible away from the original type, in the first instance, before proceeding to select the absolute form which is required. After a certain number of generations, however, of course, this atavism will begin to act on the same side as the tendency of like to produce like. If we get a number of generations of the race resembling one another generation after generation, of course the tendency to go back to the ancestors will not tend to alter the plant, because it will have a long line of similar ancestors before it, where it will not find the differences which it did in the original case. From this it follows that the older a race is, the more it is fixed. If a particular form has a long line of similar ancestors, the tendency to run back to the form of its ancestors co-operates with the tendency to be like its immediate parent; both these work to the same end, and the practical deduction is that races recently established have little or no fixity; that the older a race is, the more firmly and surely its peculiarities are fixed. We have illustrations of this in the human race, and amongst the most striking may be mentioned the Jewish race, undoubtedly one

of the most ancient, in which we see fixity so strikingly marked under such very different external conditions. In this second part of my discourse I have directed attention to the importance of physiology in reference to races. The subject of races is one which belongs particularly to physiology as distinguished from organic chemistry; as also does the constitution of species or kinds of plants, of which I have previously spoken.

The third head of my lecture has reference to the constitution of particular organs. No organ, perhaps, is of more interest in this respect, or presents a greater variety of conditions, having relation to practice, than the root. It is very much the case with those who take merely a chemical view of physiology, to regard the root as a kind of absorbing machine, as a process of prolongation of the structure into the soil (serving like the lower part of the wick of a lamp) to absorb the nourishment contained in the soil. Such a view as this is a very partial view of the nature of the root, and leaves out of consideration the most important of its physiological characters. In the first place, roots are very different in their kinds.—We have two kinds of roots among the flowering plants, examples of which occur among commonly cultivated plants. We have roots such as are produced by the turnip, by the bean, and various leguminous plants; and we have roots produced by the different kinds of grass and grain plants, where there is an original difference in the structure, a difference depending on the modes in which they first sprout from their seed. One class produces a large root; the class to which the turnip and bean belong produces a main trunk, a continuation of the lower part of the stem, from which the different absorbing branches are given off as the branches are from the trunk above. In the grass and corn plants there is never any main trunk of that kind produced, but a variable number of fibres or filaments thrown out from the bottom of the stem, as we see from the bottom of a Hyacinth bulb when growing in a glass. The number of these and their vigour depend greatly upon the stimulus applied to the plant at the base of the stem when the roots are sprouting. The number is not fixed in any given plant; it varies to a great extent in proportion to the supply of food furnished to the plant.

But when developed in either of these ways, plants do not all send their roots at once into the soil to absorb the food in the same way. We have ordinary plants growing down into the soil; then we have a large class growing in water; and in addition to these there are others which never make their way into the earth or into the water, but are supplied by the moisture contained in a damp atmosphere. Considerable difference must necessarily exist in the way in which these plants absorb their food; and not only is this the case, but we have plants which do not absorb their food from the soil or from any mineral sources. For example, we do not unfrequently find Clover fields in this country infested by a vegetable parasite, of which the plant before me is a specimen, having brownish withered-looking stalks apparently destitute of leaves (the leaves being represented by scales), and terminating in pale brownish flowers.—These flowers are as perfect as that garden Snapdragon, or the Foxglove, to which they are nearly allied, and they produce seed as perfectly as ordinary plants with proper leaves and well-developed structures. This plant will be seen to be firmly attached to the clover—indeed when the sections are placed under a microscope the two structures are found to be organically connected. The germination of these plants has been observed. When the seeds are sown they sprout in the ordinary way; but if they do not find a plant of the kind upon which they are naturally parasitic, they wither away; if they find a plant of the kind in the neighbourhood they send their slender rootlets into the root of the plant which they are about to infest, and very soon the structures becomes completely grafted, after which the plant derives the whole of its nourishment from the root of the plant which it has attacked. Not only have these plants a particular constitution, but they infest particular species or groups. This small Broom (Orobanche minor) infests Clover, another kind infests Ivy, another kind infests bed-straw; six or eight different species are known to botanists of this country, and many more in foreign countries. This plant is an illustration of a peculiarity in the constitution of roots upon which depends the peculiarity of the entire plant.

It is a plant interesting to agriculturist, not on account of any beneficial results, but on account of the mischief it does. I have also here a specimen of the Dodder (Cuscuta), which has been so mischievous occasionally also in Clover fields, particularly in Norfolk. The plant has flowers like the Convolvulus on a small scale; it belong to the family of the Convolvulaceæ, the same family to which belongs another pest, the Bearbind. This plant forms perfect seeds like the seeds of the Convolvulus, and the flowers are, in all respects, as complete as the flowers of that plant. When the seeds fall to the ground they germinate like ordinary seeds, they stretch out along the ground in a little narrow wire-like process, and if that does not meet with a clover plant it dies; but if it finds the clover plant, it makes its way to it, and the older part of the original root soon withers away. The part of the stem which is attached to the clover produces little papillæ or peg-like processes of a delicate structure, which drive their way into the tissue of the stalk of the clover. The plant derives the whole of its nourishment, after the first early epoch of its growth, from the juices of the plant which it infests; the plants are entirely parasitic. But the modifications of parasitism by means of roots are not exhausted by such plants as broomrapes and dodders; for we have others which are imperfectly parasitic, and which have in this kind of parasitism a distinct constitution. Of these are the weeds often found in pastures, called the Eye-bright, the Yellow-rattles, and some others. I have before me a specimen of a Thesium, a plant also belonging to this class, which is rather rare in this country. The roots at first attach themselves to other plants like the broomrapes. A careful examination shows little suckers or disc-like processes upon the roots; but when the plant obtains a certain degree of vigour it ceases to be parasitic, it ceases to depend upon the nurse, throws up a stem, becomes covered with green leaves, and provides for its own sustenance. The Mistletoe is an example of parasite where the root ceases to exist at a very early stage of growth. When it germinates it produces a rootlet like any other seed. It attaches itself to the branches of the trees it infests by the viscid gummy or mucilaginous matter surrounding the seed. If it falls upon an old branch covered with a corky bark it will germinate, but nothing more; but if it falls upon a young shoot covered merely by a delicate thin rind and sticks there, when it begins to germinate the lower part of the stem spreads out to a kind of disc, and from the centre. This the little rootlet penetrates through the spongy parts beneath the bark, making its way to the cambium, where the new growth of the nurse-plant will take place, so that the seedling is brought exactly to the same condition as a bud when it is grafted on the stock in the ordinary operations of gardening; an organic connection is set up, the tissues become vitally connected, and the plant becomes, as it were, a branch of the nurse-plant, and no longer produces any root structure. Still, though it has no root, unlike the broomrapes to which I have adverted, it does produce green leaves; even its stem becomes green; and it decomposes oxygen; therefore, though it does not absorb its own food, it performs some part of the processes of vegetation, and takes a share in the elaboration of the food. There are interesting cases of peculiar constitution in plants, manifesting themselves in peculiar vital qualities, as they may be fairly called, in the roots. It certainly must be regarded as a vital peculiarity in these plants that they attach themselves in this way not merely to other plants, but to other particular parts and even to particular species of plants.

In preparing this lecture, I have noted down in regard to this subject some facts and conclusions as to the functions of roots generally in reference to the supposed phenomena of choice. The above are illustrations of what may be called in roots a choice of food, and they may be taken as serving, in part, as evidence on the general question. But we must not regard this kind of choice in the same way that we regard choice of food in man, for example. The plant cannot go and seek out what food it pleases, but it has a kind of negative choice. It cannot grow upon food that is unsuitable; it must have that food which is suited for its particular constitution. If the food is indifferent, the plant will not grow, but need not be absolutely injured. If the food is noxious, the plant will be killed by it, but

to grow properly it must have food which is favourable; so that we may say there is a kind of choice, which, as already remarked, is as it were negative. It has the power of refusing to grow unless proper food is supplied. That is the only way in which we can suppose that plants have really a choice. I think this statement is sufficient to explain many of the phenomena which have been brought forward, as tending to prove the existence of choice food in plants. The circumstance that a fair supply of food favourable to the plant exists in the soil is sufficient to account for the plant possessing abundance of that particular substance in its ash, and a greater abundance of that substance in its ash than another plant whose constitution does not require that particular kind of food, and which has been well developed in a different soil. In addition to this refusal to produce organization out of unfit food, we have certain phenomena which are partly chemical and partly physical. The absorption of the root depends to a great extent upon what is called endosmosis—the power of the membrane of the rootlets to draw in fluids and solutions by which the root is surrounded with a certain amount of force, arising in many cases simply from the fact that the fluids within are denser than those without. But decompositions probably take place immediately inside the membrane of the rootlets, and the decompositions may cause differences in the proportional absorption of different constitutions of the soil. That, however, is rather a speculative than an assured point. The greater part of the absorption of liquid food is decidedly a mere physical process. Supposing the food to be favourable and accessible, and supposing the proper conditions to be fulfilled in the different species, the absorption of food is, to a great extent, a mere physical process. It is the result of the action of endosmosis. If you put a solution of gum into a bladder, and place that in water, the gum will attract the water with great energy, so that it will swell out, and if the proportions are suitable, may even burst the bladder. If the pressure is withstood there may be a filtration through the bladder from the tension produced by the excess of absorption. Some experiments have been recently made by the German physiologist, Hofmeister, showing that the endosmosis is the principal cause of the flow of sap upwards into plants. More than 150 years ago Hales showed that such sap flowed out from plants, especially from the vine in spring, with considerable force. His experiments with glass tubes containing mercury showed that cut branches of the vine emitted the sap in spring, at the time of what is called the bleeding of the vines, with such force as to raise a column of mercury equal, in some instances, to an atmosphere. The same observation has been confirmed by other observers; and Brücke has observed that the force depends upon the distance of the branch from the root—for instance, that a branch close to the root would lift 30 inches of mercury, while a branch 15 inches above the root would only lift half that quantity; so that the branches and the stem acted, as it were, like intercommunicating tubes, and the pressure was diminished in proportion to the distance from the roots. Hofmeister has gone further than this, and has shown that the force lies in the roots. By fixing the tubes upon the roots themselves, and in making some experiments on the common herbaceous garden plants, he has found that the same force exists throughout all of them, and throughout all seasons, modified by conditions of humidity of the atmosphere and soil. In one experiment on the common foxglove, a plant a yard high was cut off near the root, and a tube containing mercury, similar to a barometer tube, was fixed upon this; it was found that the force of the sap driven out from the crown of the root by the absorption of water from the surrounding soil would raise a column equal to 20 inches of mercury. Even little seedling peas were found to be capable of forcing up a column of 1 inch of mercury. The structural conditions of the tissue of the root all tend to show that these experiments are worthy of credit; the conditions of the root are exactly those which would favour this endosmosis, and also this driving of the fluids upwards in the long tubes and canals of the woody tissue, when it was filtered out from the absorbing cells by the tension produced by excessive absorption. In these experiments a most important difference in the pressure was found to result from the amount of evaporation going on in the leaves

above. Where the evaporation was very rapid the pressure was removed, and thus no tension or gorging of the vessels or soils could result. This evaporation is important as connected with the influence of excessive vegetation in modifying the condition of roots. It is well known—it is shown by the experiments, I think, of most cultivators—that excessive development of the foliage is unfavourable to the development to the roots of plants in the first instance. We have not only to consider the different direction of the energy of the plant, and the tendency of the growth of the foliage itself, but I think the rapid evaporation from the leaves may cause too quick a flow of the sap through the structure, and prevent that elaboration which is necessary from taking place in the roots. I think all our observations hitherto tend to show that a certain amount of elaboration does take place in the roots themselves, and if there is too rapid a flow of the nutriment absorbed by the roots towards the upper part of the plant, there is not a sufficient supply of elaborated nourishment in the roots, and we get too crude a condition of sap in the upper part. In the cases of plants cultivated for their flowers, we see excessive luxuriance of foliage producing an indisposition to flower and a throwing back of the whole growth. The same thing occurs wherever we promote too great luxuriance of foliage in grain plants, as when we stimulate wheat by excess of nitrogenous manures. There is too great a development of vegetative structure, and the same supply of climatal agency (heat, light) is incapable of thoroughly ripening the seeds. We see the same in garden plants, where too rich a soil prevents the plants from flowering. Almost any common weeds if transplanted in a garden will run away and produce leaves, and perhaps flowers, but the seeds will scarcely ripen; and even with cultivated plants it is a common practice among gardeners to prune the roots, to cut off the supplies of nourishment, especially by withholding water, and thus cause the plant to turn upon itself as it were, and elaborate its food rather than devote it to the production of new tissues.

The absorption of food by the roots is concerned not only with water, but with the most important of the materials out of which vegetable structure is formed, namely, nitrogen. There is little doubt that the greater part of the nitrogen contained in plants is absorbed by their roots. All experiments tend in this direction. When I say that nitrogen is the most important of the substances absorbed by plants, that is the conclusion derived from both chemical and anatomical investigations into the structure of plants. I may direct attention to a paper I published in the last part of the Society's Journal for evidence of the importance of nitrogenous substances, not only in the development of the tissues, but in the formation of the secretions or elaborated substances. Not only does the examination of the structures show this, but experiments with manures also thoroughly prove it. That nitrogen in excess will do mischief I have already stated, because it will produce excessive growth and prevent proper elaboration; but a certain amount of nitrogen is necessary in order to convert what may be called the wild plant into a tame one, to produce that full development of structure which we consider necessary to the perfection of the plant. The cultivated plant has all its favourable characters more fully developed than the wild plant through this more abundant supply of food, and the most important of the stimuli in this food is undoubtedly nitrogen. The recent experiments of M. Boussingault on the growth of plants with or without nitrogen, and with and without phosphate of lime in combination, are very interesting in this respect. He grew sunflowers—1st, in a mixture of pounded brick and sand, carefully purified: 2nd, in the same mixture with nitrate of potash and phosphate of lime added; and 3rd, in the same brick and sand mixture with carbonate of potash and phosphate of lime (thus giving the alkali and keeping out the nitrogenous substances). The plants grown in brick-dust and sand, after struggling through a few weeks of vegetation, attained only a height of six inches, and they produced a flower about an inch across; and the same result, with but little difference, took place where the plants were grown in the same mixture with phosphate of lime and carbonate of potash. The phosphate of lime did not enable the plant to go beyond this starved condition; and when the whole was analyzed, the plants were found to contain little more nitrogen than was

originally present in the seeds. They were freely exposed to the atmosphere, but they were incapable of extracting from the atmosphere sufficient nitrogen to do much more than to keep them alive. The plants, however, in the brick-dust and sand, to which not only phosphate of lime but nitrate of potash had been added, grew between three and four feet high, and were equally high, and were as healthy and fertile as plants grown in a rich garden soil. As an instance of the vital powers of the different plants, I may cite some figures. The plant in brick-dust and sand alone produced, taking the seed as one, a dry product of little more than three parts; while the one with nitrate of potash and phosphate of lime produced 198 parts; and that of the phosphate of lime and carbonate of potash about four parts. The plant in the nitrate of potash showed 200 times the quantity of nitrogen existing in the others. The result of the nitrogen present in the plant was shown also in the quantity of carbon fixed in the tissues—the substance of which the solid structure of the plant is chiefly built. The carbon fixed in the plant grown in the brick-dust amounted to little more than the 1½ grain; in the plant grown with the nitrate of potash it amounted to 120 grains, or eighty times the former. The carbonic acid, which was decomposed in twenty-four hours by the starved plant, was only 2½ cubic centimetres: while that fed upon nitrate of potash consumed in the same time 182; showing that the presence of nitrogen in the manure was that substance which not only produced the development, but produced the increased quantity of nitrogen in the product and the fixation of the carbon. These experiments, physical and chemical, bring the evidence from one side of the question to complete the reasoning furnished by the anatomical conclusions to which I previously alluded. The results are remarkable in the two cases. Boussingault's experiments shew that nitrogen is the efficient agent in the assimilation of food, and the anatomical examination of the tissues demonstrates the actual process of elaboration taking place in the midst of these nitrogenous substances.

