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.

J. E. WILLIAMS, EDITOR. AUGUST & WILLIAMS, PROP'RS.

VOL. XX. RICHMOND, VA., MARCH, 1860. No. 3.

From Josiah Parkes' Essays on the Philosophy and Art of Land-Drainage.

Physical Properties of Earthy Matter.

[CONTINUED FROM THE FEBRUARY NUMBER OF THE SOUTHERN PLANTER.]

SECTION II.

The influence of drainage and pulverization on the temperature of soils, is necessarily, dependent on the habits and constitution of the solid as well as the fluid matter composing or mixed with the soil. The variety of substances which enter into its composition; their peculiar structure; the state of division or size of their particles; their colour; their respective powers of absorbing, conducting, and radiating heat; their bibulousness—all these properties conspire to the determination of the temperature of a given soil: and these properties are irrespective of latitude or locality. Chemists have informed us of the specific heat, of the absorbing and radiating energy of various earths, and of many soluble and insoluble bodies when submitted separately to investigation; but we possess little or no knowledge of these relations when such various substances are blended together, as we find them to exist in the agricultural bed. It is there we should seek for information;—it is on the mass of the soil itself practical men should experiment, to ascertain the facts in question. Nevertheless, the labours of the laboratory are not to be rejected; it is by their agency, chiefly, that we have acquired our complete knowledge of the phenomena of water; and investigations conducted in the closet may materially aid the experimentalist in the field. I have extracted the following opinions and researches from the works of two distinguished British philosophers, as they relate to the affinity to moisture and heat of many bodies found in soil, and illustrate this division of the subject.

Professor Leslie, who added largely to our knowledge of the phenomena that heat and moisture, thus introduces the mention of his experiments on the hygrometric powers of some of the earths, which, for the sake of brevity and perspicuity, are collected in the following table:—

"Absorbent substances, besides assimilating to their essence a portion of the liquid which touches them, are likewise disposed to attract, though with various energy, the humidity of the atmosphere. The more solid as well as the softer, materials exert this power, and which is exactly analagous to that of the concentrated acids and the diliquescent salts. In their several

affinities to moisture the earthy bodies discover the most essential differences of constitution. To examine those properties, let the substance be dried thoroughly, and almost roasted before a strong fire, and introduced immediately into a phial with a close stopper; the powder having undergone that sort of preparation is, at any time afterwards, thrown partially into a very large wide-shaped bottle, and shut up till it has attracted its share of humidity from the confined air; and the delicate hygrometer being now let into the bottle indicates the measure of the effect produced by absorption."

DEGREES OF MOISTURE ABSORBED FROM AIR AT ABOUT 60°.

Clay, very highly torrefied	8
Silica, do	19
Whinstone, do	23
Carbonate of strontites	23
Carbonate of barytes	32
Clay, strongly roasted	35
Silica, soaked in water, and dried after high torrefaction	35
Silica in its natural state	40
Carbonate of lime	70
Shelly sea-sand	70
Carbonate of magnesia	75
Sea-sand, from a sheep-walk	78
Whinstone, in its natural state	80
Alumina	84
Pipe-clay	85
Sea-sand, cultivated	85
Whinstone, in a crumbling state	86
Do, reduced to mould	92
Garden mould	95

Leslie remarks that "the absorbent power of earths depends as much on their mechanical condition as on the species of matter of which they are composed. Whatever tends to harden them diminishes the measure of their effect; and hence, apparently, the reason why the action of fire impairs their desiccating quality.*

Useful as is this contribution to the philosophy of soils, it must be deemed very remarkable that, the ingenious author altogether omitted to investigate the relation of the same substances to the absorption of heat, as well as moisture. The importance of ascertaining this double relation did not, however, escape the sagacity of Davy, who preceded Leslie in this research, and whose remarks are so pertinent, and possess such intrinsic worth, that I trust the citation of them will not be thought tedious:—

"Many soils are popularly distinguished as *cold;* and the distinction, though at first view it may appear to be founded on prejudice is really just.

"Some soils are much more heated by the rays of the sun, all other circumstances being equal, than others; and soils brought to the same degree of heat, cool in different times, *i. e.*, some cool much faster than others.

"This property has been little attended to in a philosophical point of view; yet it is of the highest importance in agriculture. In general, soils that consist principally of a stiff white clay are heated with difficulty; and, being usually very moist, they retain their heat only for a short time. *Chalks* are similar in one respect—that they are difficult to heat; but, being drier, they retain their heat longer, less being consumed in causing the evaporation of their moisture.

"A black soil, containing much soft vegetable matter, is most heated by the sun and air; and the coloured soils, and the soils containing much carbonacious matter, or ferruginous matter, exposed under equal circumstances to the sun, acquire a much higher temperature than pale-coloured soils.

"When soils are perfectly dry, those that most rapidly become heated by the solar rays likewise cool most rapidly, their power of losing heat by radiation being the greatest; but I have ascertained by experiment, that the darkest-coloured dry soil (that which contains abundance of animal and vegetable matter—substances which most facilitate the diminution of temperature,) when heated to the same degree, provided it be within the common limits of the effect of solar heat, will cool more slowly than a wet pale soil entirely composed of earthy matter.

"I found that a rich black mould, which contained one-fourth of the vegetable matter, had its temperature increased in an hour from 65° to 88° by exposure to sunshine, whilst a chalk soil was heated only to 69° under the same circumstances. But the mould removed into the shade, where the temperature was 62°, lost, in half an hour, 15°; whereas the chalk, under the same circumstances had lost only 4°.

"A brown fertile soil and a cold barren clay were each artificially heated to 88°, having been previously dried. They were then exposed in a temperature of 57°. In

* Leslie on Heat and Moisture, p. 96. 1818.

half an hour the dark soil was found to have lost 9° of heat; the clay had lost only 6°. An equal portion of clay containing moisture, after being heated to 88°, was exposed in a temperature of 55°. In less than a quarter of an hour it was found to have gained the temperature of the room.* The soils, in all these experiments, were placed in small tin-plate trays, two inches square, and half an inch in depth; and the temperature ascertained by a delicate thermometer.

"Nothing can be more evident than that the genial heat of the soil, particularly in the spring, must be of the highest importance to the rising plant; and when the leaves are fully developed, the ground is shaded, and the injurious influence, which in the summer might be expected from too great a heat, entirely prevented; so that the temperature of the surface, when bare, and exposed to the rays of the sun, affords at least one indication of the degrees of its fertility; and the thermometer may be sometimes a useful instrument to the purchaser or improver of lands, &c."—(*Agricultural Chemistry.*)

The chapter containing these experiments and opinions of Sir Humphrey Davy will supply many other useful hints for the guidance of the experimentalist in his inquiry into the causes of the varying temperature of soils. I will select only one other short extract from the well-known lectures of this eminent man, as it records information touching the affinity of some particular soils to moisture, the fertility and rent-value of which he quotes as being pretty nearly in the ratio of their hygrometric powers.† The soils were first dried at a temperature of 212°, and then exposed to air saturated with moisture at 62°:—

GAIN OF MOISTURE IN AN HOUR.

	Grains.
"1000 grains of a celebrated soil from Ormistown in East Lothian,.....	18
1000 grains of a very fertile soil from the banks of the river Parrett in Somersetshire, ...	16
1000 grains of a soil from Mersea in Essex,.....	13
1000 grains of a fine sand from Essex...	11
1000 grains of a coarse sand,.....	8
1000 grains of a soil from Bagshot Heath,	3"

In reflecting on the results of these isolated experiments, and on the conclusions drawn from the consideration of some single property of soils (whether they be just or otherwise,) the philosophic mind cannot fail to perceive how infinitely more valuable such experiments would be to the agriculturist were they combined with direct indications of the actual constitution of the same soils in their natural state, and under culture, as regards their attraction for heat and moisture. May it not be reasonably expected that a well-conducted series of experiments on these phenomena would illustrate some of the causes which conduce to render certain soils in a higher latitude more productive than others in a more Southern one? Might they not serve to detect fallacies in reasoning or practice—to show, possibly, that effects have been attributed to wrong causes—and to unfold to our perception a clearer and more correct knowledge of the workings of nature?

From the foregoing review of the physical properties of soils in relation to heat and moisture, and of the action of water in warming or cooling them, it will be seen that a very remarkable difference obtains between the properties of the fluid and

* A remarkable confirmation of what has been before stated of the chilling effect of evaporation. J. P.

† Schübler has criticised this opinion of Davy's, (Journal, vol. i., p. 197.) He observes: "The assumption of Davy, that this capacity of absorption possessed by a soil was to be received as a *conclusive* proof of its fertility, is liable, therefore, to many exceptions; and, if applied without modification, might easily mislead." Excepting in one instance Schübler's experiments appear to confirm, very closely, Davy's observation.—"I have compared the absorbent powers of many soils with respect to atmospheric moisture, and I have always found it greatest in the most fertile soils; so that it affords *one* method of judging of the productiveness of land." I have not noticed that Davy has anywhere spoken of it as a *conclusive* method. Davy, Leslie, and Schübler all agree on the fact of garden-mould being the most absorbent of all soils. Davy specially excepted the case of a pure clay; and Schübler also instances that earth, as an exception to the general law deduced by both philosophers, that the fertility of soils is pretty much in the ratio of their powers of absorbing and retaining moisture. Schübler has made one step in advance of Davy, by his elaborate experiments tending to establish the fact that moisture in the earth is a preparation for its absorption of oxygen and consequently that the attraction of soils for moisture is a property of first-rate importance to agriculture.

solid bodies. It appears that water absorbs heat rapidly, but can only convey it downwards by itself descending into the earth; that the heat which it receives from the solar rays is again projected into the atmosphere by radiation, and in combination with vapour, when it remains stagnant on or near the surface; whereas, solid substances impart the heat which they absorb to all surrounding matter, in all directions, (though with different degrees of rapidity,) as well as to the atmosphere. There is yet another important effect arising from the radiating force of solids to notice. As the sun verges towards the horizon, the superficial layer of the earth becomes colder than the atmosphere, causing the precipitation of dew, which the affinity of earthy matters to moisture enables them to absorb, and thereby to recruit in part, by night, the loss of moisture which has taken place during the day. Water also radiates heat powerfully but it does not attract moisture itself except under very peculiar and rare circumstances; hence again the advantage of drainage. These important processes, viz: the absorption of moisture and the radiation of heat, will be carried on with more or less energy in proportion to the inherent qualities of a soil, to its state of mechanical preparation, and to the proper adjustment of its supply of water.

SECTION III.

Cause and Physical Action of Dew.

The quantity of moisture attracted from the atmosphere, in the form of dew, is unknown; but the cause, and many of the laws of its formation, deposition, and physical action, have been disclosed to us by the talents and labours of Dr. Wells, whose experiments and Essay on this subject stand almost unrivaled in the records of science as examples of skilful investigation and profound induction.* Previously to the conclusive experiments of this admirable philosopher, the formation of dew was held to be the *cause* of the cold observed with it, and he originally entertained the same opinion.

"But," he observes, "I began to see reason, not long after my regular course of experiments commenced, to doubt its truth, as I found that bodies would sometimes become colder than the air, without being dewed; and that, when dew was formed, if different times were compared, its quantity, and the degree of cold which appeared with it, were very far from being always in the same proportion to each other. The frequent recurrence of such observations at length converted the doubt of the justness of my ancient opinion into a conviction of its error, and at the same time occasioned me to conclude that dew is the production of a preceding cold in the substances on which it appears." Further—"that the cold which produces dew is itself produced by the radiation of heat from those bodies upon which dew is deposited."

Thus it was discovered that an *effect* had heretofore been mistaken for a *cause;* and the explanation of the various phenomena connected with the subject, afforded by this theory, has since remained unchallenged, and is admitted to be incontrovertible.

Besides the determination of the immediate cause of dew, Dr. Wells ascertained, among other phenomena affecting the temperature of soils, that the attraction of substances for water is not exactly proportional to their radiating energy; and that—"the formation of dew not only does not produce cold, but, like every precipitation of water from the atmosphere produces heat."

As the earth becomes colder than the atmosphere on dewy nights by reason of its radiating energy, and as the moisture suspended in the latter possesses the atmospheric temperature, dew, with respect to the surface of the earth, is warm. Were it not that this antagonist warming process counteracts, on cloudless and serene nights, the rapid escape of heat from the earth by radiation, it is probable that the temperature

* The original 'Essay on Dew,' which appeared in 1814, is very scarce, but is republished in the works of Dr. Wells, containing a memoir of his life written by himself.

A distinguished living philosopher thus writes of this theory, after making a concise but searching analysis of it: "We have purposely selected this theory of dew, first developed by the late Dr. Wells, as one of the most beautiful specimens of inductive experimental inquiry lying within a moderate compass. It is not possible in so brief a space to do it justice; but we earnestly recommend his work (a short and entertaining one) for perusal to the student of natural philosophy, as a model with which he will do well to become familiar." *Discourse on the study of Natural Philosophy, by Sir J. F. Herschel*, 1832, *p.* 163.

of the soil would be depressed, during the sun's absence, by a greater amount than it is elevated during its presence; and that the extremes of heat and cold, or the vicissitudes of temperature, during twenty-four hours, might be so great as to destroy vegetable life in the summer season. The least experienced observer may easily satisfy himself of the superior cold of the earth's surface on clear nights, relatively to that of the atmosphere. Hoar-frost, which is frozen dew, frequently forms on grass when the thermometer in the air indicates a temperature some degrees higher than the freezing-point; a phenomenon showing that the earth, or the leaves of plants, were colder than the atmosphere, and below the freezing-point when the deposition took place. In Bengal, ice is (or was) procured artificially, on a large scale, or for profit, by exposing water to the sky in porous earthen pans placed in shallow pits. The difference of temperature between the air and the water, at the time of its congelation, has often been observed, on clear, serene nights, to amount to 14° and 16°. The air near the ground must then have had a temperature of about 46° or 48°.

The genius of Davy would appear to have almost divined the mystery of dew-making, even before the complete revelation of its true and only cause by Dr. Wells, as may be gathered from the following profound remark :—

"The power of soils to absorb water from air is much connected with fertility. When this power is great, the plant is supplied with moisture in dry seasons; and the effect of evaporation in the day is counteracted by the absorption of aqueous vapour from the atmosphere, by the *interior* parts of the soil during the day, and by both the *exterior* and *interior* during the night."—*Agricultural Chemistry.*

If a soil be sufficiently permeable to air, and not saturated with water, it is in a state to receive accessions of moisture, which is a constant and inexhaustible vehicle of humidity; and if the temperature of a sufficiently porous subsoil be at or below the dew-point, as will frequently be the case, during some portion of the day, in the summer season, the process of depositing dew will take place in "the interior parts of the soil during the day," at the same time that the exterior, or surface of the ground, may be projecting both heat and moisture into the atmosphere. This process is evidently dependent on the relative temperatures and degrees of aqueous repletion of the air and subsoil at a given time; and independent of the hygrometric power of the latter, which is, however, a potent auxiliary to the acquisition and retention of atmospheric moisture by soil, particularly in its interior parts. Thus, it is apparent that the acquisition of moisture by soils in the form of dew is not limited to the period of the night only, nor to the surface of the earth; and it has been shown that the precipitation of dew can not take place without the communication of heat to the recipient substance: hence the importance of sufficient pulverization to permit access and change of air to the interior parts of the soil. One of the most beneficial effects of drainage may be also safely presumed to arise from its facilitating the access, and change of air to the very bottom of the bed; as, in proportion to the escape of water, so will be the entrance of the air, which will, *pari passu*, occupy the place vacated by the water.

Every observant farmer must have remarked, that the amount of dew precipitated during the same night varies greatly on different soils in fallow, and still more on the leaves of different plants. Well-pulverized soils attract much more dew than those which are close and compact, as the radiation of heat is effected from many more points in highly comminuted than plane surfaces. Sands appear to be powerful attractors, and in some countries to depend altogether on the nightly deposition of moisture for the support of vegetation. An extreme example of the derivation of the aqueous element from dew alone, and of its highly fertilizing qualities, is afforded by the fact that, on the sandy plains of Chili, rain is scarcely ever known to fall; yet that soil, which under other circumstances would be sterile, is maintained in a productive state by the active forces of radiation and absorption. The temperature of the soil is moderated during the period of the sun's action by the large amount of heat carried off combined with vapour; whilst the exhausted humidity is replaced by dew, deposited during the resplendent nights of that tropical region. Instances are also on record of the flourishing growth of trees in Africa on sandy districts, never refreshed by rain or springs, nor by artificial supplies of water: whilst soils of another nature, in

the same latitude, and not far distant, require irrigation to enable them to sustain vegetable life.

It is to the copious dews of our own country that we have in great measure to attribute the productiveness of the meadows bordering streams and rivers. The atmosphere, in the neighborhood of currents of water, becomes more highly charged with aqueous vapour than that of the uplands; and as the air transports and disperses this moisture over the adjoining fields, it is condensed and precipitated during the night by the process discovered by Dr. Wells.* The finely-divided and filamentous structure of the grasses render them, in addition to their demand for aqueous nutriment, peculiarly suitable for culture in these localities. It is worthy of notice that the leaves of different plants appear to act in somewhat different ways as to their mode of receiving and disposing of dew. A blade of grass is sometimes spangled over with dew-drops, but it usually becomes wetted throughout its whole surface by the running together of the drops, and thus conducts the water to the earth in minute streamlets; whereas, the leaves of the clover, cabbage, nasturtium, and many other plants, will be found to collect it in distinct globules, which may be rolled about on the leaf without appearing to moisten it. These drops, in fact, do not touch the leaf, but rest and roll upon a pillow of air interposed between them and the substance of the leaf. I have not unfrequently procured a tea-cup full of dew, early in the morning, from the leaves of a single cabbage plant; and, on very translucent nights, I have seen, whilst watching this elegant and interesting process, the tender clover-leaf bend beneath the weight of its crystal load, discharge it on the ground, and immediately begin to accumulate another globule. In the course of three or four hours I have observed as many collections and discharges of dew by the same leaf. The gradual diminution of the size of these drops of water, by evaporation, as the sun exerts its influence, has often struck me to be the means provided by nature for preparing plants to sustain his increasingly-ardent rays without injury; and it is generally after nights of copious deposition of dew that the mornings are the brightest, and the sun's heat the most powerful. Cup-formed and horizontal leaves and flowers seem to retain all, or nearly all, their collected dew for their special use, as if it were more beneficial to them when so applied than to their roots.

Popular belief is often founded on correct observation, and sound practice is not unfrequently in advance of science. It also not uncommonly happens that the evidence of practical truths is received with scepticism, because we are unable, immediately to "interpret nature" and frame a satisfactory theory or explanation of the origin of particular phenomena. Hence the discovery of causes is of the highest importance to the arts, and a correct theory of any action so rapidly accelerates, extends, and perfects sound practice, that we cannot too highly prize its possession. This admitted truth, together with the rarity of Dr. Wells' 'Essay,' will, I trust, form a sufficient excuse for introducing the mention of phenomena explained by his theory of dew, which though not directly affecting the soil itself, are of no slight consequence to the cultivators of the soil:—

"The bare mention of this article," Dr. Wells observes, "will be apt to excite ridicule; it being an attempt to show in what way the exposure of animal substances to the moon's light promotes their putrefaction.

"I have no certain knowledge that such an opinion prevails any where at present, except in the West Indies; but I conclude from various circumstances, that it exists also in Africa, and that it was carried thence by negro slaves to America. It was entertained, however, by persons of considerable rank and intelligence among the ancients, for Pliny affirms it to be true, and Plutarch, after making it a subject of discussion in one of his Symposia, admits it to be well founded.

"As moonbeams communicate no sensible heat to the bodies on which they fall, it seems impossible that they can, directly pro-

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The French expression, that a river *bedews*, (arrose) a country, is more correct than the English one, that it *waters* it. The watering of land is, properly, an artificial, the bedewing it, a natural, process. The distance from its banks to which a river can saturate soil with water is rarely great; though it is in this acceptation that I have known many persons and authors to understand and use the phrase *watering*. A river deep within its banks, will bedew a country as well as one bank-full; but the former acts as a drain to the land, and therefore does not directly moisten the surface of the soil. The term *watering*, in agriculture should be limited to what we understand by irrigation.

mote putrefaction. But still a reason for ascribing such a power to them may be derived from their being received by animal substances at the very time that a real but generally unnoticed cause of putrefaction in warm climates (and it is in these alone the opinion I am treating of has ever prevailed) is taking place, which ceases to act as soon as the moon's light is excluded.

"The nights on which a steady moonshine occurs, must necessarily be clear, and nights which are clear are almost always calm. A moon-shiny night, therefore, is one on which dew forms plentifully; hence the expressions 'roscida' and 'rorifera luna' employed by Virgil and Statius; and hence also an opinion, held, as appears from Plutarch, even by philosophers among the ancients, that the moon communicates moisture to the bodies which are exposed to its light.

"Animal substances are among those which acquire dew in the greatest quantity. To do this, indeed, they must previously become colder than the atmosphere; but, having acquired the moisture of dew, in addition to their own, they will, on the following day, be in that condition which is known by experience to favor putrefaction most powerfully in hot climates.

"The immediate cause assigned here for the putrefaction of animal substances which have been exposed to the moon's rays in a hot country, is the same as that given by Pliny and Plutarch; but they attributed the origin of this immediate cause, the additional moisture, to the peculiar humefying quality which they supposed the luminary to possess. This false theory has probably contributed to discredit, with the moderns the circumstance which it was employed to explain."—*Essay on Dew.*

The belief that moon-shiny or clear and dewy nights advance the process of putrefaction, is not altogether confined to the ancients as was supposed by Dr. Wells. I had personally noticed the phenomenon of an increased putrefactive vigour in dung-heaps, after nights of a copious precipitation of dew, succeeded by hot days, some years before I was acquainted with Dr. Wells' 'Essay;' and I frequently conversed on this subject with an intelligent and observant farmer near Warwick, who corroborated my idea that such was the fact. Several farmers have recently confirmed this early opinion; and it is very common in France among the numerous peasant farmers near Paris. During a residence of several years in that country, my house being surrounded by small, uninclosed and variously cropped plots of ground, with a heap of night-soil or dung contiguous to each, the sense of smell somewhat too frequently informed me of the extreme activity in the putrefactive process. On enquiring of the peasants how it happened that, on certain mornings, the odour was so pungent, they commonly replied, "It is owing to the dew of last night, Sir," but I do not recollect that any one of them imputed the effect to the moonbeams.

A knowledge of all that is requisite for the perfect preparation and management of dung, is yet a desideratum in agriculture. Means of accelerating and retarding, at will, the putrefactive process are much needed. The study of this art is certainly worthy of closer attention, and more exact experiment, than it has yet received. A moveable roof-shelter might be a useful adjunct to the sunken pit, or raised mass, in order to obtain command over the meteorological agents—air, heat, and water; each of which performs a part in the process; and more frequently to the injury than to the benefit of that species of manure which is home-made, and the most natural, if not the most beneficial to the farmer.