There are one or two other points to which I must briefly advert, as of interest in reference to this matter. I may mention, in the first place, that we have lately had a new hypothesis as to action of roots from Liebig, which, however, can only apply to roots of a certain kind, and not at all to those growing in water or very wet soils. He has formed the supposition that roots act not merely by absorption of solutions, but by decomposing solid substances with which they come in contact. In this he endeavours to explain the abstraction from soils of substances apparently insoluble. He finds that not only do aluminous soils, as shown by Prof. Way, fix various useful substances, and prevent their filtering through, but that humous soils also have a similar power. Recent researches of Thenard show that phosphates are rendered insoluble when they come into contact with alumina or oxide of iron, and that these are decomposable again by soluble silicates, and in that way the phosphates rendered available. Now, supposing the phosphates are taken up in solution. it would appear to be requisite in a soil containing abundance of alumina that soluble silicates should be also present. But, as I have said, Liebig thinks the roots may be able to decompose and abstract parts of these insoluble compounds. There may be some truth in this; and if so, we must attribute it to certain peculiarities in the constitution, as we may say, of the roots themselves. As an illustration of the possibility of some such process, I may direct attention to what takes place in the fungi, where we decidedly have a direct action of the surface of roots upon the media in which they grow. We know that the process of fermentation takes place during the action of yeast on liquids with which it is in contact: that is, the action of the surface of the membrane of the yeast and the interchange of the contents of the cells with the liquid that produces the conversion of the wort into the alcoholic fluid. It is the same with the plants that produce vinegar and that cause acid fermentation of vegetable preserves. There may be an action of this kind in the roots. The actual contact of the roots with the substances in the soil may be requisite, and in this way roots may be able to abstract from the soil food not previously in solution, but in a state of fine subdivision, chemical action being rendered probable by the moisture present in the root.

It would have been desirable perhaps to have directed your attention to some speculations with regard to the influence of phosphate of lime upon roots, but time will not admit of this, and moreover our knowledge on the subject is extremely limited. No doubt there is a kind of specific action of phosphates of lime upon roots, that it does favour the production of roots at particular seasons, and under particular conditions of cultivation. How and why it does so, science, I think, is unable at present positively to demonstate, and it is too late to-day to enter into any speculations with regard to this point. I may say, however, that for the settlement of that point only carefully devised and extensive experiments can be of any service. In regard to such experiments, I will make one remark in conclusion of my lecture. I must differ, or apparently differ, to a certain extent, from our professor of chemistry in one opinion to which he gave expression in his late interesting lecture concerning the office of science in relation to practice. I am not of a sanguine disposition—am considered rather cautious than otherwise; but I must declare that I look upon science as not only the means of explaining what has been done, but as the great instrument by which we shall discover means of doing what we have never done before. It is quite true that in the present state of knowledge agricultural practice may be in advance of science: theory has not worked its way up to the point in which it can explain all science, much more lay down any new rules for guidance. That is the result of the condition of the particular branch of science: it is not the fault of the science itself. That it is unable to do so, arises from the condition in which the science is placed by the natural course of events.—Physiology depends for one complete set of its data upon organic chemistry; organic chemistry could never be properly worked out until mineral chemistry had made considerable advances; and even were these departments of inquiry perfect, there is still meteorology in its infancy, incapable as yet of explaining peculiarities of climate, so as to enable us in some degree to foretell events with regard to weather, as the astronomer does as regards the movements of the heavenly bodies. I do not consider that this imperfect state of our information demands the conclusion that we are to give up the position of science as the leader of practice. I think that when we look upon the other branches of science which have to deal with simpler forces and less complicated questions, we have every reason to suppose that with proper prosecution of experimental inquiry in physiology, we may be able to use speculation as a means of greatly improving and advancing our practical knowledge. When we see the results of speculation in physic and chemistry, in the conquests of the powers of steam, electricity, light—all products of speculative or abstract science—I think we should not doubt that when physiology has ascended to the same relative stage, that branch of science will take its proper position, and be the guide and leader of practice rather than simply an humble follower in its footsteps.

From Emry's Journal of Agriculture.

Something of Plants, and How they Live.

Plants feed themselves. They increase in stature because of nourishment. They receive what is required, and discharge from their roots what is not required, to assist their growth. What are plants made of? If every farmer could answer this question, and then provide the pet plant with such matter as it requires in the manufacture of itself, he would disperse a mist in which at least nine-tenths of our farmers are bewildered. Burn any dry vegetable matter. What becomes of it? You see nothing but ashes. This is not all of it. The balance has become dissipated in the atmosphere. That part which is nowhere—which has escaped in the air, or burned away, is the *organic* part—the ashes the *inorganic* portion. What did this plant come from? "Dust thou art, and unto dust shalt thou return." The part become air must have originated in air; while the ashes have become earth, and originated in the soil. The *organic* part is air, the *inorganic* matter earth. Remember it. Nothing is lost. There has been no annihilation—only a change of form. The *organic* matter, which has burned away, consists of *carbon*, *oxygen*, *hydrogen*, and *nitrogen*. *Carbon* is a solid (charcoal,) and the last three named are gases. Carbon exists in all plants, and in combination with these gases constitute

nearly the whole of most plants, ashes bearing but a small proportion to the whole. Carbon constitutes about half the dry weight of plants. *Oxygen* supports combustion. It unites with many substances. It is sometimes called *vital air*, because necessary to respiration. Oxygen and carbon form carbonic acid, and united with hydrogen forms water. When united with iron, the iron becomes rusty. This rust is called oxide of iron. Oxygen united with nitrogen forms nitric acid. The two also compose atmospheric air; and here witness the wonderful adaptation of the works of creation to each other! If the atmosphere was pure oxygen, every living thing would soon decay of combustion; but adding to one part of oxygen four parts of nitrogen, God has so diluted the exhilarating gas, as that in its place we have a delicious life-giving and life-preserving nectar—so pure and palatable that we never cease to thirst for it, yet the supply is ample. But there are other elements in the atmosphere which the lungs of plants receive, and yet they are called impurities. We have seen farmers, for the want of proper knowledge, apply certain compositions to a soil, when, instead of benefitting the plant, it drove away, and dissipated all that was giving life to it. We have seen *ammonia*, one of the impurities above alluded to, allowed to escape from a manure heap, because of the want of the proper application to fix it there. *Carbonic acid, water* and *ammonia* are all essential to the maturity of most vegetables. *Carbonic acid* is the most important in its relations to plants, for from this source alone is their carbon obtained. It consists, as has been said, of *carbon* and *oxygen*. It is remarkable as being the first gaseous substance recognized after atmospheric air. Dr. Black, in 1757, called it *fixed air*, because he found it fixed in common limestone and magnesia. Plants, as we have before said, receive nourishment through their roots, and by their leaves. Carbon enters in the water by the roots, and is absorbed from the air by the leaves. Since carbonic acid is the source of supply of carbon only, to the plant, the *oxygen* must be separated from the carbon, and sent off into the atmosphere. The gum portions of the plant exhales the oxygen under the influence of sunlight. Sunlight is essential to the decomposition of carbonic acid, and to the rapid growth of plants. When a plant decays, the carbon in the plant unites with the oxygen in the air, and becomes carbonic acid. The same is the result where bodies burn. In the consumption of food and respiration, you are manufacturing and throwing off carbonic acid, which goes to assist again the formations of food for yourself or your dependants. Carbon, then, is certainly in a transition state, and though it constitutes so large a part of all vegetable and animal matter, yet it is all derived from the small amount of carbonic acid in the atmosphere; and but for this constant change and exhalation of both plants and animals, the supply would be exhausted. The fire in your kitchen is constantly supplying the trees and vegetables near your door with carbonic acid, which if exposed to the sun decomposes rapidly, and hence makes a rapid growth. The tree near your dwelling, though no better than the one planted at the same time, in the same manner, and in equally as good soil, in the orchard fifty yards distant, is far outstripping the orchard tree in growth—simply because it is fed with more carbon. Trees are necessary near the house; and in large cities, every man who understands the laws of nature and of health will provide these absorbents for the extra amount of acid generated. We frequently find in cities the leaves of plants rapidly forming, while in the country the twigs are as bear of foliage as at mid-winter. We should not be misunderstood. Carbon enters the plant in the form of carbonic acid. The *carbon* is retained until the plant decays but the oxygen is thrown off to unite with carbon again. Carbon is *fixed* in the plant until decay commences. The blood of animals, which contains carbon, unites with the air, or the oxygen of the air, as it is inhaled into the lungs, and forms carbonic acid, without which process no animal could live. This carbonic acid is thrown off, and feeds plants, which in turn feed animals again.

We have said carbon is a solid, or, in other words, *charcoal* is a solid. It is light and porous, hence a good absorbent. This is the secret of its value to the farmer. It absorbs gases that may escape from plants or decomposing substances. It separates from water any impurities, de-

cayed animal matter, and purifies it. Hence, too, its value as a filter. It is of great value to the field, whether mixed with the soil or applied on the surface. It absorbs largely at common temperatures, and when heated by the sun, yields up its atmospheric treasures to assist the growth of plants and vegetables. You remember the coal beds on the old farm "down East," where, no matter what the season, or its effect upon the balance of the crop, you were sure to find well-matured corn, a large growth of plump wheat, heavy oats, or enormous melons, within the area of the coal bed. Can you recall a time, a season, when there was not a marked difference between the products of the coal-bed and the rest of the field? Had you ever investigated the subject? You remember to have planted cucumbers and melons in your garden, and to have heard some one, noted for his success in growing these luxuries early and large, say that charcoal was a capital manure. You may have tried it with success; but why were you content with the result? Why not seek for the reason? How many lose the benefit of an extended application from the want of a spirit of inquiry! We hope the Farmers' Club will provoke and develop INVESTIGATION.

Charcoal absorbs offensive odours. Mix it with night soil, and it makes it dry and portable. Saved and applied, this is rendered a most valuable manure. Charcoal has great preservative qualities. It will keep meat sweet and pure a long time; and who has not tried its effects in the preservation of the potato? Who ever saw a *watery* potato grow on a coal bed? Who ever saw *small* ones grow there? We never did. Mix it with musty grain, if you have any, or impure meat, and tell us of its effects. Pack meat and vegetables in it, and they will not soon decay. It is a most unchangeable substance; hence posts, charred at the bottom, do not decay as soon as otherwise when set in the ground. Liquids passed through it lose their colouring and bitter or astringent flavour. Sugar-refiners discolourize their brown syrups with its assistance.

Thus, while we have not strictly departed from the text, we have given you some facts which may be of great value to you. We have deviated from our intended course, but our aim is to make these articles as plain, practical, and valuable as possible.

Remember that we have said, the *organic* portion of plants consists of *carbon, oxygen, hydrogen* and *nitrogen*. Water is composed of *hydrogen* and *oxygen*. Then water feeds the plant with these two gases. Burn the plant, and these gases escape in the form of vapour, which, condensed, falls to the earth as rain. You may desire to know something of the character of these gases abstractly. *Oxygen* is heavier than the atmosphere; it is a colourless gas, has neither taste nor smell; inhaled by animals, its effects are exhilarating and exciting. We have seen it given to individuals for the purpose of exhibiting its effects upon their action. In some cases the most extraordinary movements are made. It is, of course, injurious, and were we to inhale only *oxygen*, we would soon be unable to inhale *anything*. About one-fifth of the air, one-third of the ocean, and one-half of the solid earth are *oxygen*.

We extract the following passage from one of Johnston's lectures:

"But the quantity of this substance, which is stored up in the solid rocks, is still more remarkable. Nearly one-half of the weight of the solid rocks, which compose the crust of our globe, of every solid substance we see around us—of the houses in which we live, and of the stones on which we tread; of the soils which you daily cultivate, and much more than one-half of the weight of the bodies of all living animals and plants—consists of this elementary body, *oxygen*, known to us, as I have already said, only in the state of a gas. It may not appear surprising that any one elementary substance should have been formed by the Creator in such abundance as to constitute nearly one-half, by weight, of the entire crust of the globe; but it must strike you as remarkable, that this should also be the element on the presence of which all animal life depends, and as nothing less wonderful, that a substance, which we know only in the state of thin air, should, by some wonderful mechanism, be bound up and imprisoned in such vast stores in the solid mountains of the globe, be destined to pervade and refresh all nature in the form of water, and to beautify and adorn the earth in the solid parts of animals

and plants. But all nature is full of similar wonders; and every step you advance in the study of the principles of the art by which you live, you will not fail to mark the united skill and bounty of the same great Contriver."

Oxygen supports combustion, and all substances which burn in the open air burn in *it* (*oxygen*) with far greater brilliancy. We have said that plants exhale *oxygen* under the influence of sunlight, and we suggest a simple experiment by which this exhalation may be made perceptible.

Let a sprig of mint be placed in a white glass globe, which is then to be filled quite full of spring water, and the mouth inverted in a tumbler of water; it is then to be placed in the direct rays of the sun, and in a short time bubbles of gas will be seen collecting in the upper part of the glass, which is nearly pure *oxygen*.

Hydrogen is fourteen times lighter than the atmosphere, and sixteen times lighter than oxygen, being the lightest substance known. It is combustible, but does not support combustion. The affinity of oxygen and hydrogen is very great, yet they do not combine spontaneously. Hydrogen is colourless, and does not support life. Animals die and plants wither when introduced into it. It is not necessary to the growth of plants. United with oxygen, it becomes water or the protoxide of hydrogen. Water is an essential to the plant, but nature has provided an ample supply. It is our province to regulate and modify this supply. Irrigation at the proper time is an immense stimulant, or, more properly, fertilizer. But our *best* soils, the most durable and reliable, require drainage, and provision for feeding the plant with *only* the amount of water needed, and disposing of the surplus. We need write no "apostrophe to water." It may be of use and abuse. It *is* both used and abused. Let us learn to use it.

Next in order of the *organic* portions of plants is *nitrogen*—one of the most important *organic* constituents of vegetable matter. It constitutes about four-fifths of atmospheric air. Animals cannot live in it alone, yet they cannot be matured without it. Plants die in it, yet it is necessary to their growth. Reference has already been made to its use to dilute the oxygen of the air, so as to render it palatable and life-giving. Its existence has been known since 1772, and it was recognized as a constituent of the atmosphere in 1775. It does not support combustion, but extinguishes all burning bodies immersed in it. It is not inflammable. It is generally supposed that plants get no nitrogen from the air. Johnston says, "Spring and rain waters absorb it, as they do oxygen, from the atmospheric air, and bear it in solution to the roots, by which it is not unlikely that it may be conveyed directly into the circulation of the plants." But plants are mainly fed by nitrogen through some of its compounds. *Ammonia* is one. It is composed of nitrogen and hydrogen. Seventeen pounds of ammonia contains about fourteen pounds of nitrogen and three pounds of hydrogen. It is important to the growth of the plant—one of the most important compounds. It is common—every farmer has to do with it and daily witnesses its effects—is made aware of its presence by his senses, yet scarcely heeds its value, and often regards it as a noxious vapour which ought not to exist. But it does exist in the atmosphere everywhere where animal or vegetable matter is decaying. It is about three-fifths as heavy as atmospheric air. Our readers will recognize it as spirits of hartshorn, and it is sometimes called alkaline air, or volatile alkali. It is colourless, does not support combustion, and is inflammable. Here is another wonder for you, reader—a combination of two colourless and tasteless gases and without smell, in the proportion of 14 and 3 produces another gas that has pungent smell and a very perceptible taste. And is it not more wonderful, that it should exist, and enter so largely into all the successes and reverses of the farmer's operations, become part of his stock-in-trade, and yet create no inquiry into its properties, no curiosity as to its use or value? It is escaping yonder from that manure heap, from the liquid steaming excrements of your cattle. Here again you witness the value of absorbents to mix with animal manures. Charcoal or muck absorbs largely and should be largely used. Water absorbs ammonia over 700 and nearly 800 times its bulk of it, and is made the medium to transfer the ammonia of the atmosphere to the growing plants. Ammonia is powerful in its effect upon the

plant. It promotes its luxuriance and growth. It is mainly and perhaps wholly taken up by the roots of the plant from the soil, not being inhaled by the breathing leaf as is carbonic acid.

Liebig says, "The effect of an artificial supply of ammonia as a source of nitrogen is to accelerate the growth and development of plants." And he attaches great importance to this fact, and argues that it should be taken into account in gardening—especially in kitchen gardening, and as much as possible in agriculture on a large scale, when the time occupied in the growth of plants is of importance, as it is most certainly in our latitudes. Indeed it is the most valuable fertilizer contained in farm-yard manure, and it exists to a greater extent in the liquid part than in the solid excrement. And yet farmers—the great majority of them—provide no means for conveying this important fertilizer to the plant.

The stable manure may be thrown out under the eaves of the stable, and into the street, with no absorbing mixture. The eaves of the stable have no fixtures to convey the water into a cistern for the use of the stock, but the dripping flood inundates the manure heap, and leaches away into the street ditch, to be turned perhaps by a shrewd neighbour, if one happens to live lower down a declivity, into his own fields by a furrow, or five minutes' use of the spade, and irrigates *his* fields, furnishing his crops with a wealth of nutriment and stimulant—the *gold* of *your* manure. We have seen it done. We are not imagining anything. The same principle applied to commerce would ruin every man who indulged in it. Suppose the merchant should throw *gold* into the street, and depend upon the silver or currency received for profits, and to replace and replenish his stock; what would be thought of him? Does a farmer *know* these facts—know he is losing the *best* of his resources for the replenishment of his farm, and still neglect to take measures to retain them? Cannot *afford* to provide against this waste? If God had not blessed us with a land unrivalled in fertility, and had not provided in nature compensation for the consumption of plants, man, if left alone, would soon impoverish himself, and the earth would become barren and unfruitful.

Ammonia does not enter the plant by inhalation (if we may use the term) through the leaves. It is a gas, but there are few plants that do not require it to knock for admittance at the roots, and in company (solution) with water; and here again we must urge your attention to the saving the *liquid* manure of your stock, so full of nitrogen for the plant. It has been suggested to leave the stable floor open, with a muck-bed under it, to receive the leakage. Another plan is, to have a close floor, and litter the stable behind the stock with muck, sawdust, or tanbark-charcoal. And here we wish to say one word upon the use of muck as an absorbent. Ignorant once of the philosophy of composting, we helped a man (*then* considered more progressive than his neighbours) to clean out a swamp of its muck deposit—a purely vegetable substance. It was thrown around an orchard at once, at the roots of each tree. It had its effect, it is true; the trees grew marvellously. But, if instead of depositing it thus to "save handling," it had been hauled to the large shed in the barn-yard, and then mixed with the stable manure, which was evaporating, and leaching under the eaves on the South side of the barn, we would have *saved* enough by the operation to have paid the expenses and produced more wonderful effects still. Why? Because that muck was pure and (almost) unadulterated carbon—the best of absorbents, and that is *why* we urge composting with it; it saves for the use of the plant the ammonia in the manure mixed with it. Attend, then, to this matter, and save the *liquid* portion of the manure in your yard and stables.

Deep plowing has to do with the production of ammonia. It enables the roots of plants to penetrate and fill the subsoil with vegetable matter, which by its decay in the confined atmosphere, where the access of the oxygen of the air is not easy, gives rise to the production of ammonia. When thus formed, it is chemically prepared, and enters the roots of the bearing plant to assist its growth. We said, the ammonia of the atmosphere is absorbed by rain, dews, &c., and returned to the roots; hence, the necessity of rain and dews—the latter particularly, where vegetation is rankest and growing most rapidly, requiring continual supplies of nitrogen. Who can estimate the value of a heavy

body of snow during four months of the year succeeding a fruitful season? Here is matter for inquiry and reflection, fellow-farmer. How wonderfully accurate is the action of God's great laws of compensation—of supply and demand!

We have hitherto been talking of the *organic* parts of plants—those parts that burn away, of which nothing visible remains after combustion. Those parts which remain in the form of ashes are called the *inorganic*—are derived by the plant from the earth, and when the plant is decayed become earth again—were obtained from the soil, and have become soil again by combustion. The inorganic parts of plants are in small proportion to the organic, and yet they are numerically greater.

Let the reader remember that carbon, oxygen, hydrogen, and nitrogen are the four kinds of matter comprising the greater and organic portions of the plants; and yet the inorganic portion, though smaller, consists of nine or ten different parts. We are now to consider these. We may learn something new, and digressions will be in order if we find it for the interest of the reader to extend our science to its practical application. It involves the manure question at every point, and here we may discover, possibly, whether the rich and so-called *exhaustless* (!) virgin soil of the prairies, will need to be prostituted by the application of the *foul stuff* called barn-yard manure.

Burn a plant, a mass of weeds, a stack of wheat or other straw, reader, and how little of it is left! this you have noticed. How small in proportion to the bulk consumed, and the bulk of ashes that remain! This is the inorganic part; very seldom amounts to twelve or fifteen per cent. of the weight of the vegetable substance burned If it be straw you have burned, the weight of the ashes will seldom exceed four or five per cent. of the weight of the straw consumed. Yet this part of the plant is as important as any other, comes from the soil and must exist in the soil, so that the plant may take up the proportions required in its structure—in its growth.

Burn a ton of straw, weigh the ashes, and you, who return nothing to your fields in the shape of manure, estimate the amount of inorganic matter you take from your farm annually, saying nothing of the ashes, or inorganic part of the grain the straw yields. How long can you continue to crop your land without impoverishing it, by this no-return process? We want you to have time to ponder upon the figures you may make, by calculating that five per cent. of every ton of wheat-straw you take from your farm is actually taken from the soil, and must be supplied in some manner, and if you are not supplying it, you are growing poorer. Let the figures tell you how fast you are growing poorer. When you have aroused yourself from the stupor of insensibility, you will be in fit mood to search into the character of these several inorganic parts of plants; for it is not regarded by moderns as "stealing trash" to steal our *purse.*

Having sufficiently pondered on the amount of inorganic matter taken from the soil in every ton of straw, and which must be replaced or the soil is constantly impoverished, let us inquire what *are* these inorganic parts? Potash is an alkali—one of the four alkalies found in the ashes of plants. It is found in most plants. Fill a barrel with wood ashes, and leach with water—the *ley* contains the potash of the ashes. The pearlash of commerce is only potash and carbonic acid, a union of the two produced by the exposure of the former to the air, and if the quantity of carbonic acid is increased, saleratus is the result.

Many of our readers, perhaps, have had experience in the manufacture of pearl-ash. In early days, when the heavy forests of the North and East were being cleared, it was no unusual thing for the settler to turn a penny by the rustic manufacture of this alkali into an article of commerce. We have not unfrequently found it in the large open fire-places of the borderers, and secured it for the good dame's use, by using the "poker" among the ashes.

Plants, trees, and animals require potash in their construction. Hence it must be found in the soil, and supplied if cropping has diminished the supply.

The importance of this supply in the soil will be seen when the reader understands that every acre of wheat absorbs over thirty-two pounds of potash from the soil, barley over sixty-eight pounds, red clover over one hundred and forty four pounds, and other common crops in different proportions. How is it to be

upplied? Remember this is only *one* of he inorganic parts that you exhaust in this quantity from each acre of soil grown in wheat, barley, clover, &c., annually. Is t not a great exhausting process? Is there no necessity for supplying this food, of plowing deeper, of manuring more? If your soil is wanting lime, ashes may be ubstituted. But this supply of inorganic natter in some form *must not* be withheld rom your farm. It is a great study to earn how to economically supply it—of great importance you should learn. Potash may be used on sandy soils with good effect, and is a valuable application as a op-dressing for young plants, *for insects lo not like it.*

Soda is another alkali found in the ashes f plants, and is not unlike potash in its ffice in the construction of the plant. Common salt contains it; hence the application of the *thistle-killer*—salt—to the oil furnishes soda for the plant, and is often the best application that can be made; his, however, is a disputed question. In passing, we wish to say that *brine* is a great vermin antidote, and if carefully applied to the soil and to the compost heap will do quite as much good as harm. Caustic soda, produced by boiling the common carbonate of soda with quicklime, is dangerous to the vegetable. Common alt and lime mixed together and used in composting is very valuable as a supply of soda, for the plant is thus obtained.

Lime. The reader may perhaps consider himself posted in reference to this alkali. But its importance to the plant s oftener under than over-estimated, and t is often blindly applied, and often not applied at all when it should be. It sweetens the soil, decomposes vegetable matter, and as a sulphate is a good absorbent of he different gasses. But the importance of this inorganic part of the plant to the agriculturist must be the subject of another chapter.

Phosphoric acid, although combining with any of the alkalies, is most important when compounded with lime. It is composed of phosphorus and oxygen. The white smoke of a match when it is ignited s phosphoric acid, created by the union of the phosphorus on the end of the match with the oxygen of the atmosphere. Its importance will be understood when we tell you it forms nearly one half of the ashes of wheat, rye, oats, buckwheat, barley, peas, beans, &c., and enters largely in the perfection of vegetables and animals; and yet it is found in limited quantities in most soils, particularly those where cultivation has not been remunerative—where the whole system has been to get all possible, and pay nothing to the soil for its harvest. This acid does not exist in nature in a free state, and hence, isolated, does not affect vegetation; but as we have said, it unites with the alkalies and forms phosphates, which *are* essential to the growth of the plant, without which, perfection in the development of grains and roots cannot be obtained. It is solid and colourless, soluble in water, sour, corrodes and destroys animal and vegetable substances. It is found in combination in all plants, hence its necessity to them as an article of food; and yet it must be diluted or mixed, hence the double importance of the different alkalies as fertilizers.

The intelligent, thoughtful reader will not wonder at the constant diminution of fertility in cultivated—aye *skinned* soils. What debts would some farmers have to pay, if the earth were to make the demand to each one, "pay that thou owest," in the shape of inorganic matter taken from their farms, and never returned! It is estimated that in every hundred bushels of wheat sold, there are removed permanently from the soil on which it grew, sixty pounds of phosphoric acid! and that for each cow kept on a pasture throughout the summer, there are carried off in veal, butter, and cheese, not less than fifty pounds of phosphate of lime, of which perhaps nearly or quite one-fourth is phosphoric acid.

Warring says well, "This would be *one thousand pounds* for twenty cows; and it shows clearly why old dairy pastures become so exhausted of this substance, that they will no longer produce those nutritious gases which are favorable to butter and cheese making." We may as well quote the next paragraph, and endorse it, viz: "That this removal of the most valuable constituent of the soil has been the cause of more exhaustion of farms, and more emigration in search of fertile districts, than any other single effect of injudicious farming, is a fact which multiplied instances most clearly prove."

He instances the once world-renowned wheat producing Genesee Valley. It is well known that its fame as a wheat country does not belong to the present. And yet how many of the Western farmers, or Eastern either, can tell to-day what phosphoric acid is, or that such matter exists? They have as little idea of it, its importance to the soil, its character, and how it is found, as they have of the size of brain of the inhabitants of the planet Saturn; and how willing to let their children grow up in the same indifference to what grows, and what causes it to grow! They want them to read, write, and cipher—it was the *schooling* they had, and they get along!

O fellow farmer, insist upon that boy and girl of yours knowing something of this earth, beside its shape, diameter, and circumference, and who circumnavigated it. Require that the teacher should at least know something of plants this summer; be capable of teaching your child the beauties, peculiarities, and office of plants and flowers—in short, insist he must know something of botany. But we have left *the* acid, though we may have exhibited some acidity; if so, we cannot help it, for we feel very much like scolding at the indifference manifest to these important departments of education.

Phosphoric acid is indispensable then; it must exist in some form in the land. If you want intelligent animals, they must be fed with plants containing phosphoric acid, for phosphorus is contained in and is necessary to the health of the brain. We have said enough perhaps to set you thinking, to prove the importance of this acid in agriculture. In combination with alkalies we shall have more to say of it hereafter.

The Lives of Eminent Men.

In lately reading the life of the French mechanician Jacquard, whose name has been immortalized by his inventive genius, we were forcibly struck with a conviction of the important lessons conveyed in the simple narrative of his every-day transactions, and of the benefits that would accrue to the youth of our country if the lives of such eminent men, whether distinguished in the world of arts, letters, or other useful avocations in life, could be displayed before them in the same familiar and instructive form. Knowing full well the passion we are sometimes apt to contract for the most insignificant appendages to the favorite objects of our attention and regard, we do not wonder that the historian who properly comprehends his task does not hesitate to descend into what at first sight might be thought unimportant details. We think it is much to be desired, and should always be an object of attention to those who are employed in writing the lives of eminent persons, or in compiling materials from the works of others, to select such of their actions as are most characteristic of their genius and disposition. A trifling and seemingly inconsiderable action, an expression or word in a man's unguarded moments at home or at ease among his most intimate friends, often conveys a perfect idea of his genius and character, and serves as a key to most of the greatest and important actions of his life. And if these inferior indications of a man's life ought not to be omitted, much less should the greater and more important elements of his ability and character.

It must be acknowledged in favor of those who undertake to instruct us in the transactions of past ages, who faithfully draw from life, and accurately delineate the actions and characters of mankind that they open before us a noble fund of rational enjoyment, and are, at the same time, of the most important service in directing the minds of men to virtue, and exciting them to an honorable and worthy conduct. Whilst they are calling forth into exercise the most generous principles of the human heart, in instructing us in the nature and obligations of private and social virtue, it must be allowed that they increase our general knowledge. The actions and characters of men it is alike their province to describe, with this principal difference, that the former represent them in the public and more active scenes of life, and as they affect the general course of human affairs, whereas the latter, without omitting the public, leads us into the more private and domestic situations, makes us acquainted with the whole circle of a man's friends, lays open his connections, and correspondence, the plan of his education, the method of his studies, his leading views in life, and the manner in which he employed his time, and introduces us to the knowledge of a variety of

circumstances of the greatest importance in judging of his character and manners, the whole affording very useful hints for others to improve upon.

There have been many philosophers, mathematicians, mechanics, and others, at various eras of history, who have in a remarkable manner supported their characters, distinguished themselves in their professions, and merited favor by the service they have rendered mankind, and whose lives if properly detailed, would serve as instructive lessons to others. To render them of general and extensive use, however, they should not only be written with the greatest truth and exactness, without the errors too often consequent upon partialities of friendship or the influence of prejudice, but those gentlemen who have taken upon themselves the noble duty of perpetuating their memories and worth should search into the records of the periods in which they existed, and collect and dispose other facts of interest which have transpired in connection with them. Upon such a plan as this it would be easy to see what advance any art or science had made at a particular time, who were a man's predecessors in the same art or profession, and what advantage he enjoyed from them. As we come down, as materials increase, and knowledge and arts advance, a more extensive account of such cotemporaneous and useful events may be given, and a correspondingly increased interest and benefit attached to the lives of praiseworthy characters, so that in celebrating the virtues of good men who have been ornaments of human nature, and whose works have benefited their fellow men, the candid chronicler will not only perform a highly useful and delightful duty, but convey to his readers the most comprehensive and instructive lessons upon the subjects pertaining thereto.—*Scientific American.*

From the Washington Star.

Early Ripening Wheat.

The N. Y. *Tribune* says that J. Johnson, of Northern New York, the pioneer in the science of underdraining" in this country, offers a premium of $1,000 to any one who will tell him how to ripen his wheat ten days earlier than it ripens now. None but observing farmers comprehend the vast benefit to the country which the acquisition of good wheat ripening thus early would be. It would do away with three fourths of the damage now done by the rust at the South, and by the midge at the North, as well as perhaps half the damage from the fly, joint worm, &c., which invariably affect tender and backward wheat first; the more vigorous stalks being comparatively free from their ravages.

Our plan for trying to get an earlier ripening wheat– that is, the plan we are pursuing —is as follows: To select for seed the produce of the portions of the fields ripening first, and in cleaning it to as far as possible rid it of every grain not entirely perfect and well developed. To plow very deep in breaking up, and to fertilize highly; and, further, to sow the seed so selected on exposures suited for early ripening. We think that the result will be that in a few years we shall have a wheat which will outgrow almost all danger of the fly and rust—a vigorous wheat with early ripening tendencies as one of its particular characteristics.

We are satisfied that with the seed plump and perfect, and the land properly prepared, the best time for sowing wheat in this region is between the 1st and 10th of October, as near as may be. The use of the drill will enable any farmer, even though designing to put in thousands of acres of wheat, to get it in between those dates unless rains prevent, which, our experience teaches, does not often happen. A machine drill requires the services of two hands and three horses, and should plant fifteen acres per diem, which, to be ploughed in in the same time would require the service of ten hands and ten horses. Additional hands are hardest to be obtained, every where, just when most needed by the farmer who does not resort to the drill and the machine reaper—at the seasons of planting and harvesting. These machines are, in fact, farm hands of the most valuable kind, requiring nothing for their support while their services are not needed, and being always ready to do efficient and invaluable labor when required to go to work. As the use of the drill enables the farmer to select his own time for getting in his crop, by making him entirely independent of the additional, and, usually, unobtainable, labor (to his regular force) he otherwise invariably stands in need of in planting time,

so the machine reaper makes him entirely independent of assistance to his regular force in harvesting. A Manny and Wood reaper, with a hand to drive and another to rake, will certainly do the work of four best cradlers without the danger to health, if not life itself, consequent upon hand harvesting in July. Fifteen acres per diem is a fair average for the work of such a reaper.

Every farmer knows the importance—in its effect on the value and quantity of his grain harvested—of being able to select his own time for cutting it. A lack of force, causing a delay of from one day to a week, owing to the great variableness of the weather just at that season, not unfrequently makes a difference of from ten to twenty-five per centum in the money realized from the sales of the crop. The farmer who sows three hundred acres to wheat, if harvesting by hand labor altogether, should be able to run at least fifteen cradles to be entirely certain that he will not be damaged by moist or cloudy weather Not one farmer in a hundred, planting no more than three hundred acres to wheat, is able to set such "a squadron in the field," in addition to the necessary force of binders and rakers. So, if he would use due precaution, he must resort to the machine reapers, keeping as many of them as his crop may require. He would make money hand-over-fist by having always on hand sufficient to cut his whole crop in four fair working days. We know, from experience, that the wear and tear of the Manny and Wood reaper, when kept properly preserved (when not in use) is so inconsiderable as to amount to almost nothing. Take it, all in all, it is the farmers' money-saver as well as his money-maker. Our only wonder is that any farmer, who has as little as thirty acres of grain and as many of grass to cut annually, ventures to attempt to get on without one, and without a machine drill. But there "is no accounting for tastes" in agricultural matters, as in all things else.