"I had often," says Dr. Wells, "in the pride of half-knowledge, smiled at the means frequently employed by gardeners to protect tender plants under cold, as it appeared to me impossible that a thin mat, or any such flimsy substance could prevent them from attaining the temperature of the atmosphere, by which alone I thought them liable to be injured. But when I had learned that bodies on the surface of the earth become, during a still and serene night, colder than the atmosphere, by radiating their heat to the heavens, I perceived immediately a just reason for the practice which I had before deemed useless."

He then ascertained by experiment that: "A difference in temperature of some magnitude was always observed, on still and serene nights, between bodies sheltered from the sky by substances touching them, and similar bodies which were sheltered by a substance a little above them." "Possibly," he continues, "experience has long ago taught gardeners the superior advantage of defending tender vegetables from the cold of clear and calm nights, by means of sub-

stances not directly touching them, though I do not recollect ever having seen any contrivance for keeping mats, or such like bodies, at a distance from the plants which they were meant to protect."

It is a common practice in France to cover transplanted vegetables by linen sheets placed over sticks about two feet high. All the spare linen of my own house has been occasionally borrowed for this purpose; and I have laid my friends equally under contribution, until tender plants were sufficiently rooted and strong enough to bear complete exposure to the heat of the sun and cold of the night.

May it not possibly be of advantage to the agriculturist, to protect his potatoes, turnips, or other stored roots, from frost, by means of impermeable, portable cloths stretched at a convenient height, instead of with earth, straw, &c., placed upon them? When substances touch each other, heat is conducted from the mass, and finally radiated away into space; cold results, and the roots are frost-bitten. The experiment may be worth a trial.

Mr. Graham has communicated to me a remarkable phenomenon connected with hoar-frost, which is, perhaps, generally known to farmers, but, if not, the mention of it will convey a useful warning. He has remarked that the passage of a flock of sheep across a clover-field covered with hoar-frost, particularly young spring clover, is certainly followed by the destruction of every leaf over which the animals have passed. He further aptly observes, "you might detect the footsteps of a thief across a clover-field covered with hoar-frost, at noon the day following, by the withering of the grass in his track." Knowing as we do that hoar-frost is a great protection to the leaf against further accession of cold, we might be disposed to attribute the death of the leaf, indirectly, to the shaking off of the frozen dew; but it is possible that the proximate cause is purely mechanical, and the withering the direct effect of injury from the tread, when the leaves are so crisp as to be in a state to be bruised by a sufficient weight pressing on them. The cause would be manifested by ascertaining whether the leaf, under the circumstances, would perish if the hoar-frost were carefully brushed off of it and not trampled.

SECTION IV.

Experiments in the Temperature of soils. Schübler's Experiments.—The subject appears to have attracted the attention of several German philosophers, who have investigated it with their habitual minuteness of research. The excellent translation of Professor Schübler's learned work, in Vol. I. of our Journal, (The Journal of the Royal Agricultural Society of England,) renders it necessary to do little more than refer those persons to it who would pursue the same track of investigation. The inferences drawn by him from experiments in the laboratory, confirm, generally, those of Davy and Leslie. They are, however, chiefly of an elementary nature, and, though more comprehensive and precise, perhaps even more accurate, than those of British chemists, this valuable treatise seems to present nearly the same blanks, as respects useful practical experiments on the bed of the soil as the labours of our own countrymen. We shall all agree in the truth of the Professor's concluding paragraph; viz., that:—

"Those very soils may be fertile for one country which become no longer so for another, under a change of external circumstances."

It is the difference in these external, *i. e.*, in the meteorological conditions of the surface of our globe, which evidently renders identical systems of cropping, husbandry, and management inapplicable to all climes. It is this difference, also, which most clearly points out to the agriculturist that, if he would draw any useful deductions from experiments on the temperature of soils, they must be made on his own soil, or on like soils similarly circumstanced. In Brittain we have, generally speaking, to combat excess of moisture, accompanied by a low and inconstant solar heat. It is one of my objects to show that, *by establishing a free passage for water through the soil, the greater heat of the surface may be carried downwards, and the mean annual temperature of the mass of the soil thereby permanently raised.* This position, as well as the effect of removing excess of water, is well illustrated by Schübler in the section wherein he treats of the "*Influence of Moisture on the warming of soils.*" He states "*the depression of temperature arising from the evaporation of their water amounts to* 11¼° *or* 13½° *Farh.;*" though the method by

which he obtained this thermometric quantity is not mentioned, which is to be regretted. In the tenth section, however, wherein he treats of the "*Capacity of soils to develop Heat within themselves on being moistened,*" the following passage occurs:—

"The falling rain, in warm seasons, is many degrees colder than the lower stratum of the atmosphere, and the upper surface of the earth which it moistens; so that the earth, in hot weather, becomes rather cooled than otherwise."

This remark might seem to militate against the doctrine herein advanced, that the mass of the soil is warmed by rain when suffered to permeate it; but such opinion will, I think, vanish on further consideration, and by reference to Schübler's own experiments on the temperature of soils at Tübingen and Geneva.

At Tübingen his experiments were directed to the ascertainment of the mean highest temperature of the earth by a thermometer placed on its surface,—"the bulb being covered only 1-12th of an inch high with earth. The observations were recorded in perfectly fine weather, between noon and one o'clock, whenever the weather happened to be perfectly fine at that part of the day."

It appeared that during the six hottest months, from April to September, inclusive, the mean temperature of the surface was 131°.4. Now it is evident, that, if rain fell upon the earth when it was so highly heated, the surface must have been cooled by it; but it is equally evident that the substrata would be warmed; for the temperature of the atmosphere in the shade, which was also recorded at the same hour, was 70°.4; and that of rain, had it then fallen, would have been much the same. Thus the rain, on reaching the earth, would acquire a temperature of about 100°, and communicate heat, as it descended, to the underlying portions of soil possessing a lower temperature.

His experiments at Geneva, in 1796, give the mean heat of the soil on its surface—at three inches—and at four feet below it. The observations were taken every day, in all weathers, and therefore, as described by the Professor, "in variable weather." The mean temperature denoted during the corresponding six months of the year before mentioned was—

	DEGREES.
On the surface, - - -	86.7
At three inches below, - -	69.8
At four feet below, - - -	60
Temperature of air in the shade,	59.7

On these results the author observes,—"The elevation of temperature by the rays of the sun was, therefore, considerably less," (than at Tübingen), "according to the average results of these observations, because the temperature of the upper surface of the earth, on cloudy and rainy days, often accords exactly with that of the air; but, on the other hand, they give us more accurately the mean temperature of the ground at some depth."

These experiments denote, that if the mean temperature of the rain, during the six months, accorded with that of the air, it would receive, on reaching the earth, an augmentation of thirteen and a half degrees of heat, and sink downwards at a temperature of 3°.4 higher than that of the soil at three inches deep, and of 13.°2 higher than that of the soil at four feet below the surface; thus supplying at the same time heat and moisture to the underlying soil. His table also shows, that on the mean of the whole year, the increase of temperature imparted to the soil by the rain would have been 2°.4 at three inches, and 6°.1 at 4 feet. Schübler's remark, therefore, "that the earth, in hot weather, becomes rather cooled than otherwise," by rain, is only applicable to the effect produced on the superficies, which is there beneficial.

The section of this author's Treatise on the "Influence of Moisture on the Warming of Soils," must be deemed incomplete, by reason of the absence of all reference to the warming effect of dew: which—whether it be considered as directly communicating heat to the surface of soil necessarily colder than itself at the time of its precipitation, or as diminishing, to a great extent, the radiation of heat from the earth to the heavens—is an agent which performs an energetic part in maintaining a sufficiency both of heat and moisture in the mass of soil.

Leslie's Experiments.—In the Supplement to the "Encyclopedia Britannica," Art. Climate, written by Professor Leslie, will be found a table of experiments on the temperature of the earth, for each month of the year 1816 and 1817, at four different

depths, viz: 1, 2, 4 and 8 feet below the surface. They were made at the instance of Mr. Ferguson, of Raith. It is stated that the instruments were sunk "in a soft gravelly soil, which turns, at 4 feet below the surface, into quicksand, or a bed of sand and water." As it does not appear that these experiments were conducted with any other intent than to assist Leslie in some deductions relative to isothermal lines, and to the correspondence which might subsist between the mean annual atmospheric temperature of a given parallel of latitude, with that of springs and of the earth at certain depths, I have thought it unnecessary to extract the Table. Such deductions are, at best, very vague, nor are they calculated, in the slightest degree, to illustrate the physical properties of the various soils which form the crust of our globe, and which come within the province of the farmer; neither can they serve to assist his judgment in the management of them. The mere determination of heat to the earth, "at depths accessible to the cultivator," is useless, unless the observations be so conducted and recorded as to lead to the discovery of the circumstances which influence its temperature. I had the advantage of passing several days, about twenty years since, in company with Leslie, at the house of the late Lord Rosslyn, in Fifeshire, and he took me to Mr. Ferguson's, of Raith, to show me the thermometers in the ground. They were then, if I recollect right, two in number, and sunk in grass-land, the one descending 12 inches, the other 36 inches below the surface. Leslie's mind was, at that time, so pre-occupied with his newly-invented instruments, the photometer, differential thermometer, hygrometer, &c.—with which his hands and his pockets were filled —that I was unable to engage his attention, seriously, as to the practical use which I submitted to him might be made of observations on the temperature of soils. It was at this period I resolved to commence some experiments on the subject, but a fitting opportunity did not occur until 1837.

My own Experiments.—The site of the few experiments which I have now to describe as made by myself, was a peat-bog, called Red Moss,* near Bolton-le-Moors, in Lancastershire, in its nature identical with Chat Moss, and approaching, in many parts of it, to that consistence which would cause it, in Scotland, to be designated as flow-moss, from its semi-fluid character. The depth of the bog, at the spot where the thermometers were inserted, was nearly 30 feet; and its temperature from 12 inches beneath the surface, downwards to the bottom, was uniformly 46°. I never found any variation to occur in the results afforded by thermometers placed at various depths during nearly three years' observations; excepting in the winter of 1836, when the thermometer nearest the surface fell to 44° for a few days.

To this uniformity of temperature throughout the mass of the natural bog, I shall, subsequently, have to call attention very particularly, as it seems to stamp with certainty the fact, that the more elevated temperatures marked by the thermometers in the cultivated bog soil, were solely due to the change effected in the mechanical condition, and to the removal of stagnant water. There were no springs, so far as I could ascertain, in this bog, nor could I even perceive that water rose from the bottom of any drain cut in it. The substratum, on which the bog had accumulated and reposed, consisted of a retentive white marl, abundantly mixed with limestone gravel. The temperature of the water drawn from the bottom of a coal-pit contiguous to the bog, and 300 feet deep, was 54°; and that from a bore, or Artesian well, near my house, and 160 feet deep, was invariably 52°.

The exposure of the bed in which the thermometers were sunk was perfect. There existed no bush higher than a tuft of heather within a radius of half a mile: not a ray, therefore, of the sun's light and heat could be intercepted (except by clouds) between his rising and setting.

The preparation of the bed was as follows: The surface had been ploughed in 1836 by the steam-plough, to a depth of nine inches, and was well pulverized. A plot of about 216 square yards area, clear of the drains, was divided into twelve beds, intended for experimental culture. Each bed was six yards in length by three yards in breadth; and each was insulated from its neighbor, and from the surrounding bog, by an open drain, 24 inches broad at top, 12 inches at bottom, and 36 inches deep. Previously to opening these drains the plot

*It was on this moss that the writer undertook the construction and conduct of Mr. Heathcoat's patent machinery for cultivating bogs by steam-power.

had been surrounded by a catch-water drain, 38 inches deep, communicating with the main drain, 40 inches deep. The pulverized surface was thus drawn to a heap, the inclosed plot dug 3 feet deep, the intermediate drains opened out, and the superficial soil replaced. In this state it remained through the winters of 1836 and 1837. Had the thermometers been ready, they would have been sunk in the bed as soon as prepared, but I could not obtain them from the maker, and plant them, till June 1st, 1837. The thermometers were five in number, each being enclosed, throughout its length inserted in the ground, in an iron tube, open at the bottom, with holes perforated round the bulb. They were firmly connected together by iron clamps, and the whole formed a stiff portable frame. The glass stems rose ten inches above the ground. These were sustained against the wind or accident, by a skeleton framing of metal, carrying the scales divided into degrees and tenths. A hole being dug in the centre of one of the plots, the frame was let into it, and set in the line of the meridian, so that the stems above-ground might cast the least possible shadow on it at noon. The soil was carefully replaced about the thermometers, so as to preserve, as nearly as might be, the order of its texture and consistence throughout the mass of the bed. At the same time a naked thermometer was inserted to the depth of 7 inches in the natural bog adjoining. I did not commence any regular register of the indications until June 7th, being desirous that the thermometers should first become well settled in the soil, and arrive at what may be called a true working state.

It is necessary to state, that on the bed in question there was no kind of seed sown, nor a plant of any kind growing; my purpose having been to ascertain, in the first instance, the influence of the sun's rays, of rain, dew, and other atmospheric agents, upon the naked natural soil; and subsequently, with other sets of thermometers, to acquire some knowledge of the effect which might be produced on the temperature of such soil by the admixture of manure and foreign substances. Whether this be the proper mode of proceeding, abler judges will decide; but it would appear to be difficult to detect the true physical characteristics of a soil by apparatus applied in the middle of a corn-field; and I thought it desirable to attempt to discover the properties of the natural soil first, and then of mixed soil, before proceeding to investigate similar phenomena on similar soils under crop. An industrious experimenter might carry on all these separate investigations at the same time; since after his sets of thermometers are placed, he has only to observe and record.

[SEE TABLE ON NEXT PAGE.]

NOTE.—As there is so intimate a relation between the temperature of soils and that of plants, we have thought it would prove highly acceptable to our readers if we should present them with a connected view of some of the results of thermometrical observations on the temperature of plants. We, therefore, extract from the Encyclopædia Metropolitana the following paragraph:

"Hunter examined the heat of the internal parts of the trunks of trees by boring holes of different depths in them, and inserting thermometers; and similar experiments were made by Schübler at Tübingen. The results of these experiments were, 1st, that the temperature of trees is higher than that of the air in winter and lower in summer; 2d, that the temperature corresponds to the depth in the soil to which the roots penetrate; and 3d, that it depends on the temperature of the fluid matters taken up by the roots as well as the bad conducting power of the wood of trees. Dutrochet instituted a series of experiments to determine the temperature of the growing parts of plants. He found by means of a thermometric apparatus, that this varied from two or three-tenths of a degree to one degree above that of the air. This generation of heat only takes place when the plant is active and vigorous, and seems to be connected with processes going on in the interior of the cells. It reaches a daily maximum, the period of which varies in different plants, according to their vigour. Rameaux has confirmed Dutrochet's observations. There appears, therefore, to be two sources of heat in plants, one depending on organic actions carried on in the growing parts, and the other on meteorological influences, which either act directly through the air, or indirectly through the fluid matters brought up from a certain depth in the earth."—[EDITOR.

[OBSERVATIONS ON TEMPERATURE OF SOILS UNDER DIFFERENT CIRCUMSTANCES.]

1837. June.	Depth of the thermometer bulbs below the surface.					Time of observation.	Direction of the wind.	Temperature of the air, 4 ft. from grd and in shade.	Remarks.
	Inches 31	Inches 25	Inches 19	Inches 13	Inches 7				
	Temp. °	Temp. °	Temp. °	Temp. °	Temp. °	Hour.	S. W. by	°	
7	46	47	48.4	50	52	9 A. M.	S.	..	
	..	..	..	50.5	55	2 P. M.	W.	..	
8	..	..	..	50	51	9 A. M.	S. E.	..	Cold day.
	..	..	..	..	52.5	2 P. M.	..	..	
9	46.1	47.2	..	49	49	9 A. M.	E.	..	Cold and hazy.
	..	..	48.5	49.5	52 8	2 P. M.	W. S. W.	..	Clear and warm.
10	46.2	..	48.6	50	53	9 A. M.	S.	..	Rain during the previous night; splendid sun all day.
	..	..	..	50.5	54	2 P. M.	..	..	
11	46.3	47.4	..	51	55	9 A. M.	..	65	Throughout the day no visible cloud. Much hotter than the 10th, but, unfortunately, the air thermometer was broken after 10 A. M. The surface of standing water was 60° at that hour, and the surface of the bed 75°.
	..	..	..	52	56	10 "	..	68	
	..	..	..	..	57	11 "	..	..	
	..	..	..	..	57.5	Noon.	..	..	
	..	..	..	52.5	58	1 P. M.	..	..	
	..	..	..	..	59.1	2 "	..	..	
	..	47.5	48.7	..	59	3 "	..	..	
	..	..	..	52.3	57.5	4 "	..	..	
	46.4	..	48.8	52	57	5 "	..	..	
	..	..	..	51.5	56	6 "	..	..	
	..	..	..	..	55.5	7 "	..	..	
	..	..	..	51.3	55	8 "	..	..	
	..	..	..	51.2	55	9 "	..	..	
12	46.5	47.4	..	51	55	9 A. M.	W. S. W.	..	Warm showers.
13	46 8	48	48.8	52	59	2 P. M.	..	..	Hot; a shower at 11 A. M.
14	47.2	48.4	50.4	53	60.4	Noon.	S.		Hot and dry.
15	47.25	48.6	50.8	..	57.6	9 A. M.	S. W.	..	Very hot; cloudless.
16	47.6	49	51.4	54.2	60	9 A. M.	S. W.	69	Sultry; cloudless.
	47.8	49.6	52	55	63	1 P. M.	..	72	Light high clouds.
	..	..	..	..	64	2 "	..	74	Dark cloud to windward.
	..	..	51.8	54	62.5	3 "	W.	78	Heavy thunder storm, with lightning half an hour.
	..	49.8	51.9	55	65	3½ "	..	76	Temperature of rain
	.	..	52	57	66	3½ "	..	72	78°.
	47.9	49.9	52.5	55.5	63	4 "	S.	68	Bright sun; visible vapour from pools and ditches.
17	48	50	52.8	55.6	58	9 A. M.	S.	67	Brilliant morning.
	48.2	50.1	..	55.8	60.4	3 P. M.	..	74	Cloudless and hot.
18	48.25	50.2	..	55	56	10 A. M.	E. by S.	64	Hazy.

I have now to invite your attention to a few deductions from the tabulated results which we may be authorized to draw, notwithstanding the restriction of the observations to the short space of twelve days.

Firstly.—The constant temperature of the *natural* bog, from 12 inches to 30 feet deep, was 46°; and the thermometer, planted in the same substance, at 7 inches deep, constantly indicated 47° during the term of the experiments.

Now, the thermometer at 31 inches deep in the *worked* bed exhibited a maximum heat of 48¼°, having gradually gained 2¼°; and it was, apparently, still rising. The thermometer at 7 inches below the surface reached 66° after a thunderstorm, showing a maximum increase of 19°, and on a mean of the thirty-five observations, of 10° over its fellow, at the same depth, in the natural bog.

We have here satisfactory evidence that the accession of heat was solely derived from meterological agency, *i. e.* from action on the surface, and not from the substratum, as the latter possessed, invariably, a lower temperature, which must have tended to diminish, rather than to increase, the heat finally acquired by the worked bed. And we may safely deduce from these facts, that the origin of the increased temperature is attributable to the change induced on the mechanical condition of the soil by drainage and pulverization, as no other changes were effected in it than those of comminution of its texture, and the withdrawal of free water.

Secondly.—The inference may be permitted, even from these experiments, that, in the month of June, rain-water carries down heat, and raises the temperature of the sub-soil; whilst the loss of heat by the strata nearer the surface is quickly restored by the sun's rays. By an inspection of the Table, no doubt will be left on the mind as to the truth of these inferences. It appears that at seven inches deep, the temperature of the soil was subject to considerable diurnal increase and decrease, as well as from day to day, according to the state of the weather; that these variations became of less amount at lower depths; and that, at 31 inches, increase alone, for the time, was felt. Heat is conducted downwards so slowly by all bodies, and by moist substances particularly, that rain-water would appear, when allowed to permeate the bed, to be the most active agent in the propagation of heat to the soil. Accordingly, we find the lower thermometers to indicate accession of heat more quickly after rain than in dry weather; and had a rain of a longer continuance fallen, instead of short showers, it is probable that the lower thermometers would have been affected much more rapidly, and have indicated higher temperatures, as no water was observed to have passed through the soil in the drain.

On the 11th of June, I was able to devote an entire day to the observation of the thermometers. The results are interesting, by showing the steadiness of the increments and decrements of heat during a cloudless day, and by denoting the period of maximum temperature attained by the thermometer at 7 inches, which was about 2 P. M.

On the 16th, I had foreseen the probability of a thunder-storm, and hastened to my thermometers to observe its effect. It is well worthy of remark, that, after the temperature of the soil at 7 inches deep had attained its maximum under the previous circumstances of the day, it was subsequently raised 3½° by the descent of the rain. It is also notable, that in half an hour after the cessation of the storm, the sun again shining brightly, and evaporation being visibly great from the surface, the earth at the same depth had lost 3° of its highest temperature, showing the rapidity with which heat is carried off by water in its transformation into vapour. It would have been highly interesting to have known, by other thermometers, the temperature of the surface when the storm fell, as the transition was almost instantaneous from bright sunshine to heavy rain; but I was unprovided with a sufficiency of these instruments.

An effect of importance—which might be predicated of all soils properly prepared to receive heat and water and permit their descent—is traceable to the preparation of the bed: viz.—that the transmission of accessions of heat downwards continues during the afternoon of the day, and throughout the night, whilst the superstrata (but chiefly from 7 inches upwards) are losing some amount of their heat by conduction upwards and radiation into space. The reverse may be expected to occur during the cold seasons of the year, when the heat accumulated and stored up in the sub-soil will be drawn as

from a reservoir, and supply part of the loss then taking place more freely near the surface.

As I have criticised the labours and experiments of others in this branch of science, it is right I should point out the deficiencies of my own, which are also numerous. The experiments related can, indeed, only be regarded as a slight contribution to our stock of knowledge on the subject—the investigation of which deserves to be commenced *de novo;* to be carried on simultaneously, if possible, by different observers, and with appliances of all the instrumental means which the existing state of science can furnish. The enumeration of the phenomena which demand attention—of the methods we possess, and still need, for ascertaining their force, and measuring their amount—will, perhaps, be the simplest and most useful form in which the criticism can be conveyed.

We require to know:—

1. The temperature of soils at depths accessible and profitable to the agriculturist.

The thermometer is all sufficient for indicating temperatures. It would be highly instructive and interesting to ascertain, by thermometers sunk in the earth, the temperature of a mass of drained and undrained soil at different depths, down to the extreme depth of six feet. Self-registering thermometers would give the maxima and minima temperatures, but these instruments conduce to laziness in the observer; they give no information of the periods of the twenty-four hours, when the maxima and minima occur, nor register the continually varying increments and decrements of heat at different depths, as they are affected by sunshine or cloud, by rain, wind, and other atmospheric changes, which should be diligently and faithfully recorded.

2. The temperature of the air, in the shade near the earth.

3. The pressure of the air: for which the barometer suffices.

4. The temperature of the rain.

5. The quantity of rain; ascertained by the rain-gauge.

6. The quantity of water passed by drainage from a measured extent of land, in order to compare it with the ascertained fall of rain on its surface.

There are many situations in which this object could be accomplished at a trifling expense and the knowledge of such facts would open a new chapter of the book of nature to our view. All that has been written as to the quantity of water dismissed from the earth, is too speculative and baseless to merit more than a passing notice; and no inquiry into these phenomena has, I believe, been made with the end of making them subservient to the practice or science of agriculture.

7. The dew-point; to be determined at frequent periods of the day and night.

The best-known hygrometer is Professor Daniell's, but though simple and true, it has the disadvantage of requiring a manual experiment for every determination.

8. The quantity of dew deposited.

Of the amount of this item in the stock of Nature's fertilizing laboratory, we are wholly ignorant; and though aware, as we must be, of the difficulty of ascertaining the fact required, there is no reason to dispair of overcoming it if the attention of many gifted men, now attached to the science of meteorology, could be brought to bear on the construction of a sufficient instrument.

9. The hygrometric condition of the soil.

By this term is meant the amount of moisture which a soil may at any time contain. This quantity will depend, in a well-drained soil, on its bibulousness, or hygrometric energy. If an instrument could be contrived to indicate, by simple insertion and inspection, the humid condition of the earth between the extremes of perfect dryness and of aqueous saturation, as the thermometer discloses heat of temperature, we should, indeed, become possessed of two ready and sufficient means of quickly ascertaining the principal phenomena on which the temperature of soils depends; we should be provided with tests, which would go far towards explaining certain causes and degrees of fertility, and possibly find ourselves armed with an expeditious method of deciding on the aids which a given soil might require for increasing its fructifying properties and power. The mention of a desideratum is occasionally half way towards its fulfilment; and we may hope that the resources of science will avail for the supply of an instrument which would be so precious to the enlightened agriculturist.

(*To be Continued.*)

FASHION is the race of the rich to get away from the poor, who follow as fast as they can.

From the American Farmer.

"Humbug"—A Prevalent Disease with Agriculturists and its Remedy.

BY PATUXENT PLANTER.

Mr. Editor:—No class of men are more easily humbugged than farmers and planters. We are a confiding, trusting class, because we are honest and guileless ourselves; we judge others as we are proud to be judged—by that fair justice which springs from the purity of motive and honesty of intention. We are liable to be deceived, because, I am sorry to confess we are, as a class, lamentably ignorant of all science in regard to our profession. In the truth of this dictum lies the all-powerful necessity that we should provide an Agricultural College for our sons, and give them the opportunity, at least, of acquiring such knowledge as will protect them from those abuses that their fathers now daily have to submit to as a penality of good-natured *ignorance*.

In agricultural literature, the articles in journals and the books that are published, a farmer is often sadly deceived, cheated out of his money and his time. *Interested* journalists or their correspondents are too often found blazoning forth, in bright colors, the pretended merits of books, seeds, machinery or fertilizers, which are worse than worthless. This is practical fraud. Any man who has a pecuniary interest in any of these things he puffs, should be honest enough to declare his name, and frankly state that he is interested, whether to a large or small extent, and then his reader could have a basis on which to found a proper estimate to be placed on the statements made. Editorial reviews of books and articles of sale, should be frank, and not only praise the worthy, but guard the public against the worthless, whether book, manure, mechanical invention, seeds, or anything likely to affect the pockets of unsuspicious planters or tillers of the soil. You editors should be the doctors to apply the *preventives* against humbug books. You should make it your business to review each book as issued from the press, and point out its defects and merits, and boldly recommend it or denounce it, so that your readers might not be deceived. One of these worthless productions is H. W. Beecher's high-sounding and clap-trap titled-book—"Plain and Pleasant Talk about Fruits, Flowers and Farming," 420 pages—one grain of wheat, poor at that, to one bushel of damaged chaff, hard to winnow, and disagreeably filthy. It shows the reverend orator to have been used to very low society, and proves that the followers and associates of the early life of this Prince of Abolitionists were very dirty people, like all Yankee abolitionists, fit for "stratagem and murder," as one or two quotations will show. It is true he *condemns* such practices, but leads one to infer that they are quite common in the circles of his former adherents. "It is a dirty trick to make bread without washing one's hands after cleaning fish or chickens; to wash dishes and baby linen in the same tub alternately or *altogether*. We have a distinct remembrance of a cud of tobacco in a dish of *hashed pork*. A lady of our acquaintance, at a boarding house, * * * * found herself blessed with a mouthful of *hard soap*, which only lathered the more, the more she washed at it. It is a filthy thing to comb one's hair in a small kitchen in the intervals of cooking the breakfast; to use the bread trough for a cradle—a thing which we have undoubtedly seen; to put trunks, boxes, baskets, with sundry other utensils, under the bed where you keep the cake for company; we have seen the dexterous housewife whip the bedspread aside, and bring forth, not what we feared, but a loaf-cake! It is a dirty trick to wash children's eyes in the pudding-dish; not the sore eyes, but the subsequent puddings will not be benefitted; to make bread on a table innocent of washing for weeks; to use dirty tablecloths for sheets, a practice of which we have experimental knowledge. It is a filthy trick to borrow or lend for other's use a tooth-brush or tooth-pick." (See pages 34–5 and 6.) Beside many other dirtier "tricks" and habits which he advises his people to abandon, and which are too disgusting for insertion in our chaste pages. Such being the worse than Esquimaux habits and customs of these people, it is no wonder that they are envious of the refinements and comforts and elegant surroundings of the home of a Southron, whose dirtiest negro child, six years old, would not be guilty of like "filthy tricks." The author, having a wide-spread reputation as an eloquent, classic orator of God's Holy Word, and the book, gotten up in fine style, what may not be the number of dollars spent in its purchase, by our blooming Southern girls, whose refined manners, chaste and highly cultivated minds so beautifully harmonize

with their surpassingly lovely personal attractions, captivated by the thought of having a "Pleasant Talk about Fruits, Flowers and Farming"—all attractive, delightful subjects—with so eloquent a Divine, only to be deceived and disgusted by rabald jests, low wit and dirty "*hints*" as to what should be avoided—conduct of which an idiotic negro would not be guilty. Is not this a gross fraud? And such like "tricks" of the trade are daily performed and go unrebuked by the press—the would-be, and ought to be, regulator to a great extent of public sentiment and action.

Another disease with which we are afflicted is the "Travelling Agency" for the sale of *trees*, seeds, flowers, and machinery, and Bommer's Patent Manure. The highest prices are paid by our farmers for the roots, trees, &c., that are the refuse of the nurseries, or the worthless collections of unknown growers of seedlings, which have never been tested. I was myself *seduced* in buying from a glib-tongued vender, an apple corer and parer, at a high price, and the thing never could be made to work—it suited neither *little*, big nor medium-sized apples. The remedy for this disease is like that of another well-known bad habit—"touch not—taste not—handle not the unclean thing"—and you will be sure to buy not.

Another cancer on the diseased body of our brotherhood is the General Agency and Commission Business—these "*go-betweens*" the seller and buyer—the producer and consumer. The seller has to lose and the buyer to pay, to raise a fund for the support of this worthy class. In many cases it is very necessary and proper, but it is growing to too great an excess—it is becoming so that nothing can be bought and sold except through an agent, who often acts as agent for both parties, and thus it becomes doubtful which party gets his full due. I do not know how humanity is effected in the case of such agencies, but it has been ascertained of old, that *Judges* who receive fees from both sides, usually found *law* and facts to incline their decisions on the side of the party that handed over the *heavier purse*. The remedy here is for the producer to sell in person all that he can—and by furnishing good, reliable articles, inspire confidence in the purchaser or consumer. Those who have improved stock should advertise over their own names, and then purchasers would look to the character of the advertiser, and feel that they had a guaranty of the correctness of his statement, and regulate his offers accordingly. Every tub would then stand on its own bottom, or soon burst its hoops; short hair would not be so often found among the "F. F. V's." At present, I shall not pursue this subject, lest I weary your reader, but hope to be heard next month on the most important of all the *humbugs*—"Fertilizers"—and to suggest what I humbly deem would prove a remedial check, if not a cure.

Facts for Farmers.

"If you invest money in tools, and then leave them exposed to the weather, it is the same as loaning money to a spendthrift without security—a dead loss in both cases." If you invest money in books, and never read them, it is the same as putting your money into a bank, but never drawing either principal or interest. If you invest money in fine stock, and do not feed and protect them, and properly care for them, it is the same as dressing your wife in silk to do kitchen work. If you invest money in choice fruits, and do not guard and give them a chance to grow and prove their value, it is the same as putting a good hand into the field, with poor tools to work with. If you invest your money in a good farm, and do not cultivate it well, it is the same as marrying a good wife, and so abusing and enslaving her as to crush her energies and break her heart. If you invest your money in a fine house, and do not so cultivate your mind and taste as to adorn it with intelligence and refinement, it is as if you were to wear broadcloth and a silk hat to mill. If you invest your money in fine clothes, and do not wear them with dignity and ease, it is as if a plowman were to sit at a jeweler's table to make and adjust hair-springs. If you invest your money in strong drink, it is the same as turning hungry hogs into a growing corn-field—ruin will follow in both cases. If you invest your money in every new wonder that flaming circulars proclaim, it is the same as buying tickets at a lottery office, where there are ten blanks to one prize. If you invest your money in the "last novel," it is the same as employing a tailor's dandy to dig your potatoes.—*Valley Farmer.*

A covetous man is his own tormentor.

Industry and Economy.

There is nothing more necessary than these to success in farming. Without them no farmer should expect to succeed.

His lands may be rich and fertile, he may understand the theory of cultivation; he may have hands sufficient and implements, and all the means necessary for carrying on his business successfully, but he fails simply for the want of industry and economy if he either neglects his business or is extravagant in his expenditures.

Every farmer who has the means, ought to do a thriving business; and if he does not, the fault is in himself. There are few occupations that are more profitable than farming, if it is properly managed. It is true, a man may sometimes accumulate more rapidly for a time, at some other business; but the farmer's progress, if slow, is sure, and steadily increasing, and in the end is, perhaps, the surest means of attaining to wealth and prosperity. The merchant, the manufacturer, and the wealthy speculator may fail, but the industrious and economical farmer will have enough and to spare.

When banks fail, and those engaged in the most thriving business, are obliged to suspend operations, the farmer is secure; the soil he cultivates is his bank; there he has his money deposited; and it never fails, under ordinary circumstances, to yield him a rich per cent. per annum. These are not visionary phantoms; facts abundantly demonstrate that the farmer is the most happy, prosperous, and independent man. If his coffers are not always filled with gold and silver, yet his table is richly furnished with the choicest and most substantial pro isions; he has enough to eat and to wear, and what more should a man desire in this world!

But, although the farmer has it in his power to be prosperous, yet we find that all are not so. In order to succeed, he must have judgment to plan, and a will to execute whatever is necessary to be done on the farm. No man should engage in this business, or indeed in any other, unless he turns his whole attention to it, and brings all his energies to bear on that single point

The farmer should never attempt to do too many things at the same time; if he does, the probability is that his work will be badly done. Do one thing at a time—that which is most necessary, of course—and do it well. There is always a right time and a right way of doing a thing, and the farmer should know when and how to do his business in the best possible manner. He should always be before-hand with his work, for if he leave anything undone at the proper time, his business will accumulate on his hands, and to get through he must either leave some things undone or do them in a hurried manner, and of course such things are never well done.—*Indiana Farmer.*

The Golden Mean.

A great hindrance in the way of a farmer's prosperity, is the want of economy in his expenditures. This, however, is not peculiar to the farmer, but is common to persons of every profession. No one, whatever his business, can expect to prosper, as long as his expenses exceed his income.

It is possible, however, that under some circumstances a man may be a gainer by going in debt to a certain extent. For instance, if a man has not land enough, or horses, or means to carry on his farming operations successfully, and has not the means to pay at the present time, it may be to his interest to purchase on credit, provided he has good reason to believe he can meet the payment when due. But a good rule is to avoid running in debt. This is the ruin of thousands.

But, while commending frugality and economy in expenditures, I would not be understood as encouraging parsimony or niggardliness. Many no doubt make strict economy an excuse for miserly conduct; but there is in reality a great difference between the two. The miser denies himself the comforts and often the necessaries of life, and withholds what he ought to spend, while the economist saves what he ought to save, and spends what he ought to spend, having in view his own comfort and happiness, as well as the comfort and happiness of those around him.

The farmer will have many demands upon his charity, and this he keeps in view as one of his necessary expenses. He is never backward as far as his circumstances admit to contribute to worthy and charitable objects, he considers it his duty to do so, and experience has convinced him that he loses nothing by so doing. "There is that scattereth and yet increaseth; and there is that withholdeth more than is meet, and it tendeth to poverty."—*Ind. Farmer.*

On the Feeding and Care of Stock.

In the October number, while referring to the propriety of making preparation for the wintering of stock, by calculating what was the amount of food on hand, and noticing what stock should be selected to be kept over, and what should be sold, we had not room to refer to the principle of feeding, *with profit to the feeder*. The other kind of feeding is so well known and so much practiced that it needs no other comment than general condemnation.

In considering how to treat the stock kept on a farm during the winter, the first proposition which ought to be answered is, what is the end and aim of feeding the several kinds of animals usually found on a farm? The answer will generally be, for the purpose of making money out of them. But it will be found that money is derived from very different sources. For instance, in the cattle tribe alone, the youngest cattle are to be fed to promote their growth; the older ones to increase their weight of flesh and fat; the working oxen are to be fed so that they may yield the greatest amount of labor, and the milk cows that they may yield the greatest quantity of dairy produce.

Horses are to be fed so that they may return the greatest amount of labor; and colts that they may come to maturity as rapidly as a healthy development of their most valuable qualities will permit.

Sheep are to be fed that they may yield the greatest amount of mutton and wool; and swine, that they may yield the greatest amount of pork.

To know how to make young animals grow is one part of the business of the farmer; to make them put on flesh is another; both deserve the utmost attention; and it is a sure sign where a farmer is a skillful feeder, he is also to be relied upon as a good hand at raising the crops which provide the fodder.

Analysts all inform us that the muscle, the blood, the skin, the hair, the wool and the bones are composed of four elements, which are found in greater or less proportion in all kinds of grain. But when fat is analyzed, it consists of but three of these elements, one of the most important of the flesh forming elements not being present. Hence young animals may be fed on substances, which promote the secretion of fat largely, but not afford them the elements of growth; and on the other hand, grown animals may have a full supply of food, yielding them the elements to increase muscle, and yet not be able to add to their weight for want of a greater supply of the fat producing elements.

Amongst the worst errors into which feeders of both old and young cattle fall, none are more prominent than want of shelter during the coldest seasons. Without heat no animal can continue its functions, and hence an animal exposed to a low temperature, is always expending a great deal of its strength and of its powers to keep up the temperature of its body to such a pitch as will enable it to assimilate its food.

A great part of the food of every animal is used to create heat by which the other portions may be consumed, and thus rendered available to supply the waste which is constantly going on. And when we expose an animal to a low temperature, where the heat generated is constantly and steadily carried away by the atmosphere, it is the same as though so many bushels of corn were thrown out of doors to rot and decay without benefitting either man or beast.

It is well understood that less wood is required in our stoves, when the weather is mild, than when it is intensely cold. It is so with animals, in regard to the consumption of food, expose them to bleak storms, and they find it difficult to keep up the heat necessary for the decomposition of their food and its conversion into the elements requisite to keep the body at its full habit; they therefore draw upon the supply already provided, and farmers will observe frequently, "My cattle are losing flesh this winter," "I cannot keep them up." Yet they have enough to eat. And so they have, but is it of the right kind? This is the question which the feeder should be able to answer with certainty.

Every animal, when it respires or breathes, exhales a large amount of carbon, or the principal element, fat. The air drawn in consists of—

Nitrogen, - - - -	79.16
Oxygen, - - - -	20.80
Carbonic acid, - - -	0.04
	100.00

When the air passes out of the lungs, it consists of—

Nitrogen,	79.16	
Oxygen,	16:84 to 12.00	
Carbonic acid,	4.00 to 8.00	
		100.00

Hence it will be seen that the oxygen of the air is consumed just as it is when a fire is lighted, and carbonic acid produced. The only difference is, that instead of wood furnishing the carbon, it is the food given the animal which supplies it.

Now all kinds of vegetable food, whether hay or grain, contain a greater or less proportion of certain elements, which go to sustain heat, and others which supply the body with flesh. Amongst the heat producing elements, starch, sugar and gum, are considered the principal. They contain no nitrogen, and therefore do not aid in forming flesh. In fact, while starch and fat are alike in this respect, flesh and wool have a different composition, and require something more. Analysis gives the following as the composition of the four substances:

	Starch.	*Fat.*	*Flesh.*	*Wool.*
Carbon,	44.25	79.00	57.83	50.65
Hydrogen,	9.67	11.90	7.57	7.03
Nitrogen,	0.00	00.00	15.07	17.71
Oxygen,	49.08	9.40	21.30	24.61

Hence, in a great measure, food is generally considered the most valuable which contains nitrogenous matter in large proportion, and where the non-nitrogenous substance is in large proportion the food is not considered worth so much.

From this it is evident that if we would have young animals thrive, we must supply them not only with food which will keep up a full supply of animal heat, but also material with which the waste of the body can be supplied, and its *growth promoted.* Many farmers consider that marsh hay or the straw from a wheat stack is good enough to keep their young stock along through the winter. No idea is more fallacious. Wheat straw, when preserved in the best manner only has one and a half per cent of flesh forming matter, and marsh hay but little more, whilst the amount of woody fibre or indigestible matter is large, and the elements of respiration or heat though considerable are not in as large a quantity even as in some of the more valuable kinds of wood. When fed on this food and water alone therefore the young animal, though filling itself to repletion, is only able to keep up a moderate supply of heat, but is entirely unable to supply the waste of the body which its active habits are sure to entail. It therefore grows poorer and poorer every day, lighter in carcase, and consequently is a losing investment.

It is the same with sheep fed in this way. The cold compels them to grow wool, but they draw on their bodies for a supply of the material, and as it is not given to them in their food, consequently in the spring, they are found with a light fleece and still lighter and more worthless bodies; yet the farmer is wonderfully taken aback, at the little profit there is in keeping his flock, when compared with the amount which his neighbor gets, who understands that sheep have not the power of manufacturing wool out of nothing, and that to get full fleeces, they must have a fair supply of food, containing flesh forming elements. The machinery is there, but it cannot turn out a grist without there is wheat in the hopper.

Now timothy hay, well cured, and in good order, yields of flesh forming material nearly 10 per cent. and of heat and fat producing substances, 49. The remainder of its composition consists of woody fibre and mineral matter.

Red clover hay, when the plant is cut in flower, and when cured with care yields from 15 to 18 per cent of flesh forming matter, and from 60 to 64 of the elements of respiration and fat.

On the contrary, the common marsh hay, yields not over 4 or 5 per cent of flesh forming matter, and of fatty elements only about 33, all the rest is woody fibre and water, with the exception of a small per centage of ash.

To obtain the same nutrition out of marsh hay, that is obtained out of mixed timothy and clover, an animal must go through the labor of masticating nearly double the quantity, or it must fill itself twice, while its organs of digestion are compelled to labor twice as hard, to obtain adequate support. Every one will therefore see that a young animal, which is expected to increase in bone and muscle, and also to keep up a fair supply of flesh and fat, must be fed on something else than marsh hay, and hence one of the important reasons why marshes should be made to grow the cultivated grasses if we would have them profitable.

The right food for a young animal during the winter, should consist, besides its ration of hay or straw, of a measure of meal com-

posed of crushed oats and Indian corn, the oats being in the proportion of two to one of the metal. No grain has so high a value for its ability to produce muscle, as the oat, and hence the propriety of feeding it to all young animals. It is for want of such food that our best young animals stop growing in the winter season. The oat besides having from 15 to 18 per cent of flesh forming material, has also from 70 to 75 per cent of respiration or fatty elements, and therefore furnishes the animal with ample power of assimilating its muscle forming elements, and should there be any fear that this is not the case, the mixture of Indian corn meal, supplies the deficiency. Bran also given in the same proportion as to weight, has the same effect, for nearly all the oil or fatty matter of wheat is contained in the bran or outside covering of the grain.

The Dent corn according to the best analysis we have, contains of flesh forming elements but 8 or 9 per cent, being only half as much as the oat, of fatty materials there are full 70 per cent., part of which is oil, or fatty matter. When full rations of corn meal alone are fed to young animals there is a great waste, for the animal does not need so much heat making material, and then either refuses it, or permits it to pass trough it but partially decomposed, or only half digested. Give the young animal exercise, so that its muscular system will be developed, let it have fair rations of oats *crushed* so that its muscular tissue may be more than supplied, and let it have enough Indian corn *meal* to keep up the animal heat, and there will be no stoppage of growth in the winter season. In the spring colts will have gained in size, and general value, steers will be nearly double the weight they otherwise would be, and sheep will have a much larger proportion of wool.

It is so customary for nearly all feeders in the state to depend solely on corn, that we have deemed it proper to direct their attention to the waste incident to feeding it to young animals. We have frequently heard it observed, by intelligent farmers that their stock though fed well, did not seem to grow; especially has this been the case with young full blood stock, which have been overwhelmed with everything but the kind of food suited to their condition and age.

The practice of this principle is one of the elements of Mr. Lyndon's success in making his young stock arrive at great weight within a short time. He understands, that fat cannot be crowded on without there is a foundation of muscular fibre to sustain it. It is frequently noticed that young stock increase in weight with great rapidity, when turned out in the spring. This sudden increase arises from the ability of the animal to form bone and muscle, a store of fat being already secreted. Half or quarter fed animals spend their efforts in making attempts to regain what they have lost during the winter.—*Michigan Farmer.*

Cashmere Goats.

An importation of these valuable animals has been made by the Hon. W. H. Stiles, and after a tedious voyage, he has arrived safely at his place up the river, having been accompanied by a Greek, who is still with them as an attendant, all the way from Smyrna. This is the second importation of the pure breed of Cashmere goats ever made into this country; the first having been made by Mr. Davis, who sold them to Mr. Richard Peters, of Atlanta, from which importation all the crosses and half breeds in this country have sprung. Mr. Stiles has eight of them, and they are no less curious than valuable, something of the size and shape of our native breed. They differ widely in their hair, which grows so luxuriant as to give them the appearance of a sheep with an immense fleece on it. The experiment having been thoroughly tried as to their thriving in our climate, and resulting satisfactorily there can be no doubt of the value they will be to our country. The uses to which the hair is put are numerous. Camlet and worsted goods and ladies' fabrics, as challies, mousline delaines, gentlemen's clothing for summer wear, hosiery, &c., promising a beauty, strength, durability, lustre and permanency of color far superior to the wool of the sheep or the alpaca. These goats are found in the Himalaya mountains, and have to be brought about a thousand miles before they reach a shipping port. They are not sheared like the sheep, but the fleece is pulled off twice every year. An ordinary fleece weighs between three and four pounds. The New York price, $8 50 per pound, making at least $50 a year for each goat, while there is no cost in feeding them, for they are as frugal and hearty as the common goat. Their great value in this country is the

splendid cross with our common goat, the half breed being nearly as valuable every way as the full bred, and their remarkable fecundity soon repays a very heavy interest on the investment, while the expense of keeping them is a mere trifle, as they live on briars and foliage not touched by other animals. There is a great demand for them, and the prices they bring are fabulous—one buck sold as high as $1,500, and one of Mr. Peters' stock was sent to the Illinois State Fair for exhibition, and so pleased the President, that he offered the weight of the animal in silver in exchange for him.—*Savannah Republican.*

A Christmas Present to John Johnston.