We repeat, our plan for securing the wheat crop above and beyond most of the dangers that produce failures, is to seek to plant only the earliest ripened seed, as explained above, and to have at command the means of choosing our own time for both planting and harvesting, without going outside of our own premises for any assistance whatever. We may add, that the use of a drill certainly saves a peck of seed to the acre sown, and deposits the fertilizer in the soil just where the farmer wants it; while the use of the machine reaper secures the crop far better than that can be done by cradling—the per centage of difference being sufficient to make at least a fifth of what may be considered a fair profit on wheat-growing.

Facts about Milk.

The best Temperature to facilitate the raising of Cream.—"Will cream rise on milk in a few hours in a room where the thermometer is as low as 35° to 45°, as is claimed by persons interested in the sale of Schooley's Preservatory. Their philosophy is that the water of the milk is most dense at 39° or 40°, and the cream being lighter, will rise best at that temperature." This is one of the three questions asked by a correspondent in Erie county, on which we will endeavor to throw a little light, and perhaps others may be disposed to continue the subject and draw interesting facts from their stores of experience. Milk is composed of 4½ parts of caseine or curd, 3 butter, 4½ sugar, and 87 of water. The lower the temperature, of course the more dense the water composing so great a portion of the milk, until it reaches 39½°, at which point water begins to expand with the decrease of temperature. The cream would, perhaps, rise more readily at about 39° than at any other temperature, were it not for the fact that the cream as well as the curd is made dense by the low temperature at which it is kept, in about the same ratio as the water, and perhaps greater.

Every one of experience knows that very little cream will rise on milk kept at near the freezing point. This arises from the fact above mentioned, that water expands below 39½, while the cream and curd become more dense, so that at near 33° there is little difference in gravity between the cream and water. At 40° the cream will rise, but still more rapidly at 50°; and still more so, we judge from our own experience and observation at 60° or 70°, or even 75°. From this fact we argue that the oily matter expands by heat more rapidly than water, and of course condenses by cold in the same ratio. It does not follow, by any means, that it is best to keep milk at such a high temperature, for the whole mass might become sour before all the cream would be separated and rise to the surface. By placing a pan of milk over a slow fire and gradually increasing the heat until it reaches the boiling point, all the cream will rise to the surface in a few minutes. This would seem to prove that the temperature is favorable to the separation. For practical purposes we think a temperature of about 50° or 55° will be found the best.

The Philosophy of Churning.—The cream of milk is in the form of minute globules, the oily or buttery matter being covered with a thin coating of casein, something like the yolk of an egg. The object of churning is to break these globules, which it effects partly by the increase of temperature, and partly by the agitation.—During the operation of churning, the heat generally arises from five to ten degrees. In cold weather it is sometimes necessary to raise the temperature of the cream by pouring in hot water, or by some other means, and those who have had much experience in churning know from weary experience that it is impossible to make butter come with cold cream. The agitation is necessary, but the heat is indispensable to break the globules of cream and form butter. Where the cream is raised by placing milk over the fire, in the manner previously alluded to, the globules are broken by the heat alone, and the butter is formed without much churning. It can be finished or "gathered" in a few minutes in a wooden bowl, with a ladle, or in the churn. Butter thus made is relished by many for present use, though apt to have an oily taste. It is not made in this way in quantities or for preservation in this country, that we have learned.

In Devonshire, England, where much butter is made, and of very superior quality, a system somewhat similar is practiced. As soon as the milking and skimming processes are over, the warm new milk is placed in a brass pan. A small quantity of cold water is placed in the pan, and here it stands in the day time for six hours, or at night till the following morning. It is then carefully placed near a slow fire, so as to be heated to a certain point, but not permitted to boil. It is a delicate matter to have a fire just brisk enough to prevent milk from curdling in summer, and still not so hot as to cause it to heave or boil. A firm consistency on the surface, and a tough consolidated appearance are the criterions usually depended upon for the proper amount of heat. When sufficiently scalded, the pan and its contents are removed to a cool place in summer, and covered over, until cool, with a woolen cloth in winter, when the cream is taken off. The process of churning is very simple; the cream is placed in wooden bowls, it is then briskly stirred by the hand, or by a "whisk" of peeled willows until the butter-milk separates from the butter, which is usually effected in some ten minutes.

We have never eaten butter made in this way that we thought first-rate, and always considered it injured by the heating. Butter, too, we think is injured in the same way by too rapid churning. The fact that one churn will make butter in a shorter time than another is no evidence of its superiority, as its rapid action may raise the temperature higher than is necessary or beneficial.

The proper temperature for cream when placed in the churn is about 55°, and this coolness it is difficult to obtain in the heat of summer, unless the churning is done very early in the morning, or the dairy-house is usually well adapted to the business. In skilful hands cold water is useful, and every dairy farmer should have an ice-house, where a constant supply of ice can be obtained for regulating the temperature of the milk. In winter warm water and a warm room can be made use of as desired.—The temperature of Schooley's preservatory can be regulated very easily, and we think favorably of it. We only designed to present a few facts on this subject, and have exceeded the space we proposed to occupy. It is, however, an interesting subject, and we would like the opinions of experienced dairymen.

[*Rural New Yorker.*

Overseer's Rules.

The following rules were laid down by a good overseer in Jackson Parish, La., and published in the *Times*. Read them:

1. Before going to bed, I will think over what I have to do the next day, and note it down upon my slate, in order that it may be recollected on the morrow.

2. I shall rise early, and never let the negroes catch me in bed of a morning, but see that they are all put regularly to their work.

3. After rising I shall not idle about, but go directly at the business of my employer. I shall see that the negroes are at their work; that the horses have been fed, the cattle attended to, &c. If any of the negroes have been reported as sick, I shall at once see that proper medicine and attendance are given.

4. Wherever the negroes are working, I shall consider it my duty to be frequently with them, in order that I may see how they get along. I shall not content myself with doing this once a day, but I shall do so repeatedly, observing every time what they are doing, and how they do it. I shall never permit them to do any work wrong if it takes the whole day to do it right.

5. *Negroes*—I shall see that the negroes are regularly fed, and that they keep themselves clean. Once a week at least I shall go into each of their houses, and see that they have been swept out and cleaned. I shall examine the blankets, &c., and see that they have been well aired; that everything has been attended to which conduces to their comfort and happiness,

6. *Horses*—I shall consider it my business to see that the horses are properly fed and rubbed; their stable is well littered. When harnessed and at work, I shall see that their harness fits, and does not gall them, recollecting that these animals, though dumb, can feel as well as myself.

7. *Cattle*—I shall daily see that the cattle have been penned, that they have good water

to drink; and I shall at once see how I can best procure a pasture for them. I shall let the cattle minder know that he is watched and held responsible for these things.

8. *Milch Cows*—I shall contrive to procure these the best pasture, if possible. I shall feed them night and morning, and shall so manage it as always to have something to eat when penned.

9. *Houses, Fences, &c*—I shall endeavor never to let these get out of order. The moment I discover any of them out of repair, I shall have them attended to, never forgetting that 'a stitch in time saves nine.'

10. *Carts, Wagons, &c*—I shall observe the same rules about these as about the horses, &c. and shall never put off attending to them until I may want to use them, when I shall not have time to do so.

11. *Time*—I will always recollect that my time is not my own, but my employer's, and I shall consider my neglect of his business, as so much unjustly taken out of his pocket.

12. *Visits*—If any one calls to see me I shall entertain him politely; but I shall never forget to attend to business on that account.—"Business first, and amusements afterwards" shall be my motto. If any of my friends are displeased at this rule, the sooner they cease to be friends the better.—*Southern Cultivator.*

The Farmer.

The man who stands on his own soil, who feels that by the laws of the land in which he lives—by the law of civilized nations—he is the rightful and exclusive owner of the soil he tills, is by the constitution of our nature under a wholesome influence not easily imbibed by any other source. He feels, other things being equal, more strongly than another, the character of a man as a lord of the inanimate world, of this great wonderful sphere which, fashioned by the hand of God, and upheld by his power, is rolling through the heaven, a part of his—his from the centre to the sky. It is the space on which the generation moved in its round of duties, and he feels himself connected by a link with those who follow him, and to whom he is to transmit a home. Perhaps a farm has come down to him from his fathers. They have gone to their last home! but he can trace their footsteps over the scenes of his daily labors. The roof which shelters him was reared by those to whom he owes his being. Some interesting domestic tradition is connected with every enclosure. The favourite tree was planted by his father's hand. He sported in boyhood beside the brook which still winds through the meadow. Through the fields lies the path to the village school of earlier days. He still hears from the open window the voice of the Sabbath bell which called his father to the House of God; and near at hand is the place where his parents laid down to rest, and where, when his time shall come, he shall be laid by his children. These are the feelings of the owner of the soil. Words cannot paint them; they flow out of the deepest fountain of the heart; they are the life spring of a fresh, healthy and general national character.—*Edward Everett.*

From the U. S. Economist.

Exports of Wheat to England.

The sources whence England drew her wheat last year, and for the first four months of the present year, were as follows:

	Year.		4 months	
	1856.	1857.	1857.	1858.
Wheat—	Qrs.	Qrs.	Qrs.	Qrs.
Russia	765,746	715,734	77,027	178,005
Prussia	223,673	869,544	85,038	143,147
Denmark	178,658	289,032	64,798	86,096
Mecklenburg	62,858	133,200	49,376	23,141
Hanse Towns	138,128	234,010	54,201	80,102
Turkey and Provinces	239,653	36,615	14,585	79,915
Egypt	538,853	205,445	101,409	173,157
United States	1,286,374	665,032	273,061	126,128
Other	673,998	326,622	44,784	301,364
Total	4,107,941	3,475,234	762,279	1,191,165
Flour—			cwts.	cwts.
United States	2,929,125	1,489,359	723,631	935,052
Total	4,016,853	2,212,168	784,491	1,508,220

In the last year hardly more than 10 per ct. of the grain was drawn from the United States, but more than half the flour. Abundance and cheapness in the United States, and comparative scarcity on the Continent, will give this country a market for the usual exports of breadstuffs. The national exports for the year ending June 30, 1857, were as follows, with the estimates for 1858:

	1857.	1858.
Of Sea and Forest,	$18,439,355	18,000,000
Agriculture,	16,736,458	17,000,000
Food,	58,333,176	51,000,000
Cotton,	131,575,859	140,000,000
Tobacco,	20,260,772	21,000,000
Manufactures,	33,561,383	34,000,000
Gold,	60,078,352	52,000,000
Total,	$338,985,065	333,000,000
Imports,	336,914,124	271,514,000

A Paper on Swine.

[Read before the Committee of the Worcester (Massachusetts) Agricultural Society.]

Mr. President and Gentlemen,—With instinctive modesty I appear before you as Chairman of the Committee on Swine, deeply feeling, as I do, the responsibilities of the position I have unwittingly, and I fear unwisely, assumed; but, gentlemen, relying on your well-known courtesy, I have endeavoured faithfully, and to the best of my ability, to discharge the task which you have assigned me.

It is placing one in a very awkward predicament, to be invited out to a dinner or evening party, and when the ices or jellies have disappeared, to receive a quiet intimation from host or hostess, that the time is arrived when he is expected to be exceeding funny. Such a hint, however deliberately administered, would chill the heart of the merriest, and banish every thought of jest or humour, unless, like the farmer's farrow cow, the luckless individual possess the faculty of never dryingup, but is ever prepared to give down fun, frolic, and comical stories the whole year round.

The traditions of the past, the hallowed usages of days gone by, all point to the report of the Pig Committee, as the peculiar and proper vehicle for fun in the celebration of our Society. Prosy we dare not be, merry we would be; but the tricksy spirit which inspires with wit and humour is coy indeed, and comes not always at bidding, though wooed never so ardently. Wit, fun, and frolic are like the dew-drops that sparkle and glitter in the bright sunlight but for a moment; sprite-like they come and go—whence or whither no one knows. After an earnest invocation to the Deity of Fun, that she will grant me a few ideas which may interest or amuse you, I proceed with the subject.

Historically, socially, and gastronomically, the pig demands our careful attention. The connection with commerce, with the cuisine, and even with the great interest of fire insurance, have all made him an object of particular regard. In the early days of the Celestial Empire—as we learn from the veracious writings of the witty and voracious essayist, Charles Lamb—a wealthy Chinaman was so unfortunate as to have his dwelling destroyed by fire. Prowling around the smoking ruins, and seeking to save some of his valuables which the conflagration might have spared, his hand came in contact with the smoking remains of a poor pig which had perished in the flames; instantly, smarting with the pain, he carried his hand to his mouth, when a peculiar flavour greeted his palate, such as the gods (Chinese ones I mean, of course) might in vain have sighed for. Regardless of pain he applied himself once more, and drew forth from the smoking cinders the remains of the pig. Carefully brushing off the ashes, he regaled himself with the feast before him, but closely preserved the secret he had learned In a few short months, however, the taste for roast pig came back so strong, that John Chinaman's house was burned down again, and again was a pig found in the ashes. This was repeated so often that the neighbours grew suspicious, and watched until they ascertained that the reason for the conflagration was the feast that invariably followed. Once out, the secret spread like wildfire; every hill-top shone with the flames of a burning habitation—every valley was blackened with the ashes of a homestead; but roast pig was dearer to a Chinaman than home or honour, and still the work of destruction went on. Alarmed at a course which bid fair to ruin every insurance office in the empire, the directors petitioned in a body to the General Court of China, for the passing of an Act that should arrest the evil and avert their threatened ruin; and a careful examination of the revised statutes of China would probably show stringent resolutions against the crime of burning houses for the sake of roasting pigs.

Since the invention of the modern cooking stove, however, although incendiarism has decreased only in a slight degree, still it has ceased to be attributed to this cause, and a juicy crackling is no longer suggestive of fallen rafters or a houseless family.

There is an old adage, "Give a dog a bad name, and his ruin is accomplished." Such may be true of the canine race; but the noble family of animals of which I am treating furnishes a striking illustration that the proverb applies not to their numbers. A goose, it is said, saved lordly Rome by its cackling; and had not their list of Divinities just then been full, a grateful people would have found for him a sedgy pool and quiet nest in Olympus. How did the ancestors of that same people repay the pig for a service scarcely less important?

The veriest smatterer in the classics knows, that, when from flaming Troy, "Æneas the great Anchises bore," seeking in strange lands a new home for his conquered people, a white sow, attended by thirty white little pigs, pure as herself, pointed out to him the scene of his future empire. But what did he and his people do for the pig in return? Did they load him with honours? Did they cherish him with corn? Did they treat him with respect? No! with black ingratitude, which still merits the indignation of every admirer of the pig, they affixed to the animal the appellation of "*Porcus;*" and "poor cuss" the pig would have been to the present day, had not the Latin tongue long since ceased to be the language of the world. But "poor cuss" he is no longer, when in Worcester county he spurns his classic name, and, adopting the vernacular, he "grows the whole hog," that he may "pork us," in return for the care which we bestow upon him.

For the sake of our farmers, who are anxious to make a profit from pig-raising, it is greatly to be regretted that the thirty-at-a-litter breed,

already alluded to, has disappeared from the face of the earth. Breeding swine with such a rate of increase must be almost as profitable as "shaving" notes at two per cent. per month; but still the impression is irresistibly forced upon us, that, in a family so numerous, those who came last to dinner, at least in their infant days, would not have gained flesh very rapidly. Indeed, in such a family it would seem almost impossible to dispense with the services of a wet nurse, in order to bring up profitably the rising generation.

The course of the pig, like that of the Star of Empire, has ever tended westward. From China we trace him to Italy, the gloomy mountains of the Hartz, the broad plains of Westphalia, the fertile valleys of France, and to the waving forests of "Merrie England;" all have known him since the days when their bold barons and hungry retainers sat down to feast on the juicy chine of the wild boar, and the savoury haunch of venison. In green Erin piggy has been an important member of society; true, he has shared his master's meal, and basked in the comfortable warmth of his cabin; but, like a "gintleman" as he is, he has ever paid the "rint;" and St. Patrick, in the plenitude of his power and influence, never saw the day he could have banished him from that "gem of the ocean."

When the pig first crossed to this western world remains in doubt. Whether he came with the Pilgrims, pressing with the foot of a pioneer the Blarney-stone of New England, and scanning with fearless eye the cheerless prospect before him, or whether, regardless of liberty of conscience, and careful only of his own comfort, he waited till the first trials and toils of a new settlement had been met and overcome, we have no record; enough for us that he is here; how or where he came concerns us not. He is among us and of us. From souse to sausage we have loved him; from ham to harselet we have honoured him; from chine to chops we have cherished him. The care we have shown him has been repaid a hundredfold. He has loaded our tables, and lighted our fire-sides, and smiling plenty has followed in his steps, where hungry famine would have stalked in his absence.