During the few weeks previous to the close of the year, the following individuals, through the politeness and attention of Mr. Henry S. Olcott, of the N. Y. Tribune, united in an appropriate and well-merited testimonial to the venerable farmer of Seneca county. It consists of a massive silver pitcher and two goblets, on all of which are engraved and embossed appropriate agricultural emblems. On one shield of the pitcher is represented a reaping field as it appears in our day, and on another a mowing machine at work, and the third bears the following inscription:

Presented to John Johnston, in recognition of his services to the agriculture of New York, by his fellow citizens:

John A. King,	Luther Tucker & Son,
B. P. Johnson,	Samuel Thorne,
Henry Wager,	Erastus Corning, Jr.
A. B. Conger,	D. D. T. Moore,
William Kelly,	A. P. Cumings,
James J. Mapes,	A. O. Moore,
Lewis G. Morris,	James S. Wadsworth,
James O. Sheldon,	Addison Gardiner,
J. B. Williams,	Henry S. Olcott.

The goblets bear representations of men laying tiles for drains, a ditch-digging machine, tile machine, and all manner of small tools used in "the stupid burial of crokery"—as an English lord was pleased to term tile-draining a few years ago.

Mr. Johnston returned to Mr. Olcott the following reply:

NEAR GENEVA, 27th Dec., 1859.

My Dear Sir:—I received your letter of the 24th inst., and also the rich Christmas Gift mentioned therein. Truly, I may say that I was both surprised and delighted—surprised because the present was entirely unexpected—delighted, for I suppose there is no man that lives who is not pleased by a compliment to his opinions and his way of showing them forth. More especially when those opinions at first met with much opposition and some feeling, and have only come to be admitted as right, after an almost obstinate abiding by them on his part. And it very much gladdened me---indeed it did, that the merits of a system of farm management—its stocks and its products, had been so well exhibited as to attract the attention of so many intelligent agriculturists as to be thought worthy of such a magnificent gift.

Politicians and heads of merchantile and manufacturing establishments, and captains of packets, are not unaccustomed to such reward for conduct or exertions considered meritorious; but I know not any practical farmer who has ever attracted the notice of his fellows to his undertaking and his management by their fitness and good results, so as to receive such a testimonial; and it very much pleased me that it was to a farmer, for his ordinary day by day and year by year management, that this has been done; and I hope it will stimulate others in like position with myself, to exertions and experiments in improving their farms and farming operations when they know that the eyes of farming men are looking about to discover, and their tongues ready to praise efforts in this direction. For I feel sure that with an efficient system of underdraining—a far more liberal method of feeding the cattle and sheep—a more plentiful manuring, and a higher state of general farm culture, the American farmer may place himself in independence, and push forward his class to the position it ought to occupy—the front rank of human society. It is the farmer that puts the bread in the mouth of the rich and the poor, and feeds alike kings, princes and beggars; and should the farm labor of the land cease from May till November for but one season, dire would be the calamity to the inhabitants of this globe.

I have for many years looked upon the occupation of the farmer as of vastly more importance than that of any other human being—not the mere drudging occupation of the daily labor he pursues, but that labor industriously followed, directed by forethought, and carried on with a lively and intelligent eye to all the teachings of the

daily and yearly experience he has with the soil beneath his feet, the elastic atmosphere about him, the insect life that swarms his fields, and the useful brutes under his control. For plenty makes peace, and he that raises plenty is a peace-maker, and it is in peace and plenty that man must reach his highest development, and I know of no land on the face of the earth, where so great results in husbandry and the elevation of the husbandmen (and men in general) may be reached, as in the United States.

But I must not delay longer giving you and the gentlemen connected with you, my hearty thanks for your kindness and consideration in rendering me this gratifying compliment. May success attend you and them all in the pursuits which we love and follow, and in every way and effort in which I may assist in pushing those pursuits towards perfect results, I am with great respect and esteem, your and their obedient servant,

JOHN JOHNSTON.

New York Observer.

From the New York Observer.

Banks of Rivers.

NOTE FROM PROFESSOR STRONG, RUTGERS COLLEGE.

New Brunswick, Jan. 13th.

In the *N. Y. Observer*, for Jan. 12th, I notice an article entitled "The Right Bank," in which the writer gives what he calls "a singular proposition of M. Babinet of the Paris Observatory." In compliance with the writer's request, I propose to show that M. Babinet's proposition is true of rivers in the Northern hemisphere, and by using left bank for right bank, I also propose to show, that the proposition is true, of rivers in the Southern hemisphere.

1st, If a river, or any body, (as a locomotive) is moving over the earth's surface, in such a way, that it passes over parallels of latitude, whose diameters successively decrease, then the rotation of the earth on its axis, from the West to East, will deflect the moving mass towards the East.

This proposition is clearly true, since the easterly motions of the mass, on the parallels which it leaves, are greater than on the parallels at which it sucessively arrives; consequently, from the well-known principles of the composition of motions the mass will be deflected towards the East. Hence, rivers in the Northern hemisphere, that tend towards the North, will be deflected towards their right banks; which is in conformity with M. Babinet's proposition.

It is also clear that rivers in the Southern hemisphere, that tend towards the South, will be deflected towards their left banks. 2d, By a reverse process of reasoning, it may be shown that rivers in the Northern Hemisphere, that tend towards the South, must be deflected towards their right banks; and rivers in the Southern hemisphere, that tend towards the North, must be deflected towards their left banks. 3d, If any mass on the earth's surface moves toward the East, the tendency of the earth's rotation on its axis is to deflect it towards the equator, and if the motion of the mass is towards the West, the tendency of the earth's rotation, is to deflect it towards the nearer pole of the earth.

What is here said, is manifestly true, from any of the ordinary treatises on the figure of the earth. See the 3rd volume of Lardner's Nat. Phil. page 136, art. 2,375. It is hence easily inferred that all that has been said is true of rivers which run East. or West, in the Northern or Southern hemisphere.

Remark: I have inquired of several intelligent watermen of this place, (without stating my object) as to which bank of the Raritan, whose general course is from North to South, has been most worn away by the river. Their uniform reply was the West or right bank.

Making Soap.

I wish you to inform me through the *Cultivator*, of some of the mysteries of soap making; our *modus operandi* is to pass the lye through slacked lime, then boil and add fat; sometimes the lye and fat will unite, but often the fat will float on the top as soon as cool. Why is this? Or what are the requisites for making soft soap of wood ashes? D. F. B. *Porterszille, Pa.*

The best process for making soap is simply this: First. Procure good ashes; place a half peck of caustic or water slacked lime, in the bottom of the leach, for each barrel of ashes; if air slacked, the quantity must be larger, according to the time it has been exposed to the air. It is usual to place straw below the lime, to prevent the water from carrying it off in particles. Place the

ashes on the lime, beating it compactly as each successive layer is applied, till the leach is full. If not beaten solid, the water will run through too soon, and the lye will be weak. A stout barrel, slightly inclined, with a hole bored through the bottom, makes a good leach. It should be placed on a piece of broad plank, with a gutter cut around it, to collect the lye; and high enough from the ground to set a tub under. The water poured upon the ashes should be hot, until the lye begins to run; and the time that should elapse after the water is first applied, till, it passes through as lye, should not be less than twenty-four hours; if sooner, the ashes have not been beaten sufficiently, and the lye will be too weak. It will continue to run as long as water is applied, but at the same time growing weaker, as the potash becomes carried off.

If the ashes could be perfectly fresh no lime would be required in the leach; as when first burned, ashes are caustic, but gradually lose this quality by absorbing carbonic acid from the air. The lime abstracts this carbonic acid, and renders the lye again caustic.

If lye is not strong enough to float an egg, it will not make good soap—but we have known it to do this, and still cause a failure, if not sufficiently caustic. The last named defect may generally be ascertained by pouring in a portion of some strong acid, as aquafortis or oil of vitriol, which will cause a violent effervesence—even strong vinegar will do. When this is the case, it shows that enough lime has not been used; and it may still do to apply it. We have known its use to cause success even after the materials for the soap had been mixed together.

The grease must be *first boiled*—then a pint of lye added—afterwards a quart, and so on by gradual additions till the soap is made. A barrel of good ashes will make a barrel of soap—but if the lye is strong enough to combine well with the grease, the soap will be too strong, and injure the clothes. This is remedied by adding a pail of water to each pail of freshly made soap, or diluting it.—*Albany Cultivator.*

Potato Muffins.—One pint of milk, six large potatoes mashed, one egg, a desert-spoonful of butter, and one gill of good yeast.

Sweeney.

Mr. S. W. Wilson, of Scotland Co., State of Missouri, writes to the *Country Gentleman* as follows:—A fine five year old mare, of my own, was attacked in the month of February last with sudden lameness in the near shoulder; sometimes the animal would appear free from lameness; at others, went very lame and continued so up to the first of May. The parts in the region of the shoulder appeared to be stiff, the inferior part of the limb was flexed, and the toe rested on the ground; could not turn short round without dragging the foot and swinging the limb outwards. On the twentieth of May, found that the muscles in the vicinity of the shoulder blade *antea et postea spinatus*, were diminished in size, and instead of being full and plump, there appeared, instead, some considerable cavity. It looked as if the parts had withered, or dried up, as the saying is.

Treatment.—I applied to the shoulder a strong counter-irritant, composed of spirits of turpentine and camphor. I then inserted a seton at the superior part of the *scapula*, running downwards four inches. The parts were, afterwards, occasionally rubbed with a mixture composed of oil of cedar, aqua ammonia, and camphorated spirit, and the animal has much improved. This disease is called Sweeney, and is very prevalent in this part of the country; and I should like to read an article on the subject in the pages of your journal.

Courtesy.

The innumerable fine and delicate threads which true courtesy weaves, as woof and warp, constitute the strength of the social frabric. Courtesy is love embodied, and rendered active and visible; and love attracts into union and oneness, as when continguous water-drops rush into mutual bosoms, and form river and lake. Conventional observances may drive men into combinations, as external hoops force the staves to become the barrel and the cask. But the drawings of love will attract, even through impediment and barrier, like the magnetic influence that operates through the vessel upon the mimic floating swan.

Courtesy is essentially different from politeness, etiquette, manners. These may become mere masks of supreme selfishness and hatred; and they may be only exhibitions

for praise and profit. Courtesy has indeed, no special form or manner, and yet never wars with suitable and decorous conventionalisms. Courtesy is inherent, and ever the same; but forms of politeness are shaped by accident; hence the etiquette now reigning may be dethroned in time, and the politeness of to-day become rudeness or vulgarity.

Courtesy cannot be taught or learned; it cannot be put on or laid aside. Courtesy is felt—mere politeness seen. The former wins love, the latter respect. The one bows gracefully and profoundly; the other can lay down a life. To become polite, read Chesterfield; to become courteous, read the Bible. Abraham, the father of the faithful, and Paul, the apostle of the Gentiles, bowed, indeed, with courtly grace, respectfully; but it was their courtesy, manifest in look, word, tone, manner, that revealed their heart-love, and melted other hearts.

The writer was passing once along a narrow pavement. A young man, in coarse apparel, at our approach, stepped aside, with great alacrity, and into the mud edging the path. He did not bow, he waved no hand, he moved without grace and yet the whole was evident courtesy.

After passing, the thought arose, should we not acknowledge and thank him for behaviour so unusual in a young man in this brazen age? We went back. Offering our hand, we said, "Young man, shake hands with me!" "Certainly, sir, but why do you wish it?" "Because you are a kind-hearted fellow, and a true gentleman; you gave *all* the path to me!" "Sir, I would step into the *gutter* for an elderly man!" "God bless you, young man! May you become a believer in our Lord Jesus Christ, whose servant I profess myself; and may we meet in heaven if we never meet on earth!"

Tears stood in the eyes of both; and when we said good-bye, our hands seemed to be a love-tie binding our hearts.

Reader! "Be courteous!"—*Chris. Intel.*

TO COLOR THE HAIR.—An English writer states that a liquid that will color the human hair black, and not stain the skin, may be made by taking one part of olive oil, and one part good brandy, by measure. The hair must be washed with this mixture every morning, and in a short time the use of it will make the hair a beautiful black.

Tombstone Literature.

Last week Dr. McCaul, of Toronto, delivered in that city a very curious and interesting lecture upon "Tombstone Literature," which we find concisely reported in the Colonist as follows:

His principal object, however, in this lecture was to suggest to those most interested in the subject—and who was not?—certain points to be kept in view in epitaph writing, so that in this country we might guard against the gross want of taste and propriety that characterized too many of such inscriptions in the old country. An epitaph or inscription on a tombstone, might be properly described, if not correctly defined, as an inscription on a monument or tombstone intended to perpetuate the memory of the dead and to approve the living. In the first place, such an inscription should be simple; there ought to be no affectation or extravagance. The first epitaph he would quote which violates that rule was that of Pope on Milton:

"Nature and Nature's laws lay hid in night;"
God said, 'Let Newton be,' and all was light!"

Such language as that was not fit to be applied to any mortal; it was applied by the Almighty to that light which was to illuminate the whole world. [Applause.] The next he would quote was that on Sir Cope D'Oyley, in 1633:

"Ask not who is buried here,
Go ask the Commons, ask the Shire;
Go ask the Church—they'll tell thee who,
As well as blubber's eyes can do,
Go ask the Heralds, ask the poor;
Their ears shall have enough to ask no more.

Then, if thine eyes bedew this sad urn,
Each drop a pearl will turn,
To adorn his tomb; or, if thou cans't not vent,
Thou bring'st more marble to his monument."

The seventh century was remarkable for bad taste in this respect, also for extravagance as the following would show. This was written on Samuel Ratanks, steward to the Earl of Donby, of Donby Hall, in 1635, and evidently over-shot the mark:

"His life was an academy of virtue,
His conversation a precedent of piety,
His estate a storehouse for charity;
His good name a place for innocency,
His death a passage to eternity,
His eternity a perfecting of glory;
Where he now sits, triumphs and sings
With angels, archangels, cherubims, and seraphim.
Holy, Holy, Holy, &c., &c.

Another characteristic of inscription is, that they should be concise. The object we have in view on such inscriptions, would suggest the propriety of having it neither too long nor too short. With regard to being too long, he had made examples, but they would be too tedious to read. Puttenham, in his "Arte of English Poesie," says of these long epitaphs:

"They make long and tedious discourses and write them on long tables to be hanged upon churches and chancells over the tombs of gravemen and others, which be so exceeding long one must have half a day's leisure to read one of them, and must be locked into the church by the sexton, as I myself was served while reading an epitaph in a certain cathedral."

While it is plain that they should not be too long, they should not be too short. Of these he had many examples; all of which were selected from church-yards and cemeteries in the mother country. He would quote a few. One in Slepheney read as follows:

"Here lies the body of Daniel Saul,
Spitalfield weaver---and that's all."

[Laughter.] Another at St. Michael's crooked lane ran thus:

"Here lieth wrapt in clay
The body of William Wray;
I have no more to say."

[Laughter.] Another essential requisite to such inscriptions is, that they should be true. Nothing could justify adulation, falsity, or satire. The following is to be found in Cheshire, written in 1772, on Edward Peregrine Estrell:

"Is this his death-bed? no, it is his shrine,
Behold him rising to an angel,
Entering the harbor like a gallant, stately vessel,
He hoists his flag of hope
Through the merits of our Blessed Redeemer,
Riding before a stately gale of Atonement
Till he makes with all the sail of an assured Faith
The happy port of a joyful resurrection,
He lived in the fear and love of God,
and died in Christ.
Believe and look with triumph on his tomb."

In St. Edward's, Salisbury, there was one on a Swedenborgian, which ends in the words:

"When a gracious refulgence bids the grave resign,
The Creator's nursing protection be thine,
So each perspiring Æthen will joyfully rise,
Transcendently good, supereminently wise."

But if it were true that there should be no flattery, there was no justification for their being directly false, (an example of which the lecturer cited,) not for being satirical. There was an old maxim, "*De mortuis mil nisi bonum,*" which should be adhered to in this respect. There was an instance in the case of an old man named Charters, on whom Dr. Arbuthnot wrote the following:

"O, indignant reader!
Think not this life useless to mankind.
Providence connived at his execrable designs,
To give to after ages a conspicuous proof and
example of how small estimation
is exorbitant wealth in the sight of God.
By his bestowing it on the most unworthy of
all mortals."

Among those unkind inscriptions he might quote the following, which was to be found in Old Grey Friars, Edinburgh:

"Here snug in her grave my wife doth lie;
Now, she's at rest---and so am I."

"Beneath this stone, and not above it,
Lie the remains of Anna Lovett,
Be pleased, good readers, not to shove it,
Lest she should come again above it;
For twixt you and I, no one does covet,
To see again this Anna Lovett."

Another in Steping runs thus:

"Whether he lives or whether he dies,
Nobody laughs and nobody cries.
Where he's gone and how he fares,
Nobody knows and nobody cares."

Another characteristic of inscriptions was that they should be serious and solemn; no trifling with the subject, as puns, or far-fetched allegories, or metaphors. He (the lecturer) thought puns very good things in their place, notwithstanding Dr. Johnson; but there should be no trifling with death. The first he would notice of this nature was in the time of Henry III., on a person named John Calf.

"Oh! Almighty God, have mercy on John Calf,
Whom premature death prevented from being
an ox."

A very common thing in the 16th and 17th century was punning on names. For example, the following, written in 1589 on Sir Richard Worme:

"Does worm eat worm? Knight Worme this
truth confirms,
For here with worms lies Worme, a dish of
worms.

Does worm eat Worme? Sure Worme will this deny.
For Worme with worm a dish of worms don't lie;
'Tis so, and 'tis not so, for free from worms
'Tis certain Worme is blest without his worms."

Another was on Mr. Cave, in Leicester:

"Here in this grave there lies a Cave---
We call a Cave a grave,
If Cave be grave and Grave be cave,
Then, reader, judge, I crave,
Or grave lie here in Cave.
If grave in Cave here buried lie,
Then, grave, where is thy victory?
Go, reader, and report here lies a Cave,
Who conquers death and buries his own grave."

In this category he would quote an inscription which Dr. Fuller left to be placed on his tomb—an extraordinary thing for such a man:

"Here lies Fuller's earth."

Another:

"Here lies one blossom out of breath,
Who lived a happy life and died a happy death."

It was also very much the practice to pun on professional callings and trades, (examples of which were given.) Among the metaphors the Doctor quoted the following:

"Here lies the dust of Margaret Gwin,
Who was so very pure within,
That she chipp'd the shell of her earthly skin,
And hatched herself a cherubim."

In this matter the lecturer remarked, there ought certainly to be no levity as to the vices of the deceased, especially as to those which were the cause of their death. But such they found to be the case. For example, the following is to be found in Winchester:

"Here lies in peace a Hampshire grenadier,
Who caught his death by drinking cold small beer,
Soldiers! take heed from his untimely fall,
And when you're hot, drink strong, or not at all."

The last point he would refer to was with regard to ludicrous incongruities, putting things together that had no sort of affinity. He remembered, when a young man, seeing the following notice in a steamboat, which plied between England and Ireland: "No dogs, luggage or smoking allowed." It was very good, but the mixture of words and ideas was extraordinary. But perhaps the most extraordinary incongruity of the kind was the following at Pewsey, in Weltshire:

"Here lies the body of Lady O'Looney, great niece to Burke, commonly called the sublime. She was bland, passionate, and deeply religious; also she painted in water colours, and sent several pictures to the exhibition. She was first cousin to Lady Jones—and of such is the Kingdom of Heaven."

Another characteristic of inscriptions was that they should be correct, both in syntax and in sense. Look at the following to be found at Montrose:

"Here lies the bodies of George Young and Isabella Guthrie, and all their posterity for more than fifty years backwards."

Another more ludicrous, when the position of the deceased was considered, was this at Plymouth:

"Here lies the body of James Vernon, esq., the only surviving son of Admiral Vernon."

Here the lecturer referred to the practice of the Romans in placing admonitory inscriptions on their tomb-stones, such as "*Mors janua vita*," and then cited the following epitaph on the Earl of Devonshire, as showing how truly the scripture saying in regard to laying in store in Heaven by giving to the poor on earth, was recognized:

"Hoe! hoe! who lie here?
I the good earl of Devonshire,
With Maud, my wife."

Premium Cheese Making in Ohio.

At the Ohio State Fair the first premiums were taken by Messrs. B. Andrews and H. F. Giddings, of Ashtabula county. These gentlemen have furnished the following statement to the Conneaut *Reporter*:

STATEMENT OF H. F. GIDDINGS.

I have a barn 48 feet long, with a stable on each side, which holds 15 cows; it is 32 feet wide on the ground, and 44 feet wide above the stables; this projection affords additional room for hay, and shelter for the manure that is thrown from the stables. This barn will hold 30 cows and hay enough to winter them; we use it for milking at all seasons of the year, and probably save half an hour at each milking, besides the comfort in comparison with milking in the yard—especially in cold or rainy weather. After the cows are milked, the milk is carried from the barn to the room where the cheese is made,

which is a few rods distant. This room contains all the apparatus used in making—vat, presses, hoops, salt, shelves for pails, etc. The presses operate on the self-acting principle: the vat is one of Roe's Patent, which are in such general use that a description is probably unnecessary.

Process of Making Cheese.—The night's milk is strained into the vat and well cooled by turning cold water into the space between the water and milk vat; in hot weather the water is changed once or twice; that which remains over night in the vat is used for heating in the morning. The cream which rises over night is taken off, and the morning's milk strained in with the night's; the milk is then warmed to 84 or 85 degrees, and rennet enough added to curdle the milk in 40 or 45 minutes. As soon as the curd is well formed it is thoroughly broken with a wire cutter, which is used carefully at first to avoid starting the white whey; the curd is next allowed to settle a few minutes, after which part of the whey is dipped off. The temperature is then gradually raised and the curd well stirred and broken with the hands during the first part of the heating process; the heat is raised in the course of an hour to about 90 degrees, when it is checked by the damper so as not to raise beyond that point; it is allowed to remain at this temperature about half an hour, stirring occasionally to prevent the curd from packing together. The water is next drawn from the vat and afterwards the whey; the whey runs in long spouts to a trough near the pig-pen. After the whey has drained off, the curd is salted with ground solar salt at the rate of a teacupfull to 14 pounds of pressed cheese. After the curd is well cooled it is dipped into the hoop and put into the press; the cheese is pressed firmly two days, and is turned once each day, when taken from the press, it is carried to the curing room adjoining, where it is bandaged and dressed with warm whey oil. The curing room is in a cool place, and is kept at a temperature 70 or 75 degrees as near as can be. Here the cheese is put upon a shelf and turned once a day while new, and afterwards once in two or three days according to circumstances.

It is impossible to have a rule for making cheese which will always produce the same quality, as much depends on the quantity and quality of the milk, state of the weather etc., and the process must be varied accordingly. When and how to do this can only be learned by experience and careful observation.

STATEMENT OF MR. R. ANDREWS.

My dairy fixtures consist, 1st of a cow-barn for storing hay, and milking; it is 35 by 64 feet on the ground, and 44 by 54 over the cows, leaving a projection of six feet on each side to cover manure; it takes in 40 cows at a time, and when we milk more than forty, we milk a few, turn them out, and drive in those that were left out.

2d. A room for making cheese, which contains the necessary implements.

3d. The pressing room, which contains the presses, dressing table and other fixings pertaining to the business.

4th. The curing room, where the cheese are cured and fitted for market.

I claim superiority of management, 1st, for care and attention to all the minutiæ of the business. 2d, uniformity of manufacture. 3d, skill in the after care of the cheese; and lastly, I am able to procure better prices for my cheese, which is the best evidence of superiority of management.

Process of Manufacture.—I use a wooden vat lined with tin, and a single coil tin worm for cooling and warming the milk. The worm is placed in the vat and the evening's milk strained in; when we are about half done milking, I commence pouring cold water into the worm, from which it runs directly into an iron kettle that stands in an arch at the end of the vat; continue passing cold water through the worm at short intervals until the animal heat is entirely expelled from the milk. The first pailful of water that is poured into the worm, remains in it until expelled by the second, and so on. The temperature of the milk is reduced to 70 degrees or lower, thus preventing the sugar of milk from changing to a lactic acid, for a long time, and consequently preventing the cheese cracking. In the morning the cream is removed for family use, a fire built in the arch, the morning's milk straind into the vat, and the temperature raised to 86 or 88 degrees in warm, and 90 degrees in cool weather, by dipping water at about 150 degrees from the kettle into the worm, and stirring the milk gently while warming. A suffieient quantity of rennet is then added to coagulate the milk and form a perfect curd in 40 or 50 minutes. The curd is cut into about half inch blocks with a wire screen, then allowed to stand until

it has settled 1½ inches; stir the curd gently with the hand 15 or 20 minutes, to keep it from packing, then let it settle a few minutes. Set a common stove boiler into the kettle at the end of the vat, fill the boiler with the whey, and then commence warming the curd moderately by dipping whey from the boiler to the vat and from vat to boiler, stirring the curd gently till the temperature is raised 109 degrees. Keep it at about 100 degrees until the curd is properly cooked; this should not be determined by the indication of the mercury, but by the judgment of the operator. It is sometimes necessary to raise the temperature to 102 and even 104 degrees, for instance when the weather is cold, or the curd has been too long coming, and is consequently in a soft, pulpy state. When the curd is thoroughly cooked and worked fine, draw off the whey and salt it with ground solar salt, one teacupful to 15 to 18 pounds of cheese when it comes from the hoop; if the curd is well drained, less salt is needed. The quantity of salt necessary depends on the condition of the curd when salted; mix the salt well with the curd, then let it stand and cool. After it is properly cooled, press two days in Parker's self-press, turning the cheese each day into a clean, dry sack. After pressing, the cheese goes to the dressing table, where it is bandaged, and each is slightly stained with a preparation of annato; it then goes to the curing room; and when the surface becomes a little dry, it is well rubbed with warm whey oil. Turn and rub once a day while it is new; when partially cured turn once in two days and when well cured, turn them off to market.

Cheese Making.

In the *Ohio Farmer* of Dec. 24th, 1859, you published a communication from "Inquirer," on the subject of cheese making. I can "post" him, and other of your readers, on one of the important mechanical points in the art, and assure them that it is of much more importance than is generally imagined by those who engage in the manufacture. I allude to the pressing. I have had large opportunities to witness the results of the various modes of pressing cheese, and have seldom seen presses that were at all suited to the work. It requires a pressure of full ten tons applied to a twenty-two or twenty-four inch cheese, at the last part of the process; and when the pressure is rightly applied, that is graduated by a steady increase from fifty to ten thousand pounds during the first twelve hours, and afterward increased to twenty thousand or thirty thousand pounds, the cheese will be found to *cure* in one-fourth the time, and with one-fourth the handling necessary, where but a few hundred pounds of pressure are applied, leaving the whey to be dried out or leak out, as is frequently the case—the cheese thus treated being of a porous or honey-comb texture, strong and even sour from the fermenting whey, before it leaves the cheese.

It may be adopted for a rule among cheesemen, that they *cannot press their cheese too much*, while the hoop and cheese cloth remain around it, and the pressure is gradually increased. Cheese, well pressed, will not shrink much, are little liable to crack or to be affected by the skippers, while the rind is thinner and more palatable than where the whey is dried out, instead of being pressed out.

Cheese-makers, to avoid spending $35 or $40 for a good ten ton iron press, spend nearly that extra in labor each year in curing cheeses, and sell at 10 to 20 per cent. less than a first rate article brings, on account of inferiority.

Few persons are skilled in the rules for ascertaining the power of the presses they use, and buy a press from the commendation of some "Fair Committee," just as ignorant; and having bought it, keep trying a *complicated mystery*, that does not press harder than if used for the sitting chair of a bouncing house-wife. Farmers and dairymen must come up to the scratch, and pay the price of good implements, and they will find mechanics ready to respond with all the needed tools of the farm and the dairy

One simple rule will enable all to determine the pressue they apply to their cheese. Multiply the weight or power used in pressing by the number of inches the weight or applied power moves, as compared with the distance the follower passes in the same time.

For instance, if we use a weight of fifty pounds on a lever, and the weight passes through twenty-four inches of space while the follower or cheese passes one inch; then if the weight has acted at right angles with the fulcrum, we multiply the fifty pounds by twenty-four, and find the pressure twelve hundred pounds, about what the ordinary

press produces, but not one-eighth the pressure that should be given. I will very willingly give a design for a press that will meet the wants of dairymen, if desired, though I am not now a manufacturer.

J. E. HOLMES.

Newark, O., Jan. 9, 1860.

From the Country Gentleman and Cultivator.

Estimate of the Value of our Dairy Products.

MESSRS. TUCKER & SON:

I have not the egotism to suppose that I shall do justice to the subject on which you have requested me to furnish some papers for publication in your journal.

The subject is too extensive, the facts are varied, the conditions involved are in part obvious, but in very essential and important particulars recondite, and besides my knowledge and experience are deficient.

Milk of standard quality rapidly decomposes. Curd, the product of milk, including both casein and butter, becomes almost as speedily putrescent and disgusting. It is nevertheless true that this animal product, MILK—subtle, sensitive, perishable—is the basis of a department of *husbandry*, inferior to no other in importance, viewed in its present condition or future promise.

No doubt there has been much slovenly practice, and perhaps in many cases want of success in the absence of system, method and *management*, while prejudice has whilom elbowed it out of genteel society.

When I asked the question, "Is Cotton king?" the reply would be, "No; but Milk is;" and to justify this answer a few particulars shall suffice.

It is a truism that a judiciously selected herd of dairy cows, well cared for and thoroughly handled, will, on an average of a series of years, in lots of thirty to eighty, more or less, produce annually from each cow 450 to 550 pounds of cheese. Allowing something for smaller product of cows under four years of age, not usually embraced in such a selection, and also for the fact that the entire number of cows will probably fall before the average quality of dairy herds, and the minimum average ought to be stated at no less than 400 pounds of cheese as the product per cow. The standard estimate of cotton bales answers in weight to this number, so that one bale of cotton, and the yearly product of one cow in cheese equivalent, are alike in weight. As to prices, the winter's sales for the average of the last seven years are nine and one third cents at the home delivery within fifteen miles of the farm, and this is by no means the highest range of cheese sales which might be quoted.

The cotton bales reported in census of 1850, were, ...	2,445,793
The cows of 31 States and District of Columbia, were, ...	6,385,094

Stating the home price of cheese and cotton as six to ten, which doubtless gives to the fibrous staple great advantage in the comparison, and we have a result of estimated cheese value of $153,242,256 per annum, and of cotton $97,831,720, while the total domestic exports were less than one hundred and thirty-seven millions.

The four special crops, tobacco, rice, sugar and cotton, (only two of which are food crops,) aggregate 1,630,000,000 pounds, while the milk (cheese equivalent) aggregates 7,554,000,000 pounds.

Referring again to the census statistics of 1850, the total number of pounds of butter, in round numbers, is 319,000,000, and multiplying it by three as a cheese equivalent, gives 940,000,000 pounds, to which add the cheese reported, 105,000,000 pounds, and this makes an actual cheese product of *one thousand forty-five million pounds*, exclusive of the vast amount of milk consumed in its primitive state, by families in country and cities; and also by animals, to produce other forms of food substances as veal meat and raising young stock.

New York farmers may smile at the very modest calculation of twenty-four dollars product per cow in the above estimate. If so, they can take an enterprising dairyman's standard of money product, and double the figures, thus showing an excess of *one hundred and sixty-three million dollars*, yearly product from this humble branch of husbandry, over the entire aggregate of *domestic exports*; and of sixty-four million dollars over the aggregate of the far-famed and universal corn crop of this country, estimating the price at forty cents per bushel.

The area of Indian corn is given at thirty-one million acres, while that of hay

and pasture is put down at thirty-three million acres.

It may be safely estimated that more than one million persons are more or less employed daily in this department of production for at least two-thirds of each year.

JONATHAN E. PETTIT.

Onondaga Co., N. Y.

From the Indiana Farmer.

The Short Horns for the Dairy.

For the last fifty years the Short Horns have been bred mainly for breeding cattle, and the demand being so great, and prices so high, that with but few exceptions, all that would breed, good, bad and indifferent, were appropriated to this purpose. In fact, thousands of grade Durhams, within the last seven years, have been *pedigreed after fashion*, and sold for breeding cattle to the farmers of Indiana and Illinois, who were unacquainted with pedigrees. A large majority of the *Short Horn breeders proper*, in making their selections of breeding cattle have had but little, if any, regard whatever, for their dairy qualities; beef, beef, beef, has been their motto; they seem to have lost sight of everything else. Indeed many of them seem to believe it impossible to combine the capacities of taking on flesh rapidly and producing large quantities of superior milk in the same animal.

I think, however, a careful investigation of this subject will convince them that this may be done. Great milkers may be found of all shapes and forms, and belonging to most, if not all, of the known breeds, from that of the homeliest ill-formed "scrub," to the handsomest and most valuable beef-producing Short-horn; and as a general rule, the ill-shaped cow requires a greater quantity of feed than the handsome one, to produce an equal quantity of milk as well as beef.

By selecting cows of superior milking capacity, (such cows may be found in nearly every herd of Short-horns of any notoriety wherever they are *bred pure*,) and then breeding those cows to bulls not only descended from good milk cows, but from families or tribes of Short-horns most celebrated for their dairy qualities, and such as have proved to get mostly, if not uniformly, good dairy stock, the writer believes a race of Short-horns might be raised surpassing, in intrinsic value, anything ever yet produced. He would not, however, sacrifice every other good point for the sake of large messes of even the richest milk, neither does he think this necessary, in order to make the desired improvement, but on the contrary, thinks it possible to retain, if not improve upon, their best capacities for beef at the same time. Was I engaged in breeding Short-horns, I would never be satisfied until I produced a herd of cows, whose dairy qualities would surpass any other herd now in the State, maintaining at the same time that superiority for the shambles, which is characteristic of the breed.

The breeder whose efforts at improvement are made in this direction will no doubt be amply remunerated, *if he only starts right.* Here is the great key-stone of success. For he who has that *correct taste, the sound judgment and sufficient experience* to enable him to select the proper animals for the foundation of his herd, will know how to use those animals in establishing that herd. Although it may require years of *constant care* and a persistent determination to overcome all obstacles, in establishing such a herd, success is sure to crown his labours *if his selections are judiciously made.*

He who succeeds in establishing a herd of one hundred breeding animals possessing the superiority indicated above, and at the same time capable of transmitting those valuable qualities with unerring certainty, to their descendants, will add something to the wealth of his State, besides earning for himself an enviable name among that class who are everywhere among the most enterprising and intelligent citizens. This improvement being made in the dairy qualities of the Short-horns, we would have at hand the very material requisite for transforming our common cattle into beasts of more value to the dairy farmer of Indiana than the best imported Ayrshires, and most of our farmers who seek to improve our common cattle would have recourse to such a herd, for their stock bulls, in order to effect the desired improvement.

Having given numerous instances of the superiority of the Short-horns for the dairy, in the preceding articles, I propose to close this with the history of a cow, good for the dairy and unsurpassed for the shambles. Many instances of superiority might be cited, and the living animals designated,

but I prefer giving you the particulars relating to this extraordinary cow, which may be found recorded in the fourth volume of "The American Short Horn Herd Book," commencing on the 8th page. A portrait of this cow faces page 249 of the same volume. She was bred by Lewis F. Allen, of Black Rock, N. Y., and by him called "Grace." Her history, as given by Mr. Allen, in the Herd Book, is as follows, omitting her pedigree:

"Grace was the first calf of her dam, whose age was only two years and a half at the calving. She was calved in a cold winter night, and was found nearly dead in the morning, and for three days could not stand, and was with difficulty saved; she however became a fine calf. At seven months of age, unfortunately, she got pregnant by a bull that leaped from the road into the pasture, and produced, at sixteen months, a heifer calf. When about two years and a half old, her breeder sold her to Mr. Sheafe, of Duchess county, and at three years she dropped her second calf. In 1844, she was shown by Mr. Sheafe at the New York State Agricultural Show, at Poughkeepsie, and won the third prize, the minority of the committee thinking her the best, and that she should be placed first. In Mr. Sheafe's possession she bred four calves, all bulls, which her fine character readily sold. In 1847, Mr. Sheafe sold her to Ambrose Stevens. He showed her at the State Exhibition at Saratoga that year, and she was beaten as a breeding cow, but won the first prize as a milch cow. As a milch cow she was good, giving about 20 to 22 quarts of very rich milk, and made, at one time, on trial, as high as 16 pounds of butter per week on less than 18 quarts of milk per day.

After 1857, she did not breed, but was only fed on hay and grass for more than two years. In the winter of 1849–50, she got a little feed—about four quarts a day, of ground corn, oats and bran. In May, 1850, she was turned to pasture, and from thence on until September got only grass. In September, 1850, she was shown at the Show of the New York State Society at Albany, as a fat cow, and won the first prize from a committee of butchers, who gave her great praise. From September, 1850, to November, she had grass only; after that she got hay and moderate feed until the middle of December, when she was fed all she would eat, the precise daily allowance not being now recollected. She was fed until March, 1851, when she was taken to New York, and sold to James Irving, of Washington market, who slaughtered her. She had been permitted to run, in the summer of 1850, with a young bull, and on being killed was found to be forward in calf and quite six months gone.

The live weight of this extraordinary cow was (with the calf in her) 1795 pounds. On being dressed the weight of the calf and its appendages was sixty pounds, leaving *her* live weight 1735 pounds. After being killed her carcase hung four and twenty hours, when her quarters weighed 1210 pounds, her loose fat 153 pounds, and her hide 101 pounds; total 1464 pounds. Her dead weight was 83 pounds and 89–100 of a pound for every 100 pounds live weight; her shrinkage (which included heart, liver, tongue and tripe,) being thus only a very small fraction more than 16 pounds to the hundred in the live weight, or 16 per cent.

It is not now recollected that any animal on record ever dressed a greater dead weight for the live weight. On being cut up the beef of this cow showed superbly. The whole carcase was deeply covered over with fine, firm fat, the lean was beautifully marbled, the fat scattered throughout the entire lean fibre, and the whole remarkable for its great amount and depth of lean meat.

She continued the property of Mr. Stevens until she was killed, but was fed by J. M. Sherwood, of Auburn, N. Y. Grace never produced a heifer calf except her first, which was a grade, and that one left no produce."

T. E. T.

Cedar Cottage, Jan., 1860.

How to Catch Rats.—Rats are not only species of tenants that outwit their landlords; they will somtimes shun all baits and traps. As many modes of getting rid of them cause them to die on the premises, and taint the atmosphere, or are dangerous to human life, it may be well to remember that if the centre of a cage is sprinkled with a few drops of the "Oil of Rhodium," multitudes are irresistably attracted to the spot, to be disposed of at will.

Hall's Journal of Health.

"My Wife's Hen Speculation."

One morning, as "my wife" was reading the Grocery-man's bill, she exclaimed in a most surprised tone: "Six dozen of eggs in one week at thirty cents a dozen!" (she drew a very long breath at this point, and I followed suit,) "comes to one dollar and eighty cents a week!" "Exactly," I replied, rather sharp and prompt.

"I'd like to know what we are coming to?" inquired my "better half."

"That's my sentiments," I remarked, in a low tone, and raising my voice and speaking to a younger S—th, who was eating breakfast with me: "John, see what y'er coming to when y'er *get* married!" He smiled, I tried to, but it was very hard work.

"I don't believe," resumed my wife, "but what that Grocery-man tucks on a cent or two, just because he knows *you* (that's me, thought I,) won't say a word. I don't see why *eggs* should be so high!"

There was a dead calm for two minutes—my eyes were resting upon the last boiled egg on the table in profound meditation. Just as I was about to remark that we had better get along with less eggs, I caught a glance of my wife's eyes, and concluded that it would be well to let her do the talking.

"I don't see why," she again resumed, "that it should cost so much to live. We ought to raise all the eggs we want to use, ourselves."

"Good business," I said, "that of *raising* eggs."

My wife continued:

"There's Mrs. G—, she haves all the eggs she wants, and some to sell. She keeps hens, and her back yard is no bigger than ours. Now, less we keep hens, we can save a dollar a week."

John smiled, my wife smiled, I smiled, in fact, the whole family, even down to the youngest S—th, smiled.

"Good!" said I.

At this point my wife enlarged upon the merits of Chittagongs, Shanghais, Brahma Pootras, Chinas, Dunghills, and a host of other different kinds of hens. This subject was the only one which was discussed at our meals for the next week. She bought all the different books relative to raising hens she could find in the book stores, and on the seventh day, the entire family had an attack of the "Hen Fever." Even the youngest S—th's attack was so severe, that he rolled out of the cradle in attempting to clap his arms and crow.

The building of a hen-coop was decided upon. My wife was the architect. It was built after an original design, and resembled a patent sausage-stuffer as much as a hen-coop. Her next proceeding was, to send me to Rocky Hill, among her agricultural acquaintances, afrer a peculiar breed of hens—they were duly purchased and installed in our coop. So far, all right and successful.

That night there was a procession of hens and chickens, headed by a dozen gigantic roosters, that reached the entire length of Main Street. They, of course, paid a visit to my wife, and, of course, I made a speech; and they responded by such a tremendous crowing and cackling that it sounded as if Bedlam had broke loose. As each pullet passed my door, she made a most graceful courtesy and dropped an egg—the ground was covered, and looked as if there had been a snow storm of eggs. I filled the buttery, cellar, garret, closets, and every possible nook and corner with eggs, and as I was about to put a two-bushel basket full of them in the parlor under the piano, I stumbled and upset the entire lot upon that instrument, breaking every single egg—the yellow liquid run down through the keys of the piano, thence on to the nice Brussels carpet, all over my wife's dresses and furs, which had been brought out of the closet to make more room for eggs. That moment was one of great despair; clinching both hands into my hair, I screamed out one of the wildest and loudest shrieks that mortal ears ever heard.

"Goodness!" shrieked my wife, jumping out of bed and landing in the middle of room, "are you crazy?"

"No, guess not," said I, waking up and collecting my scattered senses, "only an attack of the hen fever."

Since that memorable night, six mortal weeks have passed, during which time, I have watched, fed and taken the best care of those "Rocky Hill chickens," and instead of saving a dollar a week, they have increased my expenses. Like certain bank stocks, I had given up all hopes of a dividend. I had looked regularly every day into that hen-coop only to be disappointed

—not a single egg had they seen fit to lay. As the holidays were coming, I suggested to my wife, as the old rooster seemed to be an almost "useless" member of the coop, the propriety of ringing his neck.

"Mr. S—th," said she, "I want you to know that that rooster *belongs* to me, and I intend to keep *him* whether the hens lay or not!"

For the first time in my life, the green-eyed monster took possession of my breast. I vowed eternal vengeance upon that old rooster. Just think of it, for a moment, my wife snubbing my nose on account of an old Shanghai rooster.

"You can't expect them to lay this cold weather," said she, breaking the silence; "it is so cold. If they had a dose of red pepper, it might do them good!"

"Yes," said I, "red pepper might do them some good."

Now's a good time to give that old rooster fits. Red pepper, thought I to myself. So I prepared a dose of red pepper for them, looking out to give my wife's old rooster a double dose. You can little imagine, Mr. T., with what infinite satisfaction and delight I watched the progress of affairs in that coop. The next day I actually found an egg in the coop. I marked it. No one carried it in the house and requested my wife to save it till she got a dozen. I gave my wife's rooster another dose of red pepper. The next day I found the second egg in the coop, and was about to mark No. 2 on the end, when I discovered figure 1, the very mark I had made the day before! I also noticed that the nest did not look much like a hen's nest. I remarked the same to my wife. She thought it was owing to the red pepper. I thought so too, and asked her to fetch the eggs in, after that time, and save me the trouble. The next day, egg No. 1 was in the box, I wrote upon it, "*Laid by Mrs. S—th, Dec. 21st*, 1858." The next morning, I found that that egg had been taken away, also, that four out of seven hens were dead as a brick. For the first time in my life I was satisfied—that my wife's speculation was a failure—that she was a woman not to be trifled with. Whether the death of these "Rocky Hill chickens" was caused by the cold weather, or over doses of red pepper, or any "other cause," I am unable to state; but I never mentioned my suspicions to my wife.

11

The next day, a military friend called upon me from Williamantic. (I forgot to state that I'm a military man.) I showed him the city. Said he to me, "S—th, you've got a new hat." I said, "Yes. Come over to the Clinton House." We went there, and our "labours" commenced and continued for an hour. My military friend invited me to the States, and again we renewed our labours. I then invited him to the Allyn House. There our labours became so great, our "hardships" so severe, and other circumstances so numerous came upon us, that we came to the conclusion that we needed rest. He took possession of a lounge and rolled off on the floor; I followed suit. The next thing I remember, was my military friend whispering in my ear, informing me that he was going home on the first train.

"Come, S—th," said he, "you're a good fellow"—

"I wish my wife thought so," said I, interrupting him.