But still further towards the setting sun has been the arena of the pig's greatest triumphs; there have been the fields of his widest influence. Beneath the vast forests of Ohio, raining to the ground their yearly harvests of mast—through her broad corn-fields, stretching as far as the eye can see, he has roamed, and fed, and fattened. From him, and the commercial interests he has mainly contributed to establish, has grown a mighty State, scarcely second to any in this confederacy; from his ashes has arisen a new order in society—the "Bristleocracy of the great West."

A broad levee bustling with business, lofty and spacious stores and slaughter-houses, crowded pens, and a river bearing on its boso steamboats in fleets—all attest the influenc which the pig has exerted on the agricultur and commercial interests of the great State Ohio. He has filled the coffers of her banker and has bought the silks which cover her belle He has built the beautiful palaces which ador the "Queen City of the West," and feeds th princely luxury of those who inhabit then *There* he is almost an object of worship, an his possession is considered as about equivaler to a patent of nobility. Fancy dimly paint the picture, when a few years hence, the wea thy pork merchant, who justly boasts hi numerous *quarterings*, shall, in the true spiri of heraldy, paint on the panel of his carriag and on the escutcheon over his doorway, lustrious shield, bearing in brilliant colours single pig, his bristles all *rampant*, his ta closely *curlant*, and his mouth widely *opan* till the lions, the griffins, and the unicorns the Old World shall fade into insignificanc before the heraldic devices of the New."

GEORGE S. TAIT, *Chairman.*

From the Genesee Farmer.

The Life of a Farmer—Healthful, Pleas ant, Profitable and Honorable.

That the life of a farmer is healthful, ha frequently been shown by tables of comparativ longevity, and one of these for Massachusett shows that their lives exceed the general ave rage by twelve years, and go nearly ninetee years above that of the common laborer, an eighteen above the average at death of thos engaged in mechanical pursuits. There seem to exist a sanitive influence in the varied em ployments of the agriculturist—in its fresh an suggestive surroundings. So the young ma to whom a long life seems desirable, may choos the occupation of a farmer with the greates likelihood of seeing in their fullness the allotte years of man. For whenever and whereve such statistics have been gathered, they brin facts to confirm the healthfulness and longevit of the tillers of the soil.

That the life of a farmer is pleasant, seems at least, the opinion of the great mass outsid the employment, if their professions are to b believed. A city writer, speaking upon th subject, remarks: "The man in active busines in other departments, pictures for himself i his retirement a rural home—a little farm wel tilled—and on that he hopes to end his days Ambitious men, who have drunk deeply o fame, are at a stand when the tide of thei affairs are at a turn, whether to make new an earnest efforts to struggle upward, or to buy farm and in the peaceful labors it requires, t enjoy a tranquil close of life." Merchants lawyers, and physicians, we may add, wher most rapidly accumulating fortunes, often stop to consider whether a competence and a snug farm are not more desirable than wealth, amid

the turmoils and cares of the city, and the vicisitudes of fortune to which its dwellers are exposed. Rural life and employment have the elements of the beautiful and the agreeable, or they would not possess so many charms to the occupant of all other departments of human enterprize and industry.

Why then do so many young men, turning from agriculture as unworthy their attention, seek other employments, or crowd the mercantile or professional ranks? There may be various reasons for this. Some may desire a more speedy return for their labor, and think it found in daily or weekly wages, not considering the uncertainty of constant employment, or comparing their actual profits with those of the working farmer. Others may be led away by the attractive and fashionable appearance of acquaintances who have found employment in the city; or by the hope of rivaling the one out of twenty who succeeds in making a fortune as a merchant, forgetting, meanwhile, the confinement and drudgery of the every-day life of their gentlemanly friend, and the nineteen failures which have taken place while the latter has suddenly risen to wealth and notoriety. A large class are impressed with the idea that in cities exist greater facilities for finding a comfortable living without much active labor; and this thought has charms for the indolent which they cannot resist. How bitterly they will be disappointed, miserable multitudes, who are waiting with Mr. Micawber for "something to turn up," can sorrowfully relate.

That the young man who has been liberally educated must study a profession—that in law, medicine, or theology, alone, can be found use for his learning—is an idea too prevalent even now. It will be a better day for all when it is discovered that the highest honors of the college do not unfit a man for the practical duties of agriculture—that it is not burying one's knowledge to graduate from the university to the farm. Some of our most successful agriculturists have reached farming through law, finance, politics, literature, or merchandize; going by way of the professions to their present field of labor. When such men take the direct route, as they are beginning to do, farming will rank not only as healthful and pleasant, but as profitable and honorable in the esteem of men. Increase in position will give increase in knowledge and refinement, and make the life of a farmer always and everywhere, what it should be—the truest and manliest of all life on earth.

J. H. B.

From the Country Gentleman.

Differences in Soils.

Soil is the earth wherein crops of every kind are produced. The component parts are argill, sand, water and air. Argill is the soft and unctious part of clay. Argill and sand contains each, in nearly equal degrees, the food of plants. There are different kinds of soil, which may be divided into four classes, namely: Clay, Sand, Gravel and what is termed Peat Earth. There is, however, another kind of soil called garden mold, but, as it is mainly an artificial creation, it can hardly be ranked with natural or original soils. Loam, too, has been considered by some as an original earth, but in reality it is an artificial soil, produced by calcareous matters, and animal and vegetable manures. In process of time the strongest clay may be converted into a loam, by repeated applications of the substance just mentioned. Sandy soils may also be converted into light loams by the application of lime, chalk, marl and clay. And even peat may be turned into a black, soft loam, and rendered fertile and productive.

A clay soil differs from all other soils, and is tough, wet and cold, and requires a good deal of labor to render it fit for bearing artificial crops of corn or grass. When once wetted it does not soon dry, and when thoroughly dry it is not easily wetted. When it is plowed in a wet state it sticks to the plow like mortar, and in a dry summer the clods can scarcely be broken or separated by the heaviest roller.

Sandy soils are managed with much less trouble and at an expense greatly inferior to what clay soils require; but the crops which are produced from them are generally of smaller value. There are several varieties of sandy soils, and in some artificial plants will not thrive unless a portion of good earth is previously mixed. A true sandy loam resting upon a sound subsoil, is called the most valuable of all soils upon which all kinds of grain may be raised with advantage, and no soil is better adapted for turnips or grass. Sandy soils thoroughly invigorated with clay and marl, by judicious management, may be made to produce the largest crops.

Gravelly soils freely imbibe moisture, and part with it with great facility. From the lightness of their texture, they are neither expensive nor difficult in the means of cultivation. They are usually barren, but by frequent application of manure, and by frequent returns of grass, they may be made fertile and prolific. Deep plowing is essentially necessary, so that the surface soil may be augmented, and greater room given to the growth of the plants cultivated on them. If shallow-plowed, it is either burned up in a day or two of drouth, or equally injured by an excessive fall of rain.

Peat earth, probably, is an artificial soil made and produced by certain substances deposited upon the surface of the earth. Philosophers, however, disagree on this point. By one it is called a primitive earth; by another, a vegetable which grows and increases, and continues to increase until it destroys all other soils; and by a third, that it consists of ligneous and aquatic plants. It has been said that one-fourth of the habitual globe is peat, or moss earth, and it is, perhaps, surprising that so little is

known on a subject of so much importance. This soil is friendly to the growth of oats, if previously it has been summer-fallowed and enriched with manure. A heavy crop of wheat, if the season is favorable, may also be obtained.

As to the uses to which soils may be most advantageously applied, it is requisite that clay soil be kept rich and full of manure, which qualifies it for carrying crops of wheat, oats, beans, and clover. Usually, clay soils require great industry and care, and a thorough knowledge in the dressing, to keep them in a proper condition. No soil is so ungrateful as this one, if allowed to get into a sterile condition; but if manure is profusely appropriated with an occasional summer-fallowing, it will yield the heaviest and most abundant crops.

Upon light soils the case is somewhat different. The facility with which they are cultivated, furnishes encouragement to keep them under the plow. Grasses flourish the best, and summer-fallow is rarely required. The best method, perhaps, of procuring wheat, is to sow upon a clover stubble, which gives an artificial solidity to the soil, and is thereby rendered capable of sustaining this grain until it arrives at maturity. W. R. P.

Elizabeth, N. J., 1858.

THE SOUTHERN PLANTER.

RICHMOND, VIRGINIA.

F. N. Watkins, Esq'r., at the office of the Farmers Bank of Va., at Farmville, is our authorized Agent to receive money due for subscriptions to this paper and to grant receipts therefor. Our subscribers in Prince Edward and the counties adjacent will please call on him.

Common Errors of Farmers.

Unfortunately for Virginia, there are yet within her borders too many farmers who will not listen to a cry for *reform*. They are joined to their idols and wish to be let alone. They resist every effort at improvement in agriculture that may be made by some neighbor who is disposed to keep pace with the "spirit of the age," and look with contempt on what they term "book farming." However, we know of but *one* of even this class who carries his prejudices quite so far as to *say*, "Poor land is hard enough to work, God knows, without having it rich"—while many, judging them by the indifference and slovenliness displayed in their want of care for their farms, seem to endorse this opinion of their frank and loquacious brother.

These tread in the footsteps of their ancestors without troubling themselves to think whether or not *theirs* was the right path—which it might very well prove to be if they are trying to get to the "Almshouse." "Land Skinners" they are by name and practice; and, for the good of the soil, for the sake of science and for the prosperity of their neighbors and themselves, we regret they can so easily be found. We cannot hope to benefit *this* class by a word of remonstrance, but there are many other farmers who are guilty of errors detrimental to their own interests, from want of reflection and from negligence in *superintending the administration of their affairs*, who will hearken to counsel given with an earnest desire to benefit them. We beg *them* to listen to an enumeration of some of the most prominent faults in the agriculture of our State; and, if convinced that they are aiders and abetters of these faults, we exhort them zealously to set about the work of *reform*. We proceed to particularize some of these errors, and

1st. The folly of cultivating *too much* land for their force and capital. Under such circumstances, the result must be that the *land* is deprived of the *quantity of manure* necessary to insure from it a generous yield, and the *work done* is of an imperfect character—insufficient to reduce the soil to a condition of "good tilth." It must be evident to any man who is capable of understanding or observing the laws of nature, that one acre of *well manured and properly cultivated land* will produce, at a very moderate estimate, three or four times as much as one of poor soil and insufficient tillage. It is better for a farmer to gather a large crop from a small space; because he will have less trouble and expense for *himself*, while his "hands" and teams will not be required to "scatter" over a large space to secure a thin and indifferent crop—the *necessary quality* of all crops the produce of poor soil. It follows, then, that the farmer, by such a course of practice, saves trouble, time and money—the

"force" of the farm and teams have less labor and exposure to undergo. The *wants of the farm* can be better attended to, as the owner has an opportunity of *seeing it often*, and is thus kept "posted up" as to the *condition* of every part of it. Many a "wash" runs into a "gulley," many "abrasions" terminate in "galls" of considerable extent, because they begin in a *distant* field. Again, there is a proportionate diminution of expense and trouble in the items of fencing and draining. Finally, it is more economical, agreeable and profitable to work a farm of proper proportion to the force and capital located on it. "Anything worth doing at all, is worth doing well."

The usual size of our farms (remote from cities) may be said to vary from 400 to 800 acres. These are *generally* divided into three fields—one of which is annually in corn, another in wheat; while the third, under pretext of being *rested* (!), is grazed and poached by all the stock of the farm.

With such "skinning" as this to submit to, of course the land must every year become more and more impoverished—the owner add to his burden of anxiety and debt. After awhile he must "sell out" and remove to a "better country," to secure the probability of a supply of bread to those dependent on him; or, worse still, he must see (what is repugnant to the feelings of every Virginia gentleman) some one or more of his negroes sold to meet his "liabilities." There are many instances of just such management as this, in more States than ours. Many a place in the U. S., where capital, which would be of infinite service in supplying to the arable portions of the land the manure and necessary labor for its profitable cultivation, is "locked up" in useless acres. What, then, is the remedy for this evil?

We answer: sell from one-fourth to one half of the land of every farmer who has pursued such a system of cultivation as we have described and lay out the proceeds *judiciously* in improving the acres he will have left. We believe it would greatly benefit our State and people to do so. We should then have a dense population in districts now almost deserted, which would give renewed impulse to agricultural improvement and incidentally benefit the interests of every class. We have never seen an acre of land made *rich* that did not pay a handsome profit on the cost of making it so—counting the great pleasure of seeing fine crops grow on spots hitherto barren *as nothing;* and pleasure should fill the heart of every man on witnessing an improvement of the soil, effected by *his own* industry, liberality and perseverance. In England, the *tenant*, in order to make his living on his *rented* land, does not hesitate to expend for manures an amount of labor per acre necessary for certain seasons, which would pay for a "fee simple" right to a good farm here.

"Good managers" have *proved that it will pay* to expend liberal sums of money judiciously in improving and renovating the soil.

If English tenants find it pays them to *improve* their landlords' farms, surely our landowners here, who are not improving theirs, are behind the spirit and intelligence of the age. Well may they "find farming a slow business" who are themselves wanting in every element of agricultural progress.

2nd. There is a lamentable state of indifference manifested in augmenting the quantity of manure and in taking care of and hauling out that which, without any special pains, accumulates about the stock-yards. A great many of the stables are built upon the edge of a hill. The manure is thrown out in a heap near its brow, exposed to sun and rain.

First, from being heaped in its fresh state, a rapid fermentation takes place—we should have said *too rapid*—by which it becomes burnt or "fire-fanged;" its gaseous constituents are evaporated, and it is left light, chaffy, mouldy and valuable for little more than the inorganic matters contained in it. Even the latter (the easily soluble portions of them) are washed out by the rain, and the bulk is injured from 50 to 75 per cent. in value. When Guano is used for the wheat crop, how often is it the case, after the *grain* is sold, that even the *straw is thrown away* and not allowed to return *to the land*—depriving it thus, with every crop, of its Lime, Potash, Soda, Phosphates, Sulphates, &c.

100 lbs. of the *ash of wheat straw*, which is 5.10 per cent. of its original weight—as ascertained by the average of 8 different analyses—is equal to about 2,000 lbs. of straw in its unburnt state, and contains inorganic material of different kinds in the following proportions, viz:

Potash,	12.14
Soda,	0.60
Magnesia,	2.74
Lime,	6.23
Phosphoric Acid,	5.43
Sulphuric "	3.88
Silica,	67.88
Per Oxide of Iron,	0.74
Chloride of Sodium,	0.22
Loss,	0.14
	100.

It will be perceived, then, that these figures indicate almost the precise number of lbs. of these important fertilizers abstracted with every 2,000 lbs. of straw from the land. If they are correct (and we do not doubt their truth) it will be well for every farmer to bear them in mind.

Can any man, pursuing such a course of mismanagement, expect to continue to make crops of wheat from the use of Guano? At the present price ($60 per ton) we think it *cannot* make a profitable return But even at the former price of 45 to 50 dollars per ton, its use in the manner mentioned must be eventually a losing business to the farmer. But we believe if it can be bought at a fair price and is used in proper quantities in conjunction with putrescent manures, and the supply of inorganic matter is kept up for the soil by the use of Lime, (in small quantities) *the wheat straw being returned to the land*, that it will be of great benefit.

We have seen it used in this way on poor land which was soon after able to bring a good crop of clover. We know farmers who make large crops of grain by the use of Guano, who do not use their wheat straw *as a fertilizer* at all. It is allowed to remain in a bulk until it rots and mounts on the wings of every breeze to be scattered to the "corners of the earth," while the owner of the farm might say of his departed manure heap what an old wag said of the soul of a neighbor of his who had recently died,

"But, where it's gone and how it fares,
Nobody knows, and—nobody cares."

The excuse offered in extenuation of such carelessness is, "We have no time to haul out manure or straw." We say *take time* to do it. Haul out and distribute to your land every kind of manure on the farm that will make another stalk of corn or of any other article of produce useful for food or luxury. One of the best farmers we ever knew; and, by the way, he made money by farming, used to say, "Putting manure on the land is the very best farming any man ever does." We know it will pay, and advise everybody who owns land and has a stock of it on hand, if he has not time to get it out with his own force and teams, to hire those of somebody else to do it, even if he has to borrow the money to pay for the accomplishment of the job. Money thus expended will come back to his pocket, bringing with it a handsome profit.