I saw my friend safely aboard the cars, and had some difficulty in getting home—though nothing to speak of, excepting the side-walks, they were rather slippery; there were, also, several individuals who tried to see how near they could come to me, and not run into me—I believe one or two inexperienced gentlemen did run into me. I excused them, and all went well till I arrived home. As I was going into the gate, I concluded I would see if I could'nt find my wife an egg, and as I came within a few yards of the coop, my wife's old Shanghai rooster crowed out in the most insulting tone, "We-don't-belong-to-you!" Fired with indignation, I seized a clothes pole and made a furious charge upon the coop, determining to run the coop, rooster and all, through and through; but I stepped on a rolling stone and landed sprawling upon the ground. And, to make the scene more interesting, the wind carried my hat under the fence into Mrs. Bibbins's yard. There's not a family in the whole city, that I dislike as much as the Bibbinses; there are seven of 'em all told, girls—but this time there were fourteen, all laughing and giggling to see me attempting to climb their picket fence. My boots were so heavy that when I got one leg up the other would pull me back. I was bound to have my hat, and was about to pull off coat and

boots and show the Bibbinses what I could do, when I heard a voice:

"S—th, do, for heaven's sake, come into the house, you'll disgrace the whole family!"

That's from my wife, thought I. Out of respect for my relatives, I postponed my feat of climbing Mrs. Bibbins's picket fence.

Since that day I have become a different man, and through the influence of my wife, agreed to become a member of the "Totally Benevolent Moral Reform and Social Teetotal Abstenence Association," on condition that my wife would sell her "Rocky Hill chickens," donate the proceeds to the society, and get me elected treasurer of the association

I append below the result of

MY WIFE'S HEN SPECULATION.

Hens.	*Dr.*
To 7 Hens, @ 38c ℔ head,.....	$2 66
1 Shanghai Rooster, (full blood,)	75
Coop, lumber, cost of making,.....	5 75
Lost time, hire of team, &c.,.....	4 50
2 bushels of corn, @ 80c ℔ bushel,..	1 60
Miscellaneous items of feed, ...	88
Red pepper (to make 'em lay,)....	5
Medicines, &c., (for myself, during my "hardships" with milit'y friend, lost time, &c., the result of an attack of the hen fever,)	13 66
New hat, lost,.....	4 50
Total expenses,.....	$34 35

Inventory of the coop and contents, January 1st, 1859.

Value of the coop,...	99
Decrease of value of three hens in coop, 25c ℔ head, ...	39
Decrease of value of Rooster (not worth a cent,).....	00
Total value of my wife's hen property,	$1 38

As there is nothing to carry to the credit of the Hen account, you will notice the total expenses which have occurred, the result of my wife trying to raise eggs, and save a dollar a week on the Grocery-man's bill.

I am permanently yours,

S—TH.

BOILED INDIAN MEAL PUDDING.—Take one quart of buttermilk, two eggs, one teaspoonful of soda, add meal enough to make a thick batter, tie it tightly in a bag, drop it in a kettle of boiling water, and let it boil one hour. Eat it with sauce to suit the taste.

From Evenings in My Library.

Birds and Acorns.

BY CHARLES LANMAN.

On recently taking a walk through the Smithsonian Instution, my attention was called to the limb of a tree about four feet long and ten inches in diameter, which had the appearance of having been completely riddled by rifle balls. On inspecting it, I found that the holes were of a uniform size and depth, and that each one was then or had been the receptacle of an acorn. So closely fitted were the nuts to the hollow spaces, that it was almost impossible to pick them out with a pen-knife, and in this way is it that the California woodpecker packs away its winter store of provisions, in the dry branches of towering trees in the lonely woods. The specimen in question was brought from the Pacific coast, where the bird alluded to abounds, and as I never tire of looking at the wonders of natural history, I examined it with peculiar interest. On looking over some of the latter reports of our exploring naturalists, I find that there are two other members of the woodpecker family that possess a habit similar to the bird of California. One of them is the Red Shafted Woodpecker of Mexico, which makes a hole in the cactus, and deposits the collected acorns in the hollow compartments of that plant. The other bird alluded to is the common Sap-Sucker of the United States, which is fond of acorns, and hides them away for safe keeping in the crevices of the bark of certain trees. It is thought by some that these borers, when they bring their skill to bear upon trees, invariably commence operations upon a living tree—a maple, an elm, or an ash,—and that their original object is to get at the sweet sap which they contain. If so, how wonderful is it, that they should first use the life-blood of one tree for their spring beverage, and the fruit of another for their autumnal and winter store; and that, as in the case of the California bird, the hollow which it makes by way of reaching the sap should subsequently become a kind of garner for the products of its industry!

An English writer says, in his advice to young married women, that their mother, Eve, "married a gardener." It might be added, that the gardener, in consequence of his match, lost his situation.

Where to Feed Fruit Trees.

The stones of the field and trees of the forest are teachers, and what is more beautiful, they teach the truth. We planted a white oak, some years since, not in honor of any warrior or political race horse on the track for election, but to add one more variety to our pretty well duplicated grounds. After it had stood a year or two, we noticed in midsummer a circle around it, some five feet from the trunk, and some six inches wide, where the grass had died out. The next year, this circle was removed from its outer rim, still further from the tree, and of an increased width and so it has continued to travel for several years. The fact gave rise to many wonders as to the cause among observers, but the inference we draw from the fact was that the white oak was a great eater, that the mass of feeders lay under the circles where the grass was killed, and pushed away from the tree in proportion as the circle enlarged.

The native chestnut planted out gave the same illustration. In this case of both trees, the inner circle became sodden with grass as new circles were forming beyond, and the increased width of the circle from year to year showed us that the feeders were increasing to meet additional demands of the tree.

To us it was a lesson without labor or cost. It taught us that the practice so universally adopted of manuring fruit trees for a little distance, just around the body of the tree, could never meet their demands for food. A few feeders may remain, to be sure, scattered along the roots which are yearly increasing in size, but the body of them are yearly pushing away in search of a greater amount of food. Fully to subserve the purpose then for which manure is applied to fruit trees, the mass of it must annually be placed further from the trunk of the tree for keeping up with the circle of feeders to gratify their demands.

The observation teaches another fact. A preparation of ground to receive a tree, for a few feet square does not fully answer their demands. It may do well to give them a start, but when they get to the end of this starting point, disease and dwarfishness will follow. The man who plants an orchard of any kind of fruit, must give *all* the soil an ample preparation, or his success cannot be complete.

The root is the most important part of the tree. If they can spread and extend themselves, the trunk and branches will follow of course, and in due time the fruit will appear.

Again, the power of a tree to resist winds depends much upon the strength and circuit of its roots. If they are fine and far spreading, but little danger will arise from stormy gales.—*Horticulturist.*

House Plants.

Many of our readers, especially among the ladies, are engaged in the cultivation of plants within-doors, and have, doubtless, suffered more or less of vexation of spirit from witnessing the depredations of insects, and will, we doubt not, thank us for a remedy. The London Floricultural Cabinet has found and promulgated a remedy and preventive for the geen-fly, mealy-bug, thrip and scale, creatures that infest house and green-house plants. The editor has tried it and pronounces it effectual. It is cheap, easily applied, and is as follows :

A wash is made by dissolving half an ounce of bitter aloes in a gallon of water. With this wash, syringe your plants so as to wet them under and over the leaves. If the enemy be there he will be destroyed ; if he be not there he will not come. Whether it be the bitter on the surface, or the smell, or both, we know not; but, so far as it has been tried, infected plants may be put all round one so treated, and there will be no sign of thrips, bugs or aphides, even if the others be covered. It is the only thing that destroyed the thrip for us; and we believe that, while the bitter remains on the surface, nothing living will touch it. We feel great confidence that even snails and slugs will not meddle with it; and all we can say about its effects on caterpillars, is, that they have not as yet attacked a plant so prepared, and that they have committed depredations on plants very close. We do hope that a remedy so simple, so easily tried, and so void of all humbug, will be adopted by every body who has plants to try it on.

[*Boston Cultivator.*

A man has no more right to say an uncivil thing than to act one ; no more right to say a rude thing to another, than to knock him down.

Preserving Plants during Winter.

On a recent visit to a friend, we observed an admirable arrangement for keeping plants over winter. In digging a barn cellar, it was carried out about eight feet longer than the size of the frame. The wall of this extended portion is brought up to the same level as the rest of the basement, and covered with glazed sashes, resting on the end of the barn elevation. It struck us as being at once the most complete and economical *pit* for keeping Orange and Lemon trees, Lagerstremias, Pittosporums, Aloes, and plants of similar nature, that we had seen. We have no doubt that even Camelias would flower well in it; and for preserving Verbenas, Geraniums, and other plants for the flower beds in summer, it is just as good as the most costly glass structure that could be contrived; of course we could not expect to cut many flowers from plants kept in this way, although we are not sure but that, by partitioning it off from the rest of the basement, so that the heat of the sun, striking through the glass would be concentrated into it, the temperature would be raised sufficient to flower many of the more hardy greenhouse plants, such as Chinese primroses, Pansies, various bulbous roots, &c. These small plants would require to be elevated near the glass, and in very severe weather a covering of loose straw or hay on the outside of the sashes would exclude frost. The greatest care should be exercised in watering; too much water would soon ruin plants, when the temperature is low. It is safe to keep all rather dry. We have seen Oleanders and Orange trees kept three months in a cellar without receiving a drop of water. No definite rule can be given for watering, but more danger is to be apprehended from an over supply, than from a deficiency, where no artificial heat is given.—*Phil'a Farmer and Gardener.*

The Farmer's Wife.

Is there any position a mother can covet for her daughter, more glorious than to be the wife of an honest, independent, happy farmer, in a country like this? To be the wife of one who is looked up to by the neighbors as one whose example may be safely followed—one whose farm is noted far and near as a model of neatness and perfection of cultivation? To be the mistress of a mansion of her own, that may be the envy of every passer-by, because it is neat and comfortable—a sweet and lovely cottage home. To be the angel that flits through the garden, bidding the flowers bloom, and twining roses and honey-suckles around the bed-room or sweetening their fragrance with her sweetest smiles; or spreading the snow-cloth beneath the old-oak at the door to welcome her husband as he returns from his toil; or ever tipping the cradle with her foot as she plies the dasher with her hand, or busily moves the needle, at the same time humming a joyous song of praise that she is the happy and fondly-beloved wife of an American farmer—one of the true noblemen of this free country—one that should by rights, rank as the pride and glory of America.—*Southern Rural Gentleman.*

Food for Cows.

We find the following paragraph in an exchange, where it appears without credit. The statement appears rational, and suggests the economy of preparing food somewhat before giving it to stock:

"M. Chabert, director of the Veternarian School at Alford, England, had a number of cows which yielded twelve gallons of milk each day. In his able publication on this subject, he observes that cows fed in winter on dry substance alone, yield less milk than those that are kept on a green diet, and also that their milk loses much of its good quality. He published the following recipe, by the use of which his cows afforded him an equal quantity and quality of milk during the summer: Take a bushel of potatoes; break them whilst raw; place them in a barrel standing up, putting in successively a layer of bran, and a small quantity of yeast in the middle of the mass which is to be left there to ferment during a whole week, and when the vinous taste has pervaded the whole mixture, it is given to the cows, who eat it greedily."

MUFFINS.—Mix a quart of wheat flour smoothly with a pint and a half of lukewarm milk, half a tea-cup of yeast, a couple of beaten eggs, a heaping teaspoonful of salt, and two tablespoonsful of lukewarm melted butter. When light, butter your muffin cups, turn in the mixture, and bake the muffins light brown.

Hay Crop----Good Cows----Feeding.

I noticed in the last *Ohio Farmer* a statement in regard to premium hay crops. In 1855, I raised from one acre, at one cutting, 9,315 lbs. of hay, for which I received five dollars premium at the Fair in our county—the ground and crop being properly certified to. The grass was a mixture of timothy and red top. This statement can be found on the 208th page of the Ohio Agricultural Report, for 1855, with some mistakes in the spelling of my name. -Washington and Adams counties can try again.

On the same page of the *Farmer*, I noticed an article on milk, and rules for selecting a good cow. I have one that I purchased a short time ago, with the intention of fattening her, which, although she does not fully answer the description given, nevertheless gives rich milk. She had been nearly dried, and gave but a small quantity of milk; but having found it rich, we tried her for a week, setting the milk by itself and measuring it. She gave in seven days twenty-four quarts and one pint of milk, from which we made five pounds and ten ounces of butter. At the time of trial, she was fed on hay and corn stalks, with a peck of soft corn per day. The next week we tried her, weighing the milk, of which she gave in seven days fifty-six pounds and ten ounces, from which we made six pounds and four ounces of butter. This time she was fed on corn stalks, with four quarts of corn and cob meal each day. The butter was thoroughly prepared for market before weighing. Beat this who can. DENNIS E. FENN, Tallmadge, Summit Co., O., Jan. 9th, 1860.

Fattening Hogs, and their Manure.

To give hogs a start, when first put up for fattening, there is in my opinion, no better food than good ripe pumpkins, boiled and steamed with a moiety of potatoes, and the whole well seasoned with meal scalded in and mixed with milk. There is a sweetness in the boiled pumpkin, which is very attractive to his pigship. Indeed all the trouble with this kind of food is, that it is difficult to get enough to supply their wants. The writer has fed to a pen of twenty, two kettles, of sixty gallons, per day, for some two weeks. I think to commence on this is even preferable to hard corn.

While upon this subject, allow me just to suggest how large an amount of good fertilizing matter is usually thrown away in feeding our pork. The common course is to have an enclosed pen for the swine to eat and sleep in, and all the manure made usually goes into an uncovered back yard—probably a real mud hole, where the manure made from feeding a large quantity of grain, is allowed to go and be leached and evaporated by the rains and sun; and when we come to get out this valuable compound the next season, to apply to our soil, we find it like the Irishman's flea—not there. Now we will talk about the value of swine's manure, and in truth, for it is indeed supposed to be more fertilizing than that of any other animal. This being so, why not endeavour to save it, and not actually *throw* it away in the manner described! If no better remedy presents, just make a temporary cover to the hog-yard, of rough boards, or anything that will keep out water, and just supply the pigs with plenty of material to work up—muck, turf, straw, weeds, leaves, or indeed almost anything of a decaying vegetable nature, and the thing is done—when perchance the next season you will find that instead of five loads of leached manure, you will have just four times the amount, and a little better article at that.

Now, brother farmers, is this mere theory, and as such, unworthy of trial—not worth the time and expense? We all know "the more manure, the better crops," and will not a course of this kind tend to enhance the manure heap.—*Country Gentleman.*

From the N. E. Farmer.

Foundering Horses.

In your issue of August first, I noticed an article, purporting to have been penned by "a farmer of Niagara county, N. Y.," saying that "in his opinion, nine-tenths of the foundered horses are made so by the shoer." From this idea, I beg leave through the columns of your paper to express my entire dissent. I am not a shoer of horses, nor am I a justifier of the cruel acts of those who are. But for a farmer of Niagara county, or any other county, to assert that a smith (or all of them) could if they tried "founder" a horse by shoeing, is, in my opinion, asserting his entire ignorance of the pathology of the disease.

The disease, founder, does not lie in the feet of horses. That the feet contract, I

will allow, but the contraction is the effect, and not the cause, of the disease. A foundered horse is in precisely the same pathological condition that a man is with a rheumatic fever; experiences the secondary effects in like manner, from subsequent exposure.

The cause of founder is attributed to a sudden cessation of the perspiratory action, while the horse is in a heated condition, resulting from too free use of water, standing in a cool current of air or any other cause briefly checking perspiration while the horse is in a heated condition; causing severe inflammation of the parts of the system which have been recently arduously taxed—most frequently the muscles of the shoulders and the flexor tendons of the anterior limbs. These are more severely taxed in fast driving in light vehicles than any other parts of the muscular proportions. Although a horse, from long and general fatigue, thus exposed, is quite as likely to have the entire system affected, as otherwise.

But to the contraction of the feet. The inflammation of the tissues of the limbs of the horse cuts off the supply of nourishment, through the assimilative organs, to the horny texture, and consequently they become dry and brittle, contract upon the coffin-bone, diminishing the space and use of the sensitive laminæ, between the crust of the hoof and the coffin-bone within, and if not soon relieved, ossification takes place, and the horse is permanently lame. The horse, losing the spring-like elasticity of the foot, (between the coffin bone and the crust,) consequently strikes a dead blow upon the distal end of the lower pastern-bone every time he puts his foot to the ground, causing pain and soreness and constant lameness.

I would like much to treat your readers, especially your smiths, to a chapter on horse-shoeing and may do so at a future time, if you desire it. M. D.

Vaccination of Cattle.

The Medical Times says that in Holland there are assurance offices for cattle's lives. One company has all its assured cattle vaccinated as a preservation against contagious pneumonia. Another company innoculates only when the disease has invaded the animal's stalls. The third company does not vaccinate at all. It has been calculated that the first company has lost 6 per cent of cattle, the second 11 per cent, and the third 40 per cent.

From the Southern Rural Gentleman.

Raising Pigs.

MR. FARMER:—I address myself to you, as I suppose the editor is now too busy in preparing that *enlarged, splendid and interesting Rural*, for next year, to have time to think of piggy now. Besides, it is your business to think of and provide for your pigs; for you know that a poor stunted pig makes a poor hog, and that it is impossible to have good thrifty hogs, without good sows and good pigs,

The first thing, then, is to have good sows and a good boar, if you want good pigs. The great law of nature, that like produces like, is as true in hog raising as in other things; and you cannot expect good pigs from a sorry sire and dam. There is good and bad stock among swine, as well as among horses and men; and if you want good hogs, you must breed from *good* stock. Did you ever see a farmer have good hogs, raised from that little fice sort of breed that are so small and stunted that you cannot make your fence so close, but they will get through the cracks and eat up your corn? Did you ever see a good stock raised from those slab sided and long-legged race of hogs, which, in the woods, are always in a trot, and if around your fence, are in a perpetual race and squeal to get in? Did you ever see a good stock raised from wild, ill-natured hogs, that no kind of treatment can render gentle and docile? Never—never. Then let all such breeds alone; pigs from such a stock will never pay. I do not regard the small or large breeds as the best for the farmer, but the medium size that will mature early and make hogs that will weigh from two to three hundred pounds.

Hogs that breed well are easily kept, mature early and are hardy, and certainly the best breed for the farmer; and when you find such stock, select from them regardless of the name by which they may be called, or of the price necessary to obtain them. Select from this stock your boars and breeding sows with as much care as you would to raise fine horses. There are good and bad points in hogs as well as horses, and form and proportion is as necessary to hogs as to horses, and unless attended to, your stock will degenerate. Keep your boars up and in good condition in a lot from your other hogs; and your breeding sows

should not be permitted to breed until they are quite grown and all their animal powers fully developed—this is necessary to the perfection of their offspring. If they do not suckle well, do not keep them; for you can never have fine pigs from such a sow. Do not keep more sows than you can feed well and keep in the very best condition for successful breeding. Ill-natured and vicious animals are generally hard to keep, and unprofitable—they seldom make good hogs, and are unsafe when you have children.

When your sows are with pig, treat them kindly and keep them in good heart, so that when they have pigs, they may suckle well. Before they have pigs separate them from your sows and other hogs, and put them in a place where they can have plenty of straw or leaves to make them a good bed. If it is winter, provide them a good shelter to protect them from the rain and snow, so that they can have a good dry bed to keep them and their pigs dry and warm during the cold weather. In warm weather they should have little or no bed. Hogs that sleep on the bare ground in summer seldom have the mange or any other cutaneous diseases. They should have access to plenty of good water, and should be liberally fed with slops, made of meal and the savings of the kitchen. To feed with corn, is to subject yourself to a loss of about forty per cent., as experiments have proved. Meal will make the secretions of milk larger and richer than corn or any other food, and consequently your pigs will be better, and besides, your pigs will soon learn to eat, and this food will be far better for them than corn, which is much harder to digest. If the sow and pigs are thus well fed at seven or eight weeks old, they may be weaned. This is easily done by placing the sow in a close pen—by liberal feeding, she will soon forget her pigs, and they her, and may be turned in to your boar as soon as in heat, which will be very soon. This is preferable to the plan of forcing the sow to wean them by fighting the pigs off. If your pigs are now well cared for and kindly treated, they will grow rapidly and make such hogs as any good farmer delights to see. I have seen pigs thus kindly treated and liberally fed, that averaged their pound of meat per day, and some even more. You may think this is too much trouble, but care and labor are necessary for success in farming or anything else. A good stock of pigs will pay you as well for kind treatment as any other animal, and at present prices of bacon, will pay quite as well as cotton or corn.

If you will have clover, oats, rye or pea fields for them to run in, after they get large enough to be uninjured by the heavy dews, and the labors of getting about over the straw and stubble, they will appreciate them aright, and appropriate them so as to accelerate their rapid growth, and materially lessen the expenses of feeding. I think that fair experiments will establish the fact, that we can make our bacon cheaper than we can buy it, even at the present prices of corn and cotton. Pigs raised in the woods and range, and poorly fed, as most hogs are, make very costly meat. If they eat one ear of corn a day, and are kept until two years old, they eat at least six bushels of corn; and then it takes at least seven bushels more to fatten them; and the average weight does not exceed one hundred and fifty, making the cost $8 33¼ per hundred. Pigs, raised as we have suggested, will be fat all the time; and the extra cost of fattening will be so little that the pork will not cost more than six dollars per hundred. It will be hard to make many farmers believe this, but if they will select one or two good pigs, and measure the meal and weigh the pig when killed, we have no fears of the result.

We earnestly ask our farmers to try the experiment *fairly*, with a few such pigs as we have recommended them to raise, and kill them at one year old. The experiment will not cost them much, and when they have made it they will believe it. Give us the result in the *Rural*. Try it—a fair trial and the result is all we ask. J.

From the Ohio Farmer.

Feeding and Care of Sheep.

During the pasturing season, sheep should frequently have a change of pasture, except they have an extensive range. Persons who confine them to small enclosures for a long time, sustain a greater loss than they are frequently aware of. The sheep not only cease to thrive, but the pastures on which they run are much injured thereby. In my opinion, salt is indispensable to the health of sheep. They should have access to it at least once a week. It should be scattered a little on the ground, instead of being thrown down in piles. Some contend that daily access to salt is preferable to any other way

that it can be given to sheep. My experience disagrees with this mode. But they should have access to water at all times, unless the pastures on which they run are fresh and succulent. Flock-masters, who furnish their sheep no other opportunity of quenching their thirst during winter, than what the snow affords, sustain a serious loss through such neglect. It is impossible for sheep to thrive under such circumstances. Flocks kept in this way are much more liable to disease than those are that have constant access to water.

In my opinion, shade is beneficial to sheep during the hot days of summer; it adds to their health and comfort. The remarks of William H. Ladd, in one of the December numbers of the *Farmer*, respecting all fall management of sheep, are very valuable; and if attended to, would add largely to the income of farmers. In our northern latitude, humanity as well as interest dictate the necessity of furnishing sheep with sheds to lie under at night, to which they should have access at all times. I have been in the habit of shutting my sheep in at night, for years, during the winter; by so doing they are kept out of the way of dogs, and escape many of the cold rains that our northern climate is subject to. Flocks that have no protection during winter, except what the wool affords, frequently become drenched with rain. If the weather should turn cold immediately after, they suffer very much from cold and wet. Whilst in this condition, they fill themselves imperfectly with food. The supply of animal heat being lessened thereby, they waste very fast. Many of the weaker ones become so hurt by such exposure, that it requires the best of nursing to carry them through the winter.