3rd. Improper cultivation or defective preparation of the ground cannot make a crop. There is a great deal of ploughing done which deserves to be called by no better name than "mere scratching." Not only is the furrow too shallow to allow the roots of plants easily to penetrate the soil, but no pains are taken to have the furrow slices *lap well*. Negligence in this matter is the cause of many a hole and sink in the surface. These are filled with water and injure plants near them as well as prove obstacles in reaping, &c., and mar the beauty of a field, especially when the ground is "bedded." Ground should be *thoroughly* broken up with the plough if it is expected to bring it into "good tilth" afterwards. If hard at the time of ploughing and left in a "cloddy condition," break the clods. If the harrow does not break them sufficiently, use a roller heavy enough to insure their reduction. In ploughing, the furrows should be run in such a direction as to assist in draining. Let the "water furrows" empty into the ditches and not (as is very often the case) run parallel with them. Here let us call the attention of farmers to the fact, that nine-tenths of them, when they have cut a ditch to carry off the redundant water in a field, *leave the bank standing alongside of it*, thus raising a dam which catches the water and defeats the object of the ditch. True, the water, in the course of time will sink and find its way into the ditch; but until it does, there must be a strip of "water sobbed" land along its edges of greater or less width according to the shape of the surface around. The banks should be thrown off as completely as possible. You can then cultivate to the water's edge; secure more thorough drainage and get rid of the eye-sore of having a hedge of thorns, brambles and unsightly weeds along the edge of every ditch. In all

operations, have an eye to neatness of appearance where neatness is not incompatible with proper economy and progress. There is much truth in the old adage, "the *neatest* farmers *are the best.*"

We propose to show, in a future number, by what means the manure heap can be augmented, relying principally for so doing upon the resources of the farm. We refer our subscribers to older and more experienced heads than ours for instruction in draining, stock management, &c., and shall be glad to have lectures from them on these points. We are very well aware, too, of how much is yet due to our own farm in the matter of proper draining, and if we should attempt to lecture on this subject, should expect to have "Physician heal thyself" hurled at us. However, we will set about remedying this evil very soon, and will only remark further, that it is worth a ride to the farm of our friend F. G. Ruffin, Esq., to witness the effects, and learn the details of, a mode of draining at once economical and easy to carry into execution. His land has been greatly improved by draining effected principally with the plough; and most of the labor has been done with implements worked with horse power instead of the spade.

Charcoal for Firing Tobacco.

We are sorry we are a judge of the *good* quality of "the weed," after it has left the hands of the Planter and passed through those of the manufacturer—after it has been assorted, sweetened, pressed, greased, &c., by the industry of the "colored population" who manipulate it at the factories. But, on this part of the subject, we can speak with a full mouth, as we rarely part company with our "quid" from breakfast until bedtime. Like many others, we have often tried to give up using tobacco, but the effort is vain. Possibly we might (in our ci-devant character of Doctor), say something of the *evils* too, of indulging in the waste of money and health, and the loss of cleanliness and proper digestion necessary before one can become a competent judge of the merits of a "quid" or good "cigar." But prudence suggests we should keep quiet here and stand "non-committal," lest we bring upon us another lecture, in addition to many already received, for the practice of a "bad habit." The venerable Dr. Chapman used to say, that the use of tobacco was so injurious and vile a habit that no man should ever acquire it. If unfortunately acquired, it should at once be abandoned forever, "*except upon a pinch.*" Suiting the action to the word, he would deliberately fill his nostrils with *snuff.*

If then the habit of using tobacco cannot be cured, we will try to remove some of the difficulties in the way of curing it.

The smell, or taste of smoke, is very objectionable in any tobacco, to nearly all persons who use it, as well as to the buyer.

If wood (particularly oak) is used in "firing," it is almost impossible to divest the tobacco of both the smell and taste of smoke, which gives it, after being manufactured, a strong, bitter, and disagreeable taste. Tobacco which is "sun-cured" is always free from this objection, and generally commands a higher price in consequence. But it is a much more troublesome operation to scaffold in the sun, keep it out of the rain, and to chink the open houses with straw, &c., in damp weather, than it is to dry up the sap at once by means of fire. There is trouble *enough* connected with it, everybody knows who has ever raised it, from the time when the plant-beds are prepared until the money is received for the crop: so that any saving of trouble, in the process of curing, is worth the farmer's attention.

We think the advantages of using charcoal for firing may be set down as follows:

1st. The tobacco is left untainted by the smell or taste of smoke, while it is, in consequence, better for manufacturing purposes.

The appearance, too, is said by some to be improved, as it generally has a glossy, silky semblance imparted to it. All the black stain of the coal dust and smoke is removed while in the course of stripping and handling.

2nd. It is much less troublesome, and *near a market for wood,* is much more economical.

3rd. There is little danger of having the Barn burnt down by sparks.

As to the cost of charcoal, we cured last fall a house full, 22 ⋈ 28 feet long, with 9 tiers, for $13. We do not know exactly how many *bushels* were consumed, but 3 cords of good oak wood would be worth that sum. The charcoal made a very hot fire, and there were no sparks from it. In a conversation with a very

successful Planter not long since, he described his method of tobacco-curing as follows:

"I always try to get my tobacco to the house as soon after cutting as is practicable. As soon as the leaves are sufficiently wilted to permit handling without any danger of breaking them, I begin to haul in. For the leaves to wilter requires only a few hours. If the tobacco is not already as yellow as I wish it, (which is seldom the case) in order to *brighten the color, I crowd it close on the sticks, and the sticks sufficiently close together for the leaves to touch slightly.* I leave a space on every tier of six or eight feet unoccupied, so as to have the opportunity, if it should be desirable, to give the tobacco more space. Having succeeded in obtaining as bright a color as I wish, my next step is to separate the sticks several inches before having a fire kindled of dry, half rotten pine wood. This should not be allowed to *blaze*—only to smoke. Fire from wood of this description will not make smoke strong enough to leave behind it either unpleasant smell or taste. It merely *warms* the tobacco faster than it would do from close crowding, and makes it yellow. When the color is sufficiently bright, I have fires of charcoal made up under each tier hot enough to raise the temperature of the house, (which should be close) to 110° or 120°, Fahrenheit. This heat should be kept up constantly. If it is, the tobacco will, in three days, be cured. I take it down for stripping as soon as I can, when it is in order. After stripping, it is again put on the sticks and placed on the tiers in the same close manner as when first brought to the house. If the weather should be unpropitious I can then separate the sticks and give it room so as to kindle a light fire under it at any time I may think it desirable from dampness."

We append an article from a correspondent of that excellent paper, the North Carolina Planter, on the same subject:

WALNUT COVE, N. C., July '58.

To make low-ground Tobacco desirable for the Manufacturer, it is necessary for it to be cured yellow. Until very recently, the idea has prevailed, that Tobacco yellowed before fire is put under it, could not be cured yellow. This is a mistake, and I will endeavor to explain the treatment in a few words. As large Tobacco requires more time to cure it than small, and sappy Tobacco more than that which yellows on the hill, you will at once see the necessity of cutting as near the same grade as possible, for the same curing. Do not put more than five plants on a stick, and have them at least twelve inches apart in the barn. Before housing put it on a scaffold near the barn door, just high enough from the ground to allow the tails of the Tobacco to rest, from 6 to 10 inches on the straw, with which the ground should be covered. As soon as the Tobacco gets sufficiently limber, crowd it on the scaffold and cover it closely over the tops and sides with leafy brush, and there let it remain until it yellows. If it should rain on it, open it on a higher scaffold and let it dry, and if not sufficiently yellow, again crowd it. When it gets nearly yellow, build a log fire in your barn and keep it hot one day so as to dry the ground and walls thoroughly, and at night remove the fire. The next day house the Tobacco, and put from nine to fifteen small fires made of charcoal, at equal distances from each other, over the floor. By hanging a Thermometer on a bottom tier near the centre of the house, you may keep the heat regular. For the first ten or twelve hours, raise the heat to 95 or 100°; then increase it 5° every fifteen or eighteen hours according to the size of the Tobacco, until the leaf is nearly cured, then increase it 5° every two hours until 165 or 170° are obtained, and continue at that until stem and stalk are thoroughly cured. The fires should be kept up night and day from the beginning to the end. The walls of the barn should be made close to exclude the air, and if it has a tight roof, a space two or three inches wide should be left under the eaves; but if a common slab roof, no space will be necessary as they are generally sufficiently open. It would be well to have air holes under the bottom of the house, that could be opened or closed at pleasure, and during the two first days of firing, keep them and the door standing open most of the time.

In giving the degrees of heat and the changes, I may not be exactly correct, but by observing the following I think there will be but little difficulty in succeeding, as the best curers in Stokes county have never used a Thermometer. The nature of Tobacco is such, that if fire is forced too fast in the beginning, it will cause the leaves to cure of a dark rusty or greenish color; or in a more advanced stage, if the heat is too great, there is danger of causing the Tobacco to sweat; which would cause large red splotches to come on the leaves; and if too slow (which I think is not often the case except when the fires are allowed to go out) there is danger of its drying up of the same color that it would in the sun or air. All of these things should be guarded against. If it should get in a sweat, which you can readily detect by frequently feeling the leaves, immediately pull down the fires and give it air freely by opening the door, &c. After it dries out of the sweat, you may proceed as before, but do not have too much steam. By observing these rules I think

the fibre may be cured as yellow as the leafy part of the plant. If too much Tobacco is put in the house at one time, it is almost impossible to keep it from getting in a sweat.

With the hope that the above may prove profitable to your numerous readers, and particularly to my esteemed friend "A Planter of Wake," I now close. B.

Experiments in Pulling Fodder and Cutting Tops.

We have received from the Secretary of the "Hole and Corner Club of Dinwiddie and Brunswick," the following "Report"—with the expressed wish of the Club that we should insert it in our pages. We gladly do this and return our thanks to the Club for the paper. We hope they will continue to send us a report of every experiment which is conducted, as this has evidently been, with care and accurate observation, by any of their members, and which they may deem interesting or "profitable for instruction."

An agricultural paper offers to farmers a channel for communicating to their whole fraternity their ideas on Husbandry, both theories and facts. In it, it is meet that they should freely discuss every subject which is likely to prove either beneficial or injurious to the interests of so important a class. A paper thus used, must be the means of doing a great deal of good; and we offer ours for such purposes to all persons who are interested in the cause of agriculture. In our columns we shall cheerfully afford them room to "take counsel together," assured that a benefit must accrue in which we may be participants:

Experiments reported to the Hole and Corner Club of Brunswick to ascertain the propriety of pulling Fodder and Cutting Tops.

Mr. President:—In compliance with a resolution of this Club, passed at its last meeting, in reference to the result of an experiment I made with corn, I report

That I selected three rows, contiguous to each other, and running parallel across a piece of ground of uniform fertility; the corn in each row appearing entirely similar in quality.

No. 1. I stripped off the fodder about the 20th of September and cut the tops about the 1st of October, as I did my whole crop, which is the usual custom in this region.

No. 2. I chopped down even with the surface of the ground, on the same day that I pulled the fodder of No. 1, and put it in small shocks of 30 to forty stalks to the shock, neither pulling the fodder nor cutting the tops.

No. 3. I did not disturb till gathering corn-time; neither pulling fodder nor cutting the tops. About the middle of November I gathered the corn, hauled, shucked and weighed the contents of each row separately—being particularly careful that not an ear was misplaced—with the following result, viz:

No. 1, weighed - - - 274 lbs.
No. 2, " - - - - 266 "
No. 3, " - - - - 316 "

Thus showing a difference in favor of No. 3, over No. 1, of 42 lbs.; and over No. 2, of 50 lbs., there being between No. 1 and 2 a difference of 8 lbs. only. From the above it would appear that the gain in the corn, by not pulling the fodder nor cutting the tops at all, over the usual plan of saving both, is a little over 15 per cent., and over the plan of chopping down stalk and all at pulling fodder time, of about 19 per cent. Now, when we consider the entire fodder crop, when well saved, as constituting about 25 per cent. of the value of the corn from which it is taken, apart from the cost of gathering and securing it, and the loss sustained in our tobacco from worms and succors while attending to the fodder, we may have a tolerably clear idea of the impropriety of pulling fodder at all; and especially when our tobacco is to suffer by it.

Respectfully submitted,
W. F. Doyle.

Dinwiddie Co., Va., Aug. 5th, 1858.

Explanatory.

Accidents will happen in the best regulated families, and everybody knows of the existence of a "Devil," in every printing office. He it is who bears the blame of all sins of omission and commission in the establishment. We but "give the Devil his due" in informing our readers of the fact, that some of our cotemporaries were deprived of the credit due them for several articles copied by us in the August No., by his machinations. We would credit them now, but unfortunately, the *copy* has been lost, and we cannot say from what paper the article for Dairymen—the "Milk of Spayed Cows"—was taken.

The letter of Mr. Lewis Bailey, on "Green Rye for Soiling Cattle," was addressed to the Editor of the Country Gentleman, published at Albany, N. Y., by Messrs. L. Tucker & Son. In this connection, we cannot help saying of the Country Gentleman, it is in our opinion, a very interesting and valuable journal for the farmer.

In reference to the mistakes referred to (occurring in the August No. of the Planter),

our own *awkwardness* is to blame. We hope this will be excused, as we shall try to avoid a repetition of it. We wrote the name of the paper, from which we copied the articles, on the *back* of the extract, and the *printer thought they were good enough* to pass into the farmer's treasury without being *signed* or *endorsed* by any one. Hereafter we will not "back a friend" in such manner as to do him injury.

Value of Agricultural Papers.

We have ever been of the opinion that the Farmer who does not take an agricultural paper commits a great error, and does himself and those dependant upon him, great injustice. The money paid for a good agricultural paper is like seed sown in "good ground," bringing "forth fruit, some a hundred fold, some sixty fold, some thirty fold."

In confirmation of this opinion we give that of one of our North Carolina subscribers, who has been taking the Planter since its commencement. He says he "verily believes there is not a subscriber to the Planter in his county who makes less than fifty per cent. more than those who do not take it." A word to the wise, &c.

Information Wanted.

A subscriber asks for a receipt for making "Apple Wine." We cannot find such a thing among our exchanges or on the pages of any of our back numbers.

Will some friend give us the information? Also, for the benefit particularly of a "Lady Friend," 'a remedy for the *Roaches*,' which pervade *every* part of the house, from the book case to the sugar dish. Chloride of Lime and several other preventives have been used without success.

We call attention to the advertisement of Mr. L. Tudor in our columns. Mr. Tudor is a near neighbor of ours, and we have seen his Trees, which are *very fine*. We do not doubt that his stock can supply the wants of those who are about to set out young Orchards.

Erratum.—In the September No. of the Planter, in the article on the "Character and Habits of Birds," on p. 503, last paragraph, first line, read (*Icterus* Baltimore) instead of (*Ictuus* Baltimore.

To Postmasters and Others.

We are satisfied, that with proper exertion, any person who will interest himself for us, will be able to make up a list of *new* subscribers for the "Planter," in almost any neighborhood, in this or any other of the Southern States. We offer, as an inducement to those who are disposed to aid and encourage us in our efforts to extend the circulation of this paper, the following premiums in addition to our hitherto published terms:

To any person who will send us clubs of

3 *new* subscribers and $6,—
The So. Planter for 1857.

6 *new* subscribers and $12,—
The So. Planter for 1857 and '58.

9 *new* subscribers and $18,—
The So. Planter for 1857, '58 and '59.

15 *new* subscribers and $30,—
The So. Planter for 1857, '58 and '59, and a copy of the Southern Literary Messenger for one year.

To single new subscribers we will send *the present* volume, (commencing with the number for January, 1858,) at the low price of $1 50, *paid in advance*.

We call upon every one interested in promoting the progress and improvement of agriculture, to lend us his aid in contributions of original articles on practical or scientific agriculture, in order that our paper may continue to be worthy of the confidence and support of those who have hitherto so liberally sustained it, and to whose interests its pages will continue to be zealously devoted.

August & Williams.

July 1st, 1858.

To Subscribers.

In consequence of the change in the Proprietorship of the "Southern Planter," it is very important that our subscribers should remit the amount of their indebtedness with as little delay as possible.

The amount due from each subscriber is in itself comparatively trifling, but in the aggregate it makes up a very large sum, and if each subscriber will consider this as a direct appeal to *himself*, and promptly remit the amount of his bill, it will be of infinite service to us.

We commence sending with this number the bill to each subscriber who is in arrear, and

shall continue to do so until all shall have been sent out. We ask, as a favor, a prompt response from all.

The bills are made up to 1st January next. The fractional part of a dollar can be remitted in postage stamps, or the change returned in the same.

AUGUST & WILLIAMS.

July 1st, 1858.

For the Southern Planter.

The Impropriety of Breaking Roots of Growing Crops.

In the 7 month number of the Planter is an able article on the "Functions of the Roots and Leaves of Plants," to which is appended some remarks by the editor. In these remarks he takes exception to some propositions of the writer, and at the same time advances other propositions as facts, that appears to me may be doubted, though they are considered "indisputable" by the editor.

He says: "Now it is true, we think, that if the roots of the plants are disturbed when the plant is fructifying, injury is done thereby to the product; but while the plant is young, we think that with some sorts breaking the roots is a decided advantage. Thus the cabbage is always larger and better if 'pricked out' before it is transplanted—*i. e.* if it is transplanted, and as soon as it begins to grow transplanted again." Why is this advantage obtained in the case of cabbages? Plainly because they are sown thickly to save labor, and then they grow "spindling," unless allowed more room. But sow them as thinly as when "pricked out," and they will make as good and as stalky plants, as if transplanted, if the soil is in equally good tilth. Who would think of transplanting beets, parsnips, carrots, &c., for the main crops? Some of these are sometimes raised in hot beds and transplanted for early use; but where is the reason that breaking the roots of these would not be as beneficial as for cabbage? Of the culture of tobacco, I know nothing, and am thankful that this *detestable weed* is not among the staples of this region, but I can readily perceive how "a close coultering" may induce "a much more vigorous growth" by loosening the soil around the plant, even if a few roots are broken.

But of the cultivation of corn I profess to know something, and I well remember fifty years ago, when I first began to hold the shovel plough, it was the practice to use a large single shovel, and plough deeply the last time before harvest, 'necessarily breaking the roots' and ridging the ground around the hills. This practice is one of the has beens here, and we should think it an insult to our good sense now, for any person gravely to argue a return to the old mode of cultivating that cereal. I have a relative here, a neat and good farmer, though somewhat old-fashioned, and not apt to take any new notion until fairly convinced, who some years ago was cultivating a field of corn adjoining a field of his neighbor's, and they were going through their crops both at the same time, just before harvest, my relative, as usual ploughing nicely and pretty deep, and hilling his corn beautifully, while his neighbor was skimming his ground with a double shovel plough, not even covering all the grass around the stalk. My relative rallied his neighbor for his indifferent work, and contrasted it with his own; but mark the result, and it is a result often occurring in our dry summers; a drought of several weeks had just set it, and his corn fired badly, the lower leaves dying, thus injuring it materially, while that of his neighbor, who by his shallow ploughing, did not disturb the roots did not fire at all, but the leaves kept green to the ground. The editor speaks of the "tendency to run to stalk," but this only takes place when there is a want of mellowness in the soil, from heavy rain or other causes. This is particularly the case here this year. The soil made very compact by heavy rains, has caused a slender growth of stalk, and unless we have a good deal of wet weather until the crop is made, the ears must be small. The only 'proper time,' in my opinion, and according to my experience, to plough corn for the last time, so as to "give a deep tilth and necessarily break roots," is when we can have rain following, it then may "change its habit of growth," and "benefit the ear," but should a drought of a few weeks take place instead, as is often the case at that season of the year, such ploughing must be far more injurious than shallow ploughing that merely keeps the surface mellow.—The evil effects of deep ploughing at such times I am well satisfied from experience, are not compensated by their occasional advantages, and the idea that to break off the roots increases their number, may be true in that regard, but it remains to be proven that it increases their length, and it is their aggregate length, that gives capacity to obtain nutriment from the soil. When cultivators wish to retard growth they root prune, and how root pruning the corn by the plough can increase its growth, is about as reasonable an argument as that of the dram drinker, who drinks in cold weather to keep the cold out, and in hot weather to keep the heat out.

The editor says, "the fact is indisputable," "that there is a tendency in every plant where vitality is impaired, to reproduce itself more quickly;" but the instances that he gives of improvement in his cabbage and tobacco and corn plants, may be properly ascribed to the pulverization of the soil rather than to the breaking of the roots. It may be, and doubtless is, often the case, that the pulverization of the soil is of more advantage to the plant than

injury to it by breaking some of its roots, but we should ascribe the advantage to the right source, and not advance a principle that in one case is considered to promote growth and in another to retard it. Nature is uniform in her operations, and we cannot change her course at will to suit our fancy. It would be better to retain all the roots if possible.

Believing that the proposition of the editor is based upon an erroneous principle, and is not in accordance with the facts instanced, I greatly prefer the principles advanced by the writer of the essay in question, considering them in the main correct. There is one proposition advanced however, that I think is beginning to be viewed in a different light, the result of which will ere long be ascribed to a different agent from that hitherto supposed.—It has long been the opinion of writers on vegetable physiology, that carbonic acid gas imbibed by the leaves and taken up by the roots, was decomposed by sun light, and thus prepared for building up the carbon in the plant.—Sun light, doubtless, plays an important part in the economy of nature in vegetable growth, but it is beginning to be believed, and strong evidence is had, that electricity is the agent mainly instrumental in releasing oxygen from its compounds. In the arts we know that it does have that effect, and would it not be more consistent with reason to assign as a cause for an effect, one that we have evidence is capable of the effect, rather than one that we have no other evidence of producing the effect than that it is produced. It is not until recently that experiments in electricity have verified this conclusion, but it would seem now to be pretty clearly ascertained, that this active agent is so generally diffused in the atmosphere as to be within the reach of every plant that grows, and every plant is the medium of conveyance from the atmosphere to the earth, and *vice versa;* and thus suiting its action precisely to the circumstances of the case. Every leaf, even every point of a leaf is a conductor, and as moisture is favorable to its conveyance, it is in precisely the condition most favorable to the decomposition of the carbonic acid in the sap, in its passage along the branches and trunk of the plant or tree. The former theory was that the inorganic materials necessary to growth were conveyed by the sap to the leaves, and that by the operation of sunlight, were there vitalized, and then returned by a downward flow of sap to build up the plant in its several parts. This is a roundabout way of producing an effect, and not at all in accordance with the simplicity of nature's laws, where we are acquainted with them. They are remarkable for their simplicity. This theory was borrowed from the known circulation of the animal system, but now our ablest botanical writers say, there's no such circulation in plants as there is in animals.

YARDLEY TAYLOR.

Tobacco Exchange.

The following communication, intended for the August number of this paper, was received too late for insertion. To those interested in the subject of which it treats, it will have lost nothing of its interest, by the unavoidable delay in submitting it to our readers.—[EDITOR.

For the Southern Planter.

FRANK G. RUFFIN, Esq., late Editor, &c.:

Dear Sir—The Bush and Briery Club have, by the publicly expressed opposition to the "Tobacco Exchange," provoked replies from several quarters; and especially have you, as late Editor of the Planter, in publishing certain "remonstrant resolutions" of the Club, thought proper, in "*your quasi official character*," to make them a text to read us a lecture on "*the code of moral obligations*," "*freedom of trade, of action, and opinion.*" To these strictures of yours we are prompted to reply, even though we should still incur your unfavourable judgment for great *moral obtuseness*—and we do so not with a view of provoking farther discussion of the subject, but to elicit your views on certain "apprehensions" and facts connected with the establishment of *this* "Exchange," and not noticed heretofore by you. We do so, hoping that if we are mistaken, you will, in some measure, enlighten our *moral sense* and set us *rectus in curia*. But until that is done, permit us here to say, that having taken the position that we do occupy in opposition to this Exchange, we will dare maintain it, even though we may not have the "congratulations of that large majority of planters who acquiesce in, or approve the reform," of which you *so boastingly* speak. Permit us, also, to inquire how you ascertained "that large majority," and if the returns were *official*. If it were practical, most gladly would we submit the question of *This Exchange* to a vote of the planters, and not fearing, would cheerfully submit to the result; and predict that the returns from the *Rural Districts* would rather set back *our friend of the City and his Exchange*.

In the published Preamble of the Club, we set forth that, "apprehending that the establishment of a Tobacco Exchange in the City of Richmond, is calculated to result in the transfer of the sale of all tobacco, carried to that market, from the hands of the planter to the commission merchant." You contend, in your article, that the "inducement is to improve the cumbrous machinery of trade, and the attempt is made to do it *in conformity with the precedents of other emporia*. The question, then, is whether Richmond is ready to imitate their example; and in all such questions, the first motive of commerce is policy: as it is the only motive which the public cares to consider, for

be its intents wicked or charitable, the public looks only to results."

We thank you for this admission. You must allude to the great cities of New York, Baltimore, Charleston, Mobile, and New Orleans, as being the emporia referred to, as worthy precedents. You are aware, that in the Northern cities referred to, you cannot buy or sell one share of stock, or sell one bushel of grain, except through the hands of the commission merchant; and at the South, even though you held all the cotton that grows on the Yazoo, or Mississippi Bottom, and go into one of these cities, you cannot dispose of a *bale* except by paying a commission to a factor. *The question, then, is whether Richmond is ready to imitate their example"?* We cannot see by what code any privileged class shall appropriate to themselves all the rights of purchase and sale at a public market, and permit no one else to come in and enjoy the advantages of the market except by paying them a *bonus* for so doing. We do not see why we, who grow the tobacco, shall not have the right of disposing of our own crops as we may think proper, be they in our barns, or in the warehouse in the city of Richmond; and what policy of commerce can be promoted by forbidding our so doing, or paying a tax for the privilege—not for the benefit of commerce—*but for the benefit of a combination of private individuals?* The demands of commerce are not so unjust, and she asks no such an offering at our hands. And if "the cumbrous machinery of trade" moves so heavily as to require some improvement, we plead guilty to the obtuseness of not being able to see the necessity, or justness, of having it *lubricated* by a *compulsory* tax of 2½ per cent. on all produce sold in market. If Richmond is to become the great emporium for the sale and shipment of tobacco, you must see that the establishment of this Exchange, "in conformity to the precedents of other emporia," must also establish a tax, amounting to the commission, on all tobacco bought in the upland markets to be re-sold in Richmond, just as the dealer, in buying cotton in Memphis, must calculate the additional cost, and deduct it from the price paid, by being compelled to employ a factor in New Orleans to dispose of it to the shipper; *all of which comes out of the planter.* If we are not much mistaken, we recollect with pleasure your zealous and able advocacy of the abolition of all Inspection Laws, as imposing unnecessary tax on the planter, and are at a loss to reconcile it with your support of a sys em now, which will, "in conformity to the precedents of other emporia," impose a compulsory tax on the tobacco alone grown by him, in many instances as *great and greater* than the whole amount he pays on all his property, personal and real, into the State Treasury, and of which tax now there is so much complaint. You have favoured us with statistics, showing the amount of Inspectors' salary &c., at Shockoe warehouse. We will now ask, and will be under obligations to you to give us some statement of the amount of tax the planter will be compelled to pay, in the way of commissions, on all tobacco sold in Richmond, when the Exchange is perfected "in conformity to the precedents of other emporia." You can approximate to the amount, by ascertaining the value of the tobacco trade for the past year, and give us the 2½ per cent. of the amount, to say nothing "of the large and *increasing trade*" which the founders of the Exchange anticipate.

We believe that the intent of the founders of the Exchange, "be it *wicked* or *charitable,*" is to break down all inspections and warehouse sales—that their "*policy*" is to force all tobacco into the Exchange, and thereafter into the hands of the agent; and that the result of its establishment will be "in conformity to the precedents of other emporia." "The public looks only to results," and profiting by these "precedents"—to prevent just this state of trade in the tobacco market that we demur—and for that reason we "do resolve,

1st. That whilst we may use our commission merchants as agents for the sale of produce, at our option, we will not be compelled to resort to their agency against our will," &c.

We still advocate "freedom of trade, of action, and opinion," careless as to whose *code* it may offend. If the machinery of trade has become so cumbrous, and it is necessary to have an Exchange, we would ask, what objections you can possibly have to an Exchange enacted by the law of the land, where all may have the same rights and privileges, that they now enjoy, *defined* by law? In other words, a general place of sale, where all samples are taken and each inspector sells the tobacco of his warehouse in the order of the breaks of that day? But you answer, that the planter now has the right to sell at the Exchange for the pittance of 12½ cents per hogshead—a sum less than he pays the Inspector. Not being a tobacco planter yourself, we perceive that you are not conversant with the tricks of the trade. 'Tis true, that we may sell at the Exchange for this small pittance, but what guarantee have we that we may do the same thing next year? and besides, as you admit the crier is "bound not to collect at all"—you must see that not one planter in fifty could collect the proceeds of the sale of his crop, divided among half a dozen purchasers, without *great loss of time and incurring expense.* It is almost impracticable, as the counting-rooms of the dealers are scattered over a large portion of the city and unknown to the planter. And besides, we charge it upon the patrons of the scheme, that this prohibition of the crier "not to collect at all," is one of the *studied* "*intents*" to force the planter into the hands of the merchant. After breaking down the inspection sales, (an intent which you will hardly deny for them,) if they do not have the hardihood to come right down

for the 2½ per cent., this *disability* will be effectual in consummating their designs. *What other motive could they possibly have?*

But, again—I believe that it is conceded that the most, and best grade of shipping tobacco, is grown in this region of the State. This high standard has been obtained by great care and skill, not only in growing the staple, but also in the handling, order, mode of prizing, and style of cask. Well, sir, a planter has his crop put up in the best English or Scotch style—bone dry—straight as candles—prized *honest* and with great care, exhibiting a beautiful exterior when stripped, and a water-tight cask. *For all of these things he gets well paid.* (You, probably, are not aware that there are in the country some planters, and professed prizers, who do not put up their tobacco quite as honestly and carefully as others.) He sends his crop to a commission merchant, and at the same time *directs it and marks the casks* to Shockoe warehouse; for the reason, that since the establishment of this Exchange, that this is the house at which the dealers "most do congregate," and he is desirous that all may see his tobacco broke and inspect for themselves. He knows that he has a very desirable crop, and *orders* his tobacco to be sold at the warehouse where all saw it, and at public auction. All of this, we contend, he has a right to do. What say you? Well, sir, what does his *agent* do? He stops the tobacco at the depot, sends it off to Dibrell's—a new warehouse where but few dealers attend, and they have never had a public sale, unless very recently,—has it broken—inspected—and the samples taken to the Exchange and sold at auction, or privately, as may suit his fancy, *and the planter loses all the benefit of his extra labour and care in preparing his crop for market.* He returns to his *principal* an account of sales—*compliments* the skilful manner in which his tobacco is put up—*lauds* the sale as being the best of the season—is confident that no other house could have done quite as well—tells him that his directions, sending his crop to "Shockoe," were noticed, but for personal reasons he has determined never to have another hogshead broke at that warehouse—that *We* (*commission merchants*) have entered into a solemn and written pledge—having established an Exchange—"*to restrict all offerings of tobacco, both public and private, thereat,*" and for this reason he could not *obey his orders*, and ——— cooly solicits farther consignments. "Now, this may or may not be very unwise, but whose 'rights' have they invaded, or what more have they done than assert certain privileges of their own?" We quote your own language and would be glad for you "to prove that the merchants are altogether right in this movement—exercising nothing but their undoubted privileges without the slightest 'invasion of the rights of the planter,' and pursuing, from whatever motive, the course of an enlightened and intelligent commercial spirit, whereby they confer a benefit on the very persons whose interests they are assumed to be assailing." We ask if the *principal*, when he thinks proper to employ an *agent*, has not the *undoubted right* to *instruct* and *control* him in that agency? If we, who hold the *fee simple*, have not the right to control our possessions, even though we think proper to give a commission of 2½ per cent. in reversion to another? We do dare maintain, then, this pledge of the merchants, restricting all offerings of tobacco to this Exchange, and refusing to obey the instructions of the owner, as a violation of rights—a "violation of the long and well-established usage of the country—an invasion of the rights of the planter—by attempting to remove the sale of the great staple of the country from the places appointed by law for its inspection and sale." The law *has established* the warehouse as a place of *inspection and public sale*—"the long and well-established usage of the country" has pronounced it *good*,—the planter has *rights* established by law there, while he only can expect *courtesies* at the Exchange, subject to be *changed* or *annulled*, as may best suit the interest or caprice of the parties controling it.

But you may say, that the planter is not compelled to employ the agent and go to the Exchange—that he yet has the privilege he has had always of selling at the warehouse if, "under the doubtful construction of a most impolitic law, he elects—say—to sell through the inspector." You must admit that either the warehouse sales, or the Exchange, must succomb. If not, you multiply places of sale, and your *machinery* becomes *more cumbrous*. That *cumbrous* as is the trade, it is not large enough to support two establishments in conflict. You must also admit, that the *bald effort* is made by the patrons of the Exchange to crush the warehouse sales—that their pledge, "restricting all offerings of tobacco thereat," proves it. If such be the case, we only ask that if the *demands* of commission merchants, their "invasions" and "restrictions" be thus *modest* now, in the name of the Prophet! what will they be when your "cumbrous machinery of trade" will be improved "in conformity to the precedents of other emporia"? Pardon us for again reminding you, that "the public looks only to results."

But we have written much more than we intended in the beginning, and must close. We are at a loss to find any argument set forth in our published remonstrance, that the establishment of the Exchange lowers the price of tobacco, unless it is your deduction from the fact that the buyers cannot see the tobacco as it is broke at the various warehouses. And we have only to suggest to you, that the objections of John Caskie, William Gray, and other veteran buyers, is worth more to establish the fact, than any assertion of ours, or individual

opinion of yours, and we place them in the scale against both. And we would suggest, if you are not well informed on the subject, to consult with these gentlemen, and learn and report their preferences for seeing all tobacco broke before it is sold—their reasons for buying *planter's tobacco* rather than *reviews*—the advantage of *care* and honest prizing—nice exteriors, and good light casks.