Persons who keep large flocks would find their incomes largely increased, by erecting sheds for all their sheep, and suitable racks therein for feeding hay. If breeding ewes are in good order in the fall, it is not necessary that they should be fed heavily on grain during the winter, provided they are given plenty of good light hay. I do not think it good economy to feed breeding ewes much grain during the winter. All that is necessary, is to keep them in good plump condition. If they have access to good clover hay, or clover and timothy mixed, fed at regular hours, ten or twelve quarts of corn per day, for 100 head, is all that is necessary. Lambs from very fat ewes, when first dropped, are generally smaller and weaker than those from ewes that have only been kept in fair condition. After they have dropped their lambs, the grain should be increased, except they have an abundance of pasture. It is very important to give the lambs a good start. If the weather is cold and stormy, sheep sometimes refuse to go to water, except it is convenient. During such times, the shepherd should see that they do not suffer for the want of it. The flock-master who suffers his sheep to get poor in the winter, generally pays dear for his negligence. It is impossible to raise them up suddenly, as is the case with other stock. If flocks of this description are fed liberally on grain, they sometimes lose a portion of their wool, and fatal diarrhœa frequently ensues. Observation has fully convinced me that lambs are much more subject to this disease than older sheep. It is generally brought on through improper treatment, such as close confinement during thaws, in stables not well ventilated; improper food, or improper quantities entering into the stomach. An over-feed of grain frequently produces it. I have lost many a lamb through kindness, that I might have saved, if I had known what experience has since taught me. To winter a lot of lambs successfully, the shepherd should be provided with a plenty of good clover hay, if possible. If he has not that kind, the best that he has should be placed in the lamb-house. If the ground is covered with snow, so that the lambs cannot feed upon the grass, he must mostly depend upon hay for the successful management of his lambs. In my opinion, a light feed of grain once a day is all that they should have; say one gallon of oats to one gallon of wheat bran for sixty head. They should be taught to eat hay and grain, three or four weeks prior to the ground being covered with snow. During damp, warm weather, when they get a little off from their feed, I frequently mix a small portion of salt amongst their grain, it being an inducement to the most delicate to eat. Care should be taken not to put in enough to scour them. During wet weather, if the shepherd is not careful to turn the troughs over, a portion of the lambs will refuse to eat. At such times, care should be taken that those that eat do not get more than an ordinary portion. It is better to drive them away after they have remained

at the trough long enough to consume the grain, if all have eaten, and permit older sheep to eat what is left. The troughs should be so arranged that a slight effort would be sufficient to turn them over, and in such a manner that they cannot get into them with their feet. Persons whose pastures will afford considerable picking during winter, would do well to permit their lambs to roam over their fields a few hours every day, in search of food. As long as they keep their stomachs well distended with food, they are doing well; when such is not the case, they cease to thrive, consequently when confined to the winter quarters, they should be fed with the greater care. Much grain not only destroys their appetite for hay, but frequently produces fatal diarrhœa. Some five or six years ago, I had the care of 200 head; one hundred of them being coarser than I wished to retain for stock, were confined to a stable and a small yard adjoining, in which there was plenty of running water. In the commencement, they were given grain moderately; but as they became more accustomed to eating it, the amount was increased until they daily consumed from ten to twelve quarts of corn. They were in fine order during the fore part of winter, and remained so until the weather began to grow warmer towards spring, when they presented a very hollow appearance, not consuming more than one-half the usual amount of hay. To make up the loss of hay, the grain was to some extent increased, which caused them no doubt to eat less hay. They soon began to eat corn very irregularly, and to all appearance was losing flesh fast. Convinced that they must have a change of food, I turned them into excellent pasture. But their stomachs had become so completely deranged by eating so much strong food, that they would not eat anything in sufficient quantities for their subsistence. A number of them perished miserably amidst plenty. Two years ago this winter, I confined half a dozen late lambs in a small stable; they had daily access to water, and as much bright hay as they would eat; and as nearly as I recollect, from two to three pints of oats per day. They consumed very little hay, and constantly presented a hollow and dull appearance. Not knowing exactly what was the matter, the grain was increased; instead of receiving two feeds of oats per day, they received three—morning, noon and evening. In a short time, they consumed scarcely any hay, and soon ate their grain very irregularly. They all perished except one, and that one probably would, if the same treatment had been continued. Instead of receiving oats three times a day, apples cut fine were given as a substitute. Convinced that there was something wrong in their treatment, I resolved to try it over again as soon as possible. Having a flock of 120 or 130 lambs on hand last fall, I selected half a dozen out of them, inferior to those that I had experimented on the previous winter. They were placed in a similar pen, and fed a little bright clover hay, three times a day. In addition to this, they received a pint of oats and bran mixed, of equal portions. A little salt was constantly mixed with their grain. This experiment was perfectly successful. They not only lived through the winter, but five out of their number throve rapidly. The success attending these experiments, favors the opinion that much grain is injurious to lambs. If farmers were careful to provide plenty of good bright clover hay, they would find but little trouble in wintering their sheep. Stables in which sheep are fed should be littered frequently with refuse chaff or straw. It is not only conducive to the health of the sheep, but it adds largely to the productive resources of the farmer.

Sheep are occasionally attacked with the colic, especially in the winter. Frequently lying down and rising suddenly; constantly stretching their fore and hind legs so far apart that their bellies almost touch the ground. A dose of epsom salts, castor oil, or even hog's lard, will generally effect a cure. It should be repeated until it physics. The disease known by many persons by the name of stretches, is the effect of flatulence, or bilious colic. If not relieved soon, death follows in a few days. If given in time, a large dose of castor oil will generally give relief. A post mortem examination of a sheep that had died with this disease, revealed the fact that the intestines were firmly, closed, for a space six inches in length. Common diarrhœa, or scours, manifests itself by frequent evacuations of a thin or watery discharge. Lambs are much more subject to this disease than older sheep. I am of opinion that more lambs die with this disease, during fall and winter, than from any other disease. If the purging is severe, the feculent matter should be removed from the bowels by gentle physic. From

repeated experiments, I am of the opinion that salts are equal, if not superior to any other medicine as a physic, in cases of diarrhœa. The bowels being in a relaxed condition, a small dose is sufficient—say a teaspoonful, or but slightly rounded. It should at all times be followed by an astringent. I generally administer a table-spoon level full of wheat flour, added to one-fourth of an ounce of prepared chalk. It should be mixed with tepid water and poured slowly down the throat. In common cases, one dose per day is sufficient. In obstinate cases I prefer to give chalk twice, morning and evening. The bowels being in a weak and excited condition, all strong food should be withheld. The flour should not be added to the chalk, if given twice a day. It is very important that the patient should have plenty of good clover hay. A cup of strong tea is sometimes beneficial in this disease. I will here give the formula of a cordial that is perhaps equal, if not superior to any other remedy now in use. Take of prepared chalk one ounce; of catechu, half an ounce; of powdered ginger, two drachms, and powdered opium, half a drachm; mix with half a pint of peppermint water. Give two or three table-spoonfuls morning and evening. I have tried this remedy to some extent, and believe it to be very valuable. In very obstinate cases, an external application of turpentine will frequently give relief. It produces intense pain, and should not be applied except in desperate cases—weak and feeble lambs are not able to endure the pain. The application should be made to the hinder part of the abdomen, and well rubbed in. It would be well to repeat the operation, say three hours from the time the first application was made.

There are other subjects connected with sheep husbandry, that I intended to have made mention of, but the length of my present article forbids. I am willing to inform the individual who criticised my last article that appeared in one of the November numbers of the *Farmer*, who seems to think that the era for mutton eating is just commencing, that I am glad he has been so kind as to enlighten the public on that subject. It is well, if such a great change is about to take place, that the people should have some time to prepare for it. He says: "If the price of mutton increases in the next ten years, in the same proportion as it has done in the last ten, there will not be one fine sheep then, for every ten there is now." It is my opinion that there will be some interesting revelations on that subject, between this and spring.

NATHAN COPE,

New Waterford, Columbiana Co., 1st mo. 5th, 1860.

Feeding Farm Stock.

We find the following interesting and able article in our excellent exchange, the *Genesee Farmer*. Mr. Harris, the editor, is a chemist himself, and has, with much earnestness and ability, sustained the views of Lawes and Gilbert, as opposed to those of Liebig, in the great controversy on the mineral theory of the latter. While we do not agree with him as to the conclusiveness of their experiments, we present the following paper to our readers as containing very interesting views of the relation of *carbon* and *nitrogen*, or rather of *carbonaceous* and *nitrogenous* substances to the feeding of farm stock, and to the rotation of farm crops:

"All know, in cleaning land, what a small amount of ash is left as the residum of the mighty forest. Carbon, or charcoal, exists in the vegetable kingdom in much larger proportion than any other element. Nitrogen is found only in very small quantity, yet its presence is absolutely necessary. No vitality or organization is found without it. There are many substances in vegetables that do not contain nitrogen, but they are not integral portions of the plant. They are merely vegetable deposits, corresponding with the deposits of fat in the animal organization. These deposits, such as starch, sugar, gum, etc., are destitute of nitrogen, and are composed of carbon and the elements of water. They are substances which contain nitrogen—and every vital part of a plant and animal that does contain it—are called nitrogenous substances. They are composed of all the four organic elements—oxygen, hydrogen, nitrogen, and carbon—united in definite proportions in all plants and animals.

"If we take a piece of carbon, or charcoal, and burn it in a stove, it gives out an amount of heat proportionate to the amount burned. The carbon of food, when taken into the animal system, is burnt in precisely the same way as that in the stove, and gives

out exactly the same amount of heat. It is well known, that when any heated body is surrounded with colder substances, the heat will fly off from the heated body, till all become of an equal temperature. And it is also well known, that more fuel would be needed to keep a stove at a given heat, when exposed to a cold temperature, than when in a warm one. An animal is affected in this respect in precisely the same manner as a stove. The temperature of the animal body is the same at the North pole as at the Equator, when at a blood-heat temperature, as when in an atmosphere 40° below zero. It must be, therefore, that this body is heated from within; and that the colder the air, the more heat must there be produced, and consequently the more carbon must there be burned in the lungs to generate it. Hence it is that in cold weather we eat much more food than in hot weather. Warmth, to a certain point, is equivalent to an increase of carbon in the food.

"The nitrogenous substances of vegetables are precisely the same in composition as the muscles or flesh of animals; and it is supposed that the nitrogenous substances of vegetables are converted into flesh without decomposition. Hence the assertion by many able chemists, that the nutritive quality of a food is in direct proportion to the amount of these nitrogenous or flesh-forming substances. Boussingault, the most reliable agricultural chemist in the world, has given tables of equivalents, founded on this principle. According to them, peas contain three times as much nitrogen as maize, and is consequently three times as nutritious. Bran, too, is much more nutritious than the finest wheat flour; while an immature corn stalk would be more nutritious than one perfectly elaborated. The experiments of Lawes and Gilbert throw much doubt on the correctness of this theory. One thing at least is demonstrated—that the amount of nitrogen a food contains in no way regulates the amount consumed by the animal. Thus, a hog will eat as much peas as corn; while in the one case he will eat three times as much nitrogen as in the other.

"We arrive at the conclusion, that the amount of food an animal will consume, other things being equal, depends upon the amount of *available carbonaceous* substances it contains, irrespective of the nitrogenous. This was invariably found to be the case throughout a very extensive series of experiments. To give more for 100 lbs. of bran than for 100 lbs. of flour, because it contains more nitrogen would not be wise. Neither would it be economical to give three times as much for a bushel of peas as for a bushel of corn, because it contains three times as much nitrogen; for though the animal will increase somewhat more when fed on peas than on corn yet he will eat till he has obtained the necessary amount of carbonaceous matter, and of which corn contains much more than peas. The fact is, that nitrogenous substances are in excess of the *available carbonaceous*. Otherwise, why is it that we strip the nitrogenous bran from the starch of wheat? Why is it that we churn so much milk for its carbonaceous compound—butter; while its nitrogenous matter, casein or curd, is given to the hogs in the buttermilk? Why is it that we eat so much fat meat and pork? How is it that sugar has become a *necessary* to nine-tenths of the world, and that rice and tapioca are found in every household? All these substances contain a large amount of available carbon, and little or no nitrogen. For feeding purposes, a food is valuable in proportion to the amount of available carbon it contains; yet the more nitrogen it has united with this carbon, the greater will be its fattening quality.

"A natural conclusion, from these facts, would be to grow those plants, as food for animals, which contain the most available carbon; or, in other words, the most starch, sugar, oil, etc.

But agriculture is a complex art. We must be careful how we jump at conclusions. In Mr. Lawes' wheat experiments, systematically continued on the same soil for fifteen successive years, the most important fact demonstrated is this: *The wheat plant*, during its growth, *destroys ammonia*. That is to say, that much more ammonia is required to produce a crop of wheat than the entire crop of grain and straw contains when fully matured. It was found, in several hundred experiments, that an application of ammonia increased the crop up to a certain point, dependent on climate influences, in proportion to the amount supplied; but that about five times as much ammonia is required to produce a given increase of wheat than it contains when grown.

"Mr. Lawes' experiments on turnips, peas, beans, clover, etc., show that these crops do not destroy ammonia during their growth; and that if sufficient available inorganic matter be present, they can obtain sufficient ammonia for an average crop, from the atmosphere. Whether corn, oats, barley, timothy, and other cereals, destroy ammonia, is not yet proved, but it is highly probable. Let us admit that these cereals, like wheat, destroy ammonia during their growth, and that peas, beans, clover, lentils, etc., do not, and see how it affects the subject of rotation.

"On a farm, then, where wheat, maize, barley, and oats are grown, as well as timothy and other grasses, for feeding purposes, it must be evident that there is an immense destruction of ammonia; and that if we are to obtain large crops, large quantities of ammonia must in one way or other be placed in the *soil*. The cheapest way under most circumstances, of increasing the ammonia on a farm is, by growing those crops which do not destroy it during their growth, but, on the other hand, retain that which is brought to them in rain from the atmosphere.

"At least one-half the dry food given to an animal is consumed in the production of animail heat, and escapes as carbonic acid and water in breath and perspiration. The nitrogen of the food, however, is not given off in a gaseous state, but except a small portion, retained in the increase of animal, is all thrown out of the system in liquid and solid excrements, the former containing often six times as much as the latter.

"A crop of clover, in root and branch, often contains 80 lbs. of nitrogen, the greatest part of which is probably derived from the atmosphere; and this clover, plowed in or eaten on the farm by animals, would furnish 80 lbs. of ammonia for a wheat, corn, or timothy crop, which would be increased accordingly. This 80 lbs. of ammonia cannot be purchased in an artificial form for less than $12. A good average crop of peas contains about as much nitrogen as the clover, and, like it, obtains most of it from the atmosphere. The same can be said of turnips, mangels, beets, carrots, beans, tares, &c.

"It will be seen, then, that while maize in one sense is much more nutritious than peas—containing more available carbon—yet this nutritious quality is produced at such an expense of the ammonia of the soil, that it cannot be grown for feeding purposes, unless a high price is obtained for the meat. Peas, though in one sense less nutritious, have been produced at so little expense, as compared with corn, and besides contain so large a quantity of nitrogen, that their growth and consumption on the farm cannot fail to be comparatively profitable. The comparison between timothy grass and clover is equally, and for the same reasons, unfavourable to the growth of timothy for the purpose of feeding to animals on the farm. Not only does it contain less nitrogen, but it has consumed less ammonia during its growth. If this is correct in theory, it cannot be far wrong to say that the average yield of wheat, maize, barley, oats, and timothy, on any farm, will be in direct proportion to the quantity of clover, peas, turnips, etc., raised and consumed on the farm.

Feeding and Care of Stock in Fall and Winter.

A wise Providence has ordered that the autumn should be, the world over, the period of most convenient and rapid fattening. The average temperature is indeed the same as in spring, and the food may be the same or nearly the same; and yet, the fattening process never does go on so well, except under the most artificial circumstances. The weather has much to do with this. The gradually increasing cold gives an appetite and relish for food, while the increasing warmth of spring produces the opposite effect, which even the first taste of the fresh grass cannot counteract. The coat is shed and renewed in spring, so that the animal is keenly sensitive to changes of temperature. Grain well kept till spring is said to be more easily digested and more nutritious than when fed early in fall. This may be; and doubtless also, pound for pound, hay is better for being stored, if well cured and well kept. Changes go on in various kinds of food, root crops as well as grains, by which some of the woody fibre becomes more readily digestible, and starch and gum are converted into sugar. Some roots it is true, become, especially if they sprout, more fibrous and corky, hence less fattening. Autumnal grass, on the contrary, is much more nourishing than the early

growths of spring and summer, when the plants are doing their best to themselves in the best possible *feeding* order, so that when in order to perfect the seed, great demands are made upon root, and leaves and stalk, they may be in condition to meet it After this necessity is passed, and the seed matured, the after growth possesses a sweetness and excellence which the most casual observer can hardly fail to notice. The sweetening of food by frost is proverbial. The coats of most animals gradually thicken and fill up with a soft growth of hair as cold weather draws on, and the tax upon the system is so slight as not to be noticed at all.

Almost all things, not including the abundance of grain in the fall, combine to render it easy for animals in a state of nature to prepare a good store of fat for winter use. Under artificial treatment all animals should be put in high "store" condition in fall, and then motives of policy should induce their being kept so. Warm, well ventilated stables, the least possible exposure to the cold, an airing of an hour or so in pleasant weather, and good food, including a reasonable variety, which promotes an appetite and causes the food to go farther, will insure, at the least possible expense, a good wintering, and bring stock out at the end of the season in prime order for bearing healthy, valuable young, for the hard work of the spring, or for readily laying on fat in the summer pastures.

Winter fattening of beef and mutton, if they are kept as we have said, proceeds rapidly, and may be most economically followed. Fattening animals should enjoy but a limited prospect beyond their mangers, or pens, especially if a large number of them are together, for any little disturbances attract the attention of all, and setting them on the alert, keeps them in an excited condition, unfavourable to the end sought, namely, fattening. Sheep do better in a pretty dark place.—*Homestead, Hartford.*

Out Door Whitewash.—Put a peck of unslaked lime into a bucket, stir in as much water as will be required to make it fit for use, and while slaking, stir in well half a pound of tallow, which the lime and water will melt.

We bear the marks of our habits, as the prisoner does those of his chains.

Humbug.

Among the many issues of base coin which from time to time were made in Ireland, there was none to be compared in worthlessness to that made by James II. at the Dublin Mint. It was composed of any thing on which he could lay his hands, such as lead, pewter, copper and brass, and so low was its intrinsic value that twenty shillings of it was only worth twopence sterling. William III., a few days after the battle of the Boyne ordered that the crown-piece and half-crown should be taken as one penny and one half penny, respectively. The soft mixed metal of which that worthless coin was composed, was known among the Irish as Ulm bog, pronounced Oem bug, i. e. soft copper, i. e. worthless money; and in the course of their dealings the modern use of the word *humbug* took its rise, as in the phrases, "That's a *piece of uimbog.*" "Don't think to *pass off your uimbog* on me." Hence the word *humbug* came to be applied to any thing that had a specious appearance but which was in reality spurious. It is curious to note that the very opposite of *humbug*, i. e. false metal, is the word *sterling*, which is also taken from a term applied to the *true* coinage of Great Britain, as *sterling* coin, *sterling* worth, &c.—*New York Observer.*

Blowing up Stumps.

Speaking of Stump Pullers, our friend W. A. Gill of the Columbus Agricultural Warehouse and Seed Store, was relating to us his experience upon a stumpy twenty acre field, just north of this city, some years ago, which he cleared by the aid of gunpowder, to cheaply and expeditiously, that he thinks it better than any patent invention in the market. The plan is this: Select a solid place in a large root, near the ground, if an oak or any stump with a tap root, and with an inch and a quarter augur, bore in, slanting downward, to as near the heart of the base of the tap root as you can judge; then put in a charge of one or two ounces of powder, with a safety fuse, and tamp in dry clay or ordinary tamping material, to fill the hole, some six inches above the charge; then touch fire to the fuse, and get out of the way. The blast will usually split the stump into three places, and make it hop right out of the ground. If the charge is put in too high up, the blast will only split the top of the stump, without lifting it.

[*Ohio Cultivator.*

From the Farmers' Advocate.

Broom Corn.

MR. EDITOR—Perhaps I am the very one to tell the Peoria County folks all about broom corn. I have had fifteen years experience with it in Illinois, and have raised it nearly every year, and made it into brooms.

1st. Will it pay? Yes, with proper care. The profit, on the whole, is not very much greater than Indian corn; but it has the advantage of being a more *sure* crop, for it may be grown on ground that is too wet for Indian corn, and it may be planted later.

2nd. Where can we get seed? I think it would be advisable to get it from the East; for after being grown in this soil and climate a few years, it degenerates in quality; the straw becoming too coarse. The red seed that I have now does not produce the nice, fine brush it did ten years ago. I expect seed will be rather scarce in this region this next season, because there was much less raised than commonly. And I suppose the same is the case in Ohio, for we see by the Cincinnati papers, the price of brush there is $110 and $140 per ton, whereas the price here has never been over $60.

3rd. How shall we plant it? The last of May in rows 3½ or 4 feet apart, hills 1½ feet, and 60 seeds to a hill; then thin out to ten. It should be hoed at least once; then keep out the weeds.

4. When and how to harvest. This has to be done about the same time that Indian corn should be cut up. Go backwards between two rows, then break a hill down knee high or a little over, leaning the tops over the opposite row "angling;" then a hill on the other row, laying the tops slanting over the first, and so on. This makes a *table* on which to spread and cure the brush. If there has been no frost, and the stalks are green, it may lie on the tables till after one rain. This will take out some of the gum, and make it work much easier, and the straw is tougher; yet some prefer to have it look green. I think they are in error. When cured, it is to be corded up like wood, turning the seed ends of the handfuls, alternately, either way, and a plenty of stalks set around to secure it from the weather, until the seed can be combed off. Lay down stalks to cord it on, to keep from the ground. This is best done by a hand machine, unless you can have a governable power of some other kind; for the *speed* of your cylinder should be adapted to the ripeness and dryness of the brush, or else you may cut the straw too much. This threshing is the most disagreeable part of the business, for the dust is irritating to the skin of one who is not used to it. After the seed is off nicely, it must be bound very tightly in bundles, so that it will bear handling; the brush end kept even always, and stored away from the weather. It should be cut *only just long enough* to work well, as all stalks over that is much in the way. This last seems to be the most difficult part for beginners to learn.

The price in this region has never been over $60 per ton, or $3 per hundred. It pays tolerably well at that. It yields, on an average, about 600 lbs. to an acre. About the greatest objection the farmers have to raising it, is, that the roots are so hard to plow up. But there is a great difference in the varieties. The black seed variety grows much higher, and the stalks are harder, and the roots tougher, than a kind of the red seed we have had.