We have not contended "that the law has ever appointed a place *when and where only* tobacco shall be sold." The policy of the law is "freedom of trade—of action and opinion." But we do contend that the law has established the warehouse as a *place of inspection and sale*—free to all—where the planter has rights, and that the attempt on the part of a self-constituted tribunal to break down the warehouse sales, is an invasion of these rights. If they succeed in this attempt, we do contend that the establishment of this Exchange will, according to your own "*precedents*," result in the *restriction* of *all sales* of tobacco thereat—in the transfer of the sales of all tobacco from the planter to the commission merchant; and that this will be a tyranny. Aye, sir! "the very essence of tyranny." We "thank thee Jew for that word."

You also ask, "what motive could influence the buyers to enter into a conspiracy to compel the planter to pay commissions on his sales?" It is hard to judge men's motives; and we have only to refer you again to one of the results of the establishment of Exchanges according to your precedents. You must know that you, *an outsider*, cannot buy a share of stock at the Exchange in New York, and that if *you desire* to purchase cotton in New Orleans, you must employ a *broker* to trade with the factor. There has ever been a considerable speculative trade in tobacco between Petersburg and Richmond, and sometimes *upland* dealers make a handsome operation by slipping in on a crowded market in Richmond. Such has been the amount of this kind of trade, that already there are buyers in Richmond who tender their services as *tobacco brokers*, to be employed at the option of *outsiders*, (as they are termed.) We have no doubt that many manufacturers, and other dealers, are actuated by motives of "economy of time, as well as to conduce to the comfort and convenience to all," but at the same time we can see an "*inducement*" in the "*trade*" to exclude these *outsiders*, or levy a contribution on them for the privilege of *coming in*. And this will be in conformity to your precedents.

Your arguments touching the Inspector, and the objections brought against him, we do not notice, as we do not appear as the especial friends of the Inspector. We are fully aware that they have been "*fillibustering*," as well as others, in raising their charges for selling, collecting, &c., and we desire to see them *pruned* a little, and made to know that they are *men under authority*. We must say, however, that your *fling*—that we advocate a policy which offers an inducement, or rather *bribe*, "to him to neglect his legitimate business," and that "we hold this alternative, either that a useless office shall be continued that we may have the advantage of sales at less than the regular commissions, or that they shall have, for a small consideration, the benefit of services already pledged to the public for a very large one"—we regard as *special pleadings*, and not pertinent to the question at issue.

In accordance with your example, and "in conclusion, we have to congratulate that large majority of planters who do 'not' acquiesce in, or approve the reform;" that whatever be its temporary success, we have our relief from a tribunal rather higher than a self-constituted board, and that we are not yet *sold* to The Tobacco Exchange, though bequeathed to it by the *late Editor* of the Planter, by his "last will and testament."

BUSH AND BRIERY.

From the Germantown Telegraph.

A Few Words to Young Farmers.

We find the following hints to young farmers in the *Country Gentleman*, and lay the article, at the earliest moment, before the readers of the *Telegraph*. It contains sound sense, drawn, doubtless, from many years' observation, and it should be regarded by those whom it is especially intended to benefit, as valuable information, which they should store up in their minds and make use of.

"There seems to be a prevailing sentiment of aversion, not to say contempt, for their calling, among old practical farmers. Their idea seems to be that a farmer can have no position in society, no influence among men—that their sons who follow in their footsteps, are doomed to endless plowing or pig-feeding, with no incentives to mental culture, for which, indeed, they conceive there is no *necessity* if a man is to be a farmer. "Only a farmer"—"nothing but a common farmer," are expressions constantly in the mouths of such men when speaking of themselves or their class. No man can be happy who entertains such a feeling towards his business in life, or harbors contempt for the class of men among whom his lot is cast. To be successful in any avocation of life, betokens fidelity in its pursuit; but to be *eminent*—to be *celebrated* for conducting a business better than others have done or can do it, bespeaks an enthusiastic study *for the sake of the thing itself*. It is to "take a pride" in one's calling, be it what it may.

"There are many farmers who deem their calling inglorious and humble, who have an ambition to see their sons *elevated* (as they conceive) to some profession, and their daughters *idle ladies*, forsooth. Accordingly, nothing is more common than to see young men, thrust by

their parents into professions, idling away month after month in a musty briefless law office with little or no business, making themselves despised by honest hard-working men, by their attempts *to live without work*, which has come to be a synonym for "living genteelly." Or perhaps the luckless wight is turned into a doctor! to peddle drugs and to endanger human life by empiricism. Look at the swollen ranks of doctors and lawyers for proof. If, with the same education they have been obliged to receive to graduate themselves as M.D.'s or lawyers, these same young men would go back on to the farm and labor earnestly and with the enthusiasm necessary to *eminence* in any profession, the results would soon be manifest on the farms and farming systems throughout the country.

"When we cast about for the reason and occasion of so much false philosophy among our farmers in directing the economy of life for their children, we find that it is mainly the *ignorance* of that class of men who decry "book-farmin'," "larnin'," and "eddication," for farmers. Foolish men, do not wonder that you are overlooked when occasion has need of a *man*, and that you have no position in society, and (taken as a body) little influence among men!

"There was a time when the farmers of New-England were an influential body of men, renowned for their many virtues. They bore themselves with all the innate but quiet dignity of *men*—men true to themselves and their calling, and true to others—true to the calls of patriotism, steadfast in the cause of right in legislative halls, in the jury-box, in politics, and in religion. The "homestead" was a nursery of domestic virtues and happiness, to which its nurselings looked back in the toils of after life with veneration and love. It was as near patriarchal as any form of domestic discipline could be in these latter degenerate days, and around the hearth-stone, and under the shade of the family *trysting-tree* grew and flourished every domestic virtue, and a patriotism under the teachings of good men and good women, that the artificial manners of now-a-days are choking out of life. "How are the mighty fallen!"—The "good man" of the farm is rarely looked up to and respected now as then, and farm-life has become a different kind of life. Why is this? It is because, and *only* because the body of farmers at present in the same section of country have not the same thorough *education—simple*, it is true, but none the less thorough, well-directed education that the men of old acquired, and that, too, at a time when the facilities for spreading education and useful knowledge were comparatively limited. It is a fact that in the farming community of New-England the standard of education is not as high as it was eighty years ago. The farmers of those days had more general information—more extended and profounder views of human life—more and fresher ideas. They had juster notions of morality, a correct acquaintance with the laws of the land enough to enable them to conduct business matters with better judgment and more securely than the same class of men at present, who can hardly make a trade with each other out of which a law-suit might not be hatched. How many out of a hundred of them at this day can write a free legible hand-writing?—how many a terse, intelligible letter?

"How many of us have seen the grey-haired veterans of a long, peaceful, rural life, men who made their mark in their day and generation, to whom we have looked up with respect—relicts of the giants of other days—going down with slow and measured pace to the impenetrable shades. And when shall we see their like again? Not till the standard of education is raised among the tillers of the soil; till the young man is educated on the farm and for it; till he is taught home habits and home enjoyments; till he has that cultivation of the mind that fits him to enjoy books and sources of culture at home, as a relief from care and labor; till he can *relish simple pleasures*, and needs not the excitement of the turf and the noisy festivities of a bar-room for his amusement. Farmers educate your children; give them priceless boons, of which no money-panic, no commercial crisis, no prowling incendiary or midnight thief, no human agency, can rob them. Inspire them with a love of the beautiful, and to do this teach them that "a thing of beauty is a joy forever," by surrounding them with beautiful object, natural and artificial.

"Teach them a love for the cultivation of the mind and the virtues of the heart, by surrounding them with good readable books, and procuring for them the tutorings of enlightened teachers. This seems to sound chimerical and visionary as relating to farmers, but it is a practicable thing—more feasible among ruralists than among any other class of men. The farmer can do much more in this way for his children than the care-worn jaded man of a profession, whose brain is always overheated, and whose time is too much occupied to pay the necessary attention to these minutiæ. I am aware that these things cost money, and if really thoroughly entered into, will take a large dividend out of the yearly revenue, but it will pay you better than any bank-stock or bond and mortgage. Make your home beautiful and pleasant to your children—make it the elysium of their childhood and youth—give them advantages for mental culture, and encourage them in it, and they will be far less likely to roam "out West" and leave you alone in your old age; fewer of them will wreath the midnight bowl, and fill a drunkard's grave at six-and-twenty, and when you turn your face to the wall, you will feel conscious that you have discharged your duty towards them, and although perhaps your estate is not so large, you have taught them better how rationally to enjoy what you

have left them; filial love will watch over and guard your down-hill totterings, and keep alive your memory in gratitude more glorious than glittering monuments or ornamented shrines, and, like dew on Hermon, shall fall holy tears for you departed.

SWANTON, *Vermont.*

From the Rural New Yorker.

The Soil.

The soil is the farmer's capital—to make it pay him good profits, his business. His means are invested in land, and from its generous bosom he must draw support for himself and family—house, food, clothing, fuel, books, papers, education for his children—all the necessaries of life, without which man cannot live, and all these luxuries without which life is hardly worth the having. The President in the White House, or ministers at foreign courts, the American loungers in Paris or Rome, the missionary on the burning sands of Africa, the merchant in his counting-room, and the mechanic at his bench, all derive sustenance from American soil. Truly do the Scriptures say, "The profit of the earth is for all; the king himself is served by the field." This fact no political economist can deny, no sophism can conceal. To keep his capital from depreciation, and in such a condition that it may be able to honour his many and necessary drafts, so as to be in no danger of a panic, and that no suspension may become necessary, is the great business of the farmer. It is, then, of the greatest importance that we should know the *character* of the soil which a kind Providence has provided for our sustenance, and the best method of securing this desirable result.

We need not tell American farmers that our soil differs in character, that we have *clayey*, *loamy*, and *sandy* soils—nor that these different soils require a different treatment, and are suited to different crops. And yet we often think those important matters are forgotten; for how few, who send us reports of their crops, of their success, or their failures, give even a hint as to the nature of the soil in which the crops were grown, or the experiments tried!

Then there is much need of information as to the best manner of cropping and manuring the different varieties of soil. We know of land in this section, that ten or fifteen years ago was considered so entirely unsuited to agricultural purposes that it was thought no sane man would buy it for farming purposes. Starvation or retreat was supposed to be the sure fate of any one bold enough to try the experiment. These lands are now the most productive and valuable of any in this part of the State. This change has been brought about by skilful culture and a wise adaptation of crops to the soil.

Every farmer should possess a general knowledge of the formation, composition, character, and classification of soil, and on these points we shall endeavour to make the whole subject so plain that it will be understood and remembered by all.

CHARACTER AND FORMATION OF SOILS.

Soils are those portions of the earth's surface which contain a mixture of mineral, animal, and vegetable substances in such proportions as to adapt them to the support of vegetation. We quote from a valuable article in *Morton's Encyclopedia:*

"On examining the various soils in this or any other country, they will be found to consist generally, 1. Of larger or smaller stones, sand or gravel. 2. Of a mere friable, lighter mass, crumbling to powder when squeezed between the fingers, aad rendering water muddy. 3. Of vegetable and animal remains, (organic matter.)

"On further examination of the several portions obtained by means of washings, we find,

"1. That the sand, gravel, and fragments of stones vary according to the nature of the rocks from which they are derived. Quartz-sand, in one case, will be observed as the predominating constituent; in another, this portion of the soil consists principally of a calcareous sand; and, in a third, a simple inspection will enable us to recognize fragments of granite, feldspar, mica, and other minerals.

"2. In the impalpable powder, the chemist will readily distinguish principally fine clay, free silica, free alumina, more or less oxyde of iron, lime, magnesia, potash, soda, traces of oxyde of manganese, and phosphoric, sulphuric and carbonic acids, with more or less organic matter.

"3. The watery solution of the soils, evaporated to dryness, leaves behind an inconsiderable residue, generally coloured brown by organic matters which may be driven off by heat. In the combustible or organic portion of this residue, the presence of ammonia, of humic, ulmic, crenic, and apocrenic acids (substances known under the more familiar name of soluble humus,) and frequently traces of nitric acid, will be readily detected. In the incombustible portion, potash, soda, lime, magnesia, phosphoric, sulphuric, and silicic acid, chloride, and occasionally oxyde of iron and manganese, are present."

All cultivated soils present a great similarity in composition—all containing the above chemical constituents; and yet, notwithstanding this similarity of composition, we observe a great diversity in their character. This is caused by the different proportions in which the constituents are mixed together, the state of combination in which they occur, and the manner in which the different soils are formed. All arable soils contain organic matter, varying from half to twelve per cent. Good garden mould frequently contains from twenty to

twenty-four per cent. of its own weight, and in peaty bogs from sixty to seventy per cent. is not uncommon. It was once thought that the richness of a soil was plainly indicated by the proportion of organic matter it contained; but careful analyses of seven specimens of the best wheat soil of Scotland, and yielding about alike, being made, they were found to range from three to ten per cent. The poorest peaty bogs, also, contain the greatest amount of organic matter, while they are notoriously unproductive.

The organic matter in the soil is due, for the greater part, to the vegetable remains of former crops. The prairie soils are rich in organic matter derived from the annual decay of the grass for centuries. The soil of the forests is enriched by the fallen leaves.

The manner in which soils are formed cannot be doubted by any one who has observed the appearance of large rocky masses, the bare surface of their smoother and harder parts, and the growth of mosses and small plants on the more softened portions. The soil in valleys surrounded by rocky mountains shows very evidently that they originated in the disintegration and decomposition of the solid rocks in their neighbourhood. One of the principal agencies in effecting a gradual disintegration of solid rocks in the oxygen of the atmosphere. "Oxygen possesses a great affinity for many mineral substances, and has, consequently a powerful tendency to form new compounds. Those compounds, or oxydes, being always more voluminous, looser, and less compact, are the primary cause of the bursting of many rocks, particularly those containing much iron. In the course of the formation of these oxydes, the compact texture of the rock is broken up, and the whole mass of the rock gradually crumbles down."

Another and powerful agency in the formation of soils is the carbonic acid of the atmosphere carried down by rain. Limestone is easily attacked by rain water, as the carbonic acid which the water contains dissolves the carbonate of lime. "On feldspar, granite, and other minerals consisting of silicate of alumina and an alkaline silicate, carbonic acid, and water exercise a highly important action. Under their influence these minerals are decomposed into alkaline silicates, which in their turn give rise to silica and carbonate of potash or soda, and into silicate of alumina, or pure clay."

The lower orders of plants and animals take a very active part in the formation of soil from solid rocks. The seeds of lichens and mosses floating in the air attach themselves to the surface of rocks which have become partially decomposed by the action of the air and rain, as before described, and finding here sufficient food, grow, thus keeping the surface of the rock moist for a longer time after rain, and giving the water a better opportunity to exercise its dissolving powers. Insects feed on the moss; and both insects and plants die and decay. A thin layer of more fertile soil is thus formed, which is soon taken possession of by a higher order of plants and animals; which in their turn die, leaving a better estate to the succeeding generation.

Mechanical causes, too, operate upon rocks. The wind, thawing and freezing, and the principle of gravitation, effect them more or less.

Boiling Potatoes.

Is there, among vegetables for every-day consumption, anything to compare to a well-cooked, mealy potato? and is there anything poorer than an ill-boiled, watery potato? And yet how seldom do you see, even among good livers, a first-rate dish of potatoes! A well-cooked, boiled potato is the happiest looking inamimate thing in creation. When they come to the table smoking hot, with their "jackets" on, all bursting with the good inside, it is a sight to make a dyspeptic good-natured, and never will fail to turn a sullen face into wreathing smiles. Then let me say a few words about cooking this vegetable, and tell the way in which I have been most successful.

To boil potatoes, let them lie in cold water six hours, at least, before boiling, (twelve hours for very old potatoes is not too long.) Then put them into boiling water a little salted, and the water should be kept at moderate boil till they are done, which should be tested with a fork; then poor off the water and let them stand in the pot till dry. Great care should be taken not to let them boil a moment after they are done, as it will render them watery.

An excellent plan to make old potatoes mealy is to turn them into a cloth and rapidly shake them about, or take them one at a time in a cloth and slightly press them.

The larger potatoes should be put into the pot before the smaller ones, that they may be equally done.

It requires from forty to fifty minutes to boil old potatoes. New ones will take about half that time.—*Homestead.*

To Preserve Dried Fruit from Moths.

A fruit-grower gives, says the *Louisville Journal*, the following receipe for preventing dried fruit being damaged by moths:

Put the dried apples or peaches into a tin vessel with a perforated bottom; cover closely with flannel; place the vessel into a boiler or kettle containing two or three quarts of boiling water, having some sticks across the water to prevent the tin touching it; boil briskly, and the fruit will soon be thoroughly heated without loss of flavour. Spread it out; the heat will soon evaporate the moisture.