W. GOULD, P. M.

Bates, Sangamon Co., Ill., Jan. 13.

Corn in Drills.

"More corn can be grown on a less number of acres, with thorough culture, if *planted in drills.*"

So says one of our best Agricultural Journals. We do not believe it.

If you cultivate a very large kind, put the hills four feet apart each way; if a medium kind, put them four feet one way, and three feet the other, or three feet nine inches both ways; if quite a small kind, three feet each way. Put from four to six kernels in a hill, thin to three or four, and you will get as much corn as the land is capable of producing.

The Journal, that so mistakenly, as we think, advises to drill corn, says better things about its cultivation, as follows:

"One of the most important essentials to a good crop, after good soils, is thorough cultivation. The weeds must be kept down, the soil must be stirred. In order to succeed in the mastery of the former, cultivation should commence before the corn is up, if necessary. The most successful corn growers harrow the ground *before* the corn appears, or about the time of its appearance.

The advantage gained fully compensates for any loss that may occur by rooting it up. Indeed, there is much less danger than the tyro anticipates. *Keep the weeds down.* Thorough culture, frequent stirring of the soil, is a fundamental doctrine in the creed of the successful corn culturist. He needs no long written, detailed, scientific theory of the habits and requirements of the plant to convince him either. The golden harvest satisfies him. Then we need not waste time and space in an elaborate treatise upon the necessities of the corn plant, but warrant a sure return for all labor expended in its thorough tillage."

We doubt about cultivating before the plants are up, or quite as soon as they appear; but too much cannot be said of the importance of perfectly clean cultivation, from the time it is fairly out of ground till the 10th, 15th, or 20th of July, after which the benefit of longer fighting the weeds will not more than counterbalance the injury to the roots of the corn.—*Exchange.*

From the Boston Cultivator.

Potato Culture.

MESSRS. EDITORS: In the *Country Gentleman* of the 22nd of September, I notice some statements about potato culture, from the pen of Mr. Bartlett, that have the "ring of the true metal." He ridicules the idea of manure causing the potato *rot*, or that flowering is a sign of its degeneracy. Allow me to state some facts bearing upon this interesting question.

The nine tubers which were raised from a worthless potato in 1858, [see *Country Gentleman* for October 14, 1858,] and raised in the same manner in 1859, in twelve hills, produced potatoes of good size, had buds, blows and balls matured the second year, although no sign of a bud appeared the first year. Most of the tubers were sound when dug, on the 12th of September, but a few were not sound, as they were not dug or the tops cut or pulled as soon as ripe, as should become the practice in all cases.

The nine tubers, the first year's product, it is *certain* were not matured or ripe; but they were perfectly sound, and remained so until I planted them the next spring. But the product of the same this year are fully ripe, but not all sound when dug. I have laid by twelve to be planted in 1860, to be dug as soon as ripe, not before, and will report the result.

It is certain that the ripe potato is much more the subject of disease than the unripe or thrifty growing potato. Nor do I agree with Dr. Manby, that it is at all a sign of degeneracy, or of "*growing out*" in the flowering or ripening of the potato. If a plant is in a thriving condition, it is not the less so for blossoming and setting, as the potato may, even two or three times. But let it cease to thrive and shrivel up, from whatever cause, its tops should be at once destroyed, and save what growth of tubers is attained at such time, that the same may be and remain sound for the table, or for planting, with less trouble of picking over, and no loss from disease.

The potato should ripen before, or after the month of August, as far as it is possible. I planted 24 hills of white kidneys last May, a variety much inclined to the rot. I planted 24 hills of early blues at the same time, a variety not much subject to the rot. On the 20th of August I pulled the tops of 12 hills of each of these varieties, being fully ripe, and the other 12 hills of each I let stand till the 12th of September, when the stalks were both dead and dry. The kidneys not pulled on the 20th of August, had 72 diseased tubers, those pulled had but 23 defective ones. Of the blues not pulled on the 20th of August, five tubers were found defective, September 12th, of those 12 hills, but those pulled on the 20th, were *all* sound.

In the first experiment of the defective tubers were six to two in a hill; the other, two to nothing. Numerous experiments of this kind have been made on more than a dozen varieties of potatoes, and they have been attended with the same general results. If any one will test this principle by experiments in 1860, it will confirm this theory of the potato disease as the only correct one, and give the world the long-sought remedy against its early ravages.

I planted seed from the potato balls in the fall of 1858, and sowed seed in beds in the spring of 1859, and the plants, many of them, grew very thriftily, and in September budded and flowered and formed embryo balls, which soon fell off the stems, some of which had been twice transplanted. Does not this demonstrate the practicability of obtaining full grown potatoes the first year from the seed itself? What, indeed, will

become of the theory that *high manuring* rots the potato, or that "*flowering* is a sign of their *growing out?*" Give the potato a warm, dry soil, rich manure from the hog-pen or hen roost, spread broadcast or put in the hill, or used as a top-dressing, or in all these ways, with clean culture, and I can warrant potatoes of any kind to grow to ripeness without disease, *if the tops are destroyed at that period.*—*Cor.*

In summing up the results of our correspondent's valuable experience as related in the above article, we find that in years when he dug the potato before it reached maturity, or at least as soon as ripe, it has been preserved comparatively sound and free from rot; on the contrary, when it has laid in the ground for a time after ripening, rot has ensued, as in the case mentioned, in which the potato was ripe August 20th, yet not pulled until twenty-three days later, on the 12th of September. The sentence in which our correspondent recommends avoiding the necessity of digging in August, owing to its juxtaposition to the statement of his successful experiments, in which August potatoes came out better than September ones, seems at first thought somewhat contradictory; but the experiment has no connection with the previous recommendation, and it is cited to show, that in spite of what was regarded as an unfavourable ripening season, the potatoes *were* preserved from disease by their not being suffered to remain in the earth longer than barely up to the time of ripening.

It is obvious that these and "numerous other experiments" pointing in the same direction, seem to show how the rot may be partly avoided in the ripe potato; but it does not appear to cover the whole subject, as this theory does not affect the condition of *unripe* tubers, for it will be conceded, we suppose, that many potatoes have been subject to the ravages of disease *before* they have arrived at maturity.—*Editors Boston Cultivator.*

From the Rural Register.

Plaster of Paris—Gypsum—How it Acts upon Growing Crops.

Ever since that German workman, in his daily walk across the fields from the Gypsum Quarry in which he was employed, discovered the fertilizing properties of what is now commonly called Plaster of Paris, by the ranker growth of the herbage, which had gleaned the dust from his footsteps, there have been many contradictory opinions advanced with respect to its mode of action. Even the best agricultural chemists have disagreed upon this point. In this country, our own Franklin, first, practically demonstrated the astonishing effects produced by this substance upon a certain class of plants, and Judge Peters, of Pennsylvania, has the honor of having brought it into general use; but, to this day, the manner in which it operates is as little understood by our farmers as it was when first introduced. We propose therefore to clear away some misconceptions which have arisen with respect to its peculiar properties, and shall endeavor to reconcile at the same time some of the contradictory theories which have been advanced.

Many years ago Doctor Muse, of our State, expressed the opinion that the chief, if not the only cause of the efficacy of plaster in promoting vegetation, arose from its tendency to produce phosphoric acid. Sir Humphrey Davy, on the contrary, imagined that its fertilizing properties were derived from the sulphur, which it supplied to the soil; whilst Liebig, contends that its chief virtue consists in the fact that it fixes the ammonia which chemists have discovered in rain water, in the same manner as it arrests it during the fermentation of farm-yard dung. Neither of these theories are irreconcilable with each other—the apparent error of Muse, Davy and Liebig, being that each of them regarded plaster as having but one single fertilizing property, instead of possessing, as we believe, a combination of properties. In other words, we feel satisfied that plaster has two distinct and separate functions; and that while it acts *directly* as food upon a certain class of plants, it *indirectly* furnishes additional food to the same plants by fixing the ammonia contained in the atmosphere, and in the dew, and rain, and snow, which is thence derived. When the physiology of plants comes to be better understood, it will be found that their leaves play a much more important part in the vegetable economy than is generally ascribed to them; and that they serve not merely as lungs, but as mouths also; absorbing the food supplied by the atmosphere, just as the fine fibrous roots collect the food supplied by the soil. How else can we account for the fact, that plaster acts most beneficially

upon clover when its leaves have fairly expanded, and with the least advantage when applied directly to the soil. Indeed, the old notion that leaves are nothing more than the respiratory oagans of plants, has already been exploded by the best informed botanists, who contend, and very justly too, that they are likewise absorbents. Admit this to be true and it will be seen immediately what important results may be derived from acting upon this knowledge. It shows that the animal and vegetable kingdoms are governed by the same general laws, and that the more vigorous in the earlier stages of its growth the plant or animal may be, the greater are its powers for the absorption and the assimilation of its peculiar food. Sir Humphrey Davy established the important fact, that by the comparative energy with which different soils attract and retain the moisture of the atmosphere, the measure of their fertility may be ascertained—those that are the most fertile possessing this power of absorption in the highest degree, while those that are naturally poor, or have been exhausted by frequent cropping, evince it the least of all.

The same rule will apply to plants. A feeble and sickly plant can no more collect and assimilate from the atmosphere the large store of nutriment it invariably contains, than a feeble and sickly animal can digest the food that is offered it. Stimulants and tonics are required in both cases to restore the system to its natural vigour, and these are offices of Plaster of Paris, so far as a certain class of plants is concerned. Now, when Doctor Muse attributed the efficacy of Plaster to its tendency to become phosphoric, by exposure to the atmosphere, and proved that phosphorus exists in vegetables, he was perfectly correct as far as his statement went. So was Davy, when he claimed that the fertilizing properties of Plaster were derived from the sulphur it contained; and so was Liebig, when he contended that its beneficial influence upon growing plants arose from its power to arrest and fix the ammonia descending in dew, and rain, and snow, from the atmosphere. They were each of them wrong—right in attributing its efficacy to a certain property contained in, or belonging to Plaster, but wrong in claiming that its sole power was derived from the exhibition of a single property, when in reality it exerts a combined action, and its beneficial influence is attributable not only to its tendency to become phosphoric, but also to the sulphur which it contains, and to the ammonia which it collects from the atmosphere, and fixes in the soil, and which is recognized as the most powerful of all manures for vegetables containing nitrogen.

An analysis of Plaster shows that it is composed as follows:

Sulphuric acid,	43 parts.
Lime,	33 "
Water,	24 "
	100

Now, every farmer knows how striking are the effects of an application to clover, and the philosophy of its action may be very readily understood by the following analysis of the ashes of Red Clover. An acre of good clover furnishes when dried:

		OUR COMMENTS.
Nitrogen,	78 lbs.	Drawn in part by the Plaster from the atmosphere in the shape of ammonia.
Potash and Soda,	77 "	
Lime,	70 "	—contained in the Plaster.
Magnesia,	18 "	
Sulphuric acid,	7 "	—contained in the Plaster.
Phosphoric acid,		ascribed by Dr. Muse, to the conversion of Plaster into a phosphate by atmospheric influences.
Chlorine,	7 "	

Silica, Iron, Manganese, Oxygen, and Hydrogen, make up the remainder.

Analyses of Sainfoin, Peas, Beans, Vetches, Turnips, Beets, and Carrots, show that they are composed, though in varying proportions of similar inorganic substances, and hence that Plaster will act beneficially upon them. Plaster acts principally upon the leaves of plants, increasing the stem and foliage, and is therefore much better adapted to forage crops than to the cereals. It produces but little effect when buried in the soil, except when it is spread upon a clover ley before it is turned down, when by arresting the volatile ammonia that is disengaged during fermentation, it exerts a remarkable influence upon the following wheat crop.

There are, however, certain soils, as there are certain plants, upon which Plaster pro-

duces no sensible effect. It succeeds best on tolerable fertile sands, or gravelly loams, or upon any soils that are not too stiff or too moist. When a soil already possesses a sufficiency of sulphate of lime, the additional application of Plaster is not of very material service. The best season for applying Plaster, is in the early spring, when the young clover is about three inches high, and during warm, moist weather, when the fine dust will adhere to the leaves for some time. In a soil wholly deficient in Sulphate of Lime, Plaster has produced superior effects by broadcasting the field at the time of sowing the clover seed, and repeating the application the following spring. A field once Plastered with from 250 to 400 lbs. per acre, will not need a similar top-dressing for four years.

Rural Register.

For the Southern Planter.

Vegetable Physiology.

In one of the late numbers of the Southern Planter is an interesting article by 'Professor Campbell, on Vegetable Physiology.' The science of vegetable physiology is, at this time, an appropriate study; the botanist and the agriculturist are alike interested. The more we know of the structure of plants, and their manner of growth, the better are we enabled to promote their growth and to answer their requirements.

There is, however, one part of his article that certainly is founded on theory alone—unsupported by facts. This theory—I mean the downward circulation of sap in plants—was advanced in the early study of botany as a science, and was taken from the supposed analogy of the circulation of blood in animals. All writers agree that 'the sap ascends from the root to the leaf, and carries with it in solution a portion of the material necessary for the nourishment of the growing plant.' It is also generally admitted, that 'plants derive a large portion of their nourishment from the air, through their leaves, in the form of carbonic acid gas.' * * 'As the carbonic acid gas enters the leaf, it is at once dissolved by the sap, and carried through the circulating vessels of the leaf where it is decomposed, its carbon being retained, and its oxygen thrown back into the air.' As gas is in the smallest division into which matter is yet known to pass, it certainly is not correct to say it is 'dissolved' on entering the sap, it is mixed with it, as it is well known that water has a great affinity for that gas, and will imbibe several times its bulk of it without pressure, and many more times with pressure. The preparation that the gas undergoes is called 'digestion.' 'When the sap has thus been prepared for nourishing the plant, it is called 'latex' or true sap. It is then conveyed by the circulating organs to the various portions of the plant, and in some mysterious way, under the guiding finger of Omnipotence, assumes various forms of organic structure, producing stems and leaves, flowers and fruits. Here we have a beautiful analogy between the circulation of sap in plants, and the circulation of blood in animals.'

This downward circulation, to say the least of it, is a round about way of attaining an object, and is contrary to that simplicity we see in all the operations of nature with which we are acquainted. Why should it be supposed necessary to send the sap first to the leaf, before the matters in its solution, could be used in building up the plant? How do we know that those matters are not sufficiently vitalized, on entering the roots, to be used at once? Are there no other known processes by which carbonic acid gas can be decomposed but by sunlight? Were a chemist in this day wishing to release oxygen from its compounds, he would employ electricity and not sunlight; and may not that subtle and powerful agent be the principal cause of the decomposition of that gas in plants? We know that the differing states of positive and negative electricity between the earth and the air, are continually changing, and plants are precisely in that position to make them the medium between the two for the conveyance of that fluid, and more particularly through the water of the sap, where it meets the gas. Experiments have been made by erecting wires in an open space, and extending them under growing plants beneath the surface of the earth, thereby largely increasing growth. This increase must have been caused by a more rapid decomposition of the carbonic acid gas in the plant than would otherwise have taken place, for electricity contained in itself nothing that could be made subservient to growth.

In the 'New American Encyclopædia,' now in the course of publication, article Botany, the downward flow of sap is rejected, and arguments used to show that though the

amount of matter for growth in the ascending sap is small; yet, considering the great amount of water given off from the leaves of plants, there is abundant room to conclude that matter sufficient for growth is brought up by the sap. Electricity is also considered as playing an important part in vegetable growth. The philosophic editor of the 'Flore des Ceres,' of Belgium, in an article not long since, asserted that 'the office of the leaves was chiefly perspiratory, and that this ere long would be generally acknowledged.' He also asserted that a downward flow of sap did not exist.

It would be well for those who are preparing elementary works, to examine into all recent discoveries in science, and profit thereby. Few of the theories put forth in the first investigations of science, in its different departments, are now retained; later experiments have set many of them aside, and substituted others more in accordance with known facts. How much more consistent with the simplicity of nature, and with what we know of facts, to suppose that the matters brought up by the sap for growth are distributed in passing up, than to suppose they must all be first conveyed to the leaves to be vitalized! Were this the case, it is reasonable to infer that the matters would be more deposited near the leaves than they are, thus making the top grow faster than the body; this we know is not the case. But as they come up in a condition to be assimilated, they are deposited in much larger quantities near the ground than higher up—a beautiful provision of nature, to give the plant increased strength at the base, and make its body more valuable.

It is just as easy to suppose that the matters for growth are 'conveyed by the' upward 'circulating organs to the various portions of the plant,' as to suppose that this is done by a downward circulation. It would be just as much 'under the guiding finger of Omnipotence' in the one case as the other, and would set aside the necessity of resorting to 'some mysterious way' of Omnipotence to help us out of our difficulty. It would be a 'mysterious way,' indeed, to suppose a downward as well as upward movement of the sap; the downward being much thickened by the evaporation of the superabundant water at first contained in it. This difficulty is not overcome by supposing the descent, beneath the bark, where most of the growth is made, for it must pass through the stem of the leaf where there is no known evidence of their passing each other. According to this theory, it must pass through the pores of the sap-wood too, for it is well known that these pores gradually become more and more filled up by matter, until the texture of the heart-wood is assumed. How does this matter get there? Is there a downward flow there too? Here is a difficulty that cannot readily be gotten over.

But by allowing electricity to act a prominent part in the decomposition of the carbonic acid gas in the sap of plants, and thus making matters ready for assimilation through an upward circulation alone, we have a theory for growth that accords well with the simplicity of nature's laws, and will account for all we see, without bringing in mysteries to our aid. The laws of nature are all mysteries to man, while ignorant of them; but it is his province to make himself acquainted with these laws, and the more he does so, the more will he see of the beneficent designs of a gra-cious Providence.

YARDLEY TAYLOR.

For the Southern Planter.

Will Merino Sheep Pay a Profit on a Breeding Stock, Costing $20 a Head.

MR. EDITOR—In compliance with your request, that I should send you a communication on stock-breeding, I have concluded to furnish you with a short article on the rearing of sheep. *Will Merinoes pay at the cost of* $20 *per head?*

From the day that Abraham was about to sacrifice his son Isaac, down to the present time, sheep have been dependent upon man for protection, and provision for their support. But, as they are every where adapted to the abodes of man, and at the same time furnish him with comfortable and luxurious clothing, as well as the cheapest, most healthy, and nutritious flesh, they are far from being burdensome; on the contrary, they amply remunerate the expense and care, which their sustenance and protection involve. If the southern planter would but consider how fertile his southern home would become, if he raised less tobacco and cotton, and gave more attention to sheep husbandry, I am sure he would readily see the propriety and importance of a change of the existing policy of his farming operations. But he will perhaps at first object that the price of Merinoes at $20 per head,

is too high as an investment for profit. Let us see: Any investment of capital, paying a net profit of 6 per cent, is ordinarily considered not a bad one. Now, observe how the account will stand on reducing it to the test of close calculation:

20 Merino sheep, at $20 per head, - - -		$400
Interest on cost for one year, - -	$24	
Expense of keeping them one year, @ 75 cts.,	15	
	—	39
		$429
From these 20 sheep he may calculate on 100 lbs. of wool, which, at 50 cts. per lb., is -		$ 50
Which, after paying interest and keeping for one year, -		39
Leaves a net gain on wool of -		$ 11
Now, from this flock an ordinary flock-master would raise 15 lambs, besides keeping up the stock. These, when one year old, will produce the value of $2.50 in wool, from which, deducting 75 cts., as the cost of keeping, leaves $1.75 net for each, which, multiplied by 15, is equal to		26 25
Making the aggregate net value of wool, - - -		$37 25

This amount deducted from the $400, reduces the cost of the flock, now increased 75 per cent in number, to $362 75, or $10 36 per head on 35 sheep, the number of the flock.

Pursuing this line of calculation, it is easy to perceive how soon the profits will liquidate the cost and expenses, and leave the owner in possession of a large and continually growing flock, feeding him with its fat carcass, clothing him with its soft fleece, and yielding him a handsome pecuniary income, while its manure is enriching his worn out fields, and increasing their capacity for rich and abundant returns in their productions, for the labor bestowed upon them.

J. S. GOE.

Near Brownsville, Pa.,
January, 1860.

For the Southern Planter.

Culture of Broom Corn.

My experience in cultivating broom corn has only been for two years, yet I will give my mode of culture, which may be of some service to those who have never attempted it.

I deem it very important to plough the land in the fall, that it may pulverize well by the spring. Plough the land again just before the planting season, using the harrow freely, that the soil be thoroughly prepared to receive the seed corn. I have the rows laid off three feet apart, and plant as other corn. On high land I leave the corn four inches apart, but on low grounds, which is preferable, I put it at two inches in the step. Land of moderate fertility will afford a pretty good crop of broom corn; yet to obtain a very good result the land should be strong. After thinning, I use a coulter, and never touch it with a hoe except in thinning. I coulter the land twice, and then lay it by with a small turning plough; rely upon this mode, and I will ensure a good crop, according to the quality of the soil.

You shall hear from me again in regard to the mode of cutting and curing the crop, preparatory to the manufactory of brooms.

C. E. LITTLE.

Scottsville, Feb. 15, 1860.

Profits of Sheep Raising.

I noticed in the *Farmer* of January 7th, an article from R. F. Bingham, on "Profitable Sheep Husbandry." He says that John and E. W. Bingham have sold, the past season, a certain amount of sheep and wool; and wishes to hear from any one that has done better. I will here give a few facts and figures for his benefit. Last season I clipped 250 sheep; the wool sold for $552. I have sold within the year 74 sheep, which is equal to the number of lambs raised, for $814; making $1,366. My sheep are of the Spanish Merino breed, and mostly ewes; a few bucks and wethers. I have kept sheep for the last twenty years, and consider it the most profitable business the farmer can engage in.—JOSEPH W. WORCESTER, Pittsfield, Lorain Co., Ohio, January 11th, 1860.

The Southern Planter.

RICHMOND, VIRGINIA.

Gas Lime.

We are frequently asked the question, "Is Gas Lime good for anything as a fertilizer?" and as many of our subscribers are directly interested in a thorough understanding of the subject, we will give our opinion of its value, and the reasons which have led to our conclusions.

The Gas Works of the city afford an abundant supply of this article to those who are "in striking distance of them, and at about half the cost of fresh lime. However, they ask for it, per bushel, several cents more than is demanded for it at the Gas Works of other cities.

The gas, after being manufactured of bituminous coal, contains (we believe) a trace of iron, as well as *sulphur* and ammonia.

To free it from them, and to render it pure, shell lime is employed, and after this process of purification is completed, the lime, of course, contains these articles in a certain degree—of which we shall speak more definitely by and by.

The lime is used in the following manner at the works.

Four bars of iron are laid across each other at the corners, (like a log-pen,) and on the top of them is placed a piece of perforated sheet iron. This sheet iron is covered over with shell lime—which being done, four more iron bars are laid on top of it, and the perforated plates of sheet iron and lime applied in the same manner, until they are run up to the desired height. The whole of them are then covered in by a large cast iron bell, just as a clock is covered by a glass case, and the gas is forced up under it, until the lime absorbs its impurities, after which it is fit for use.

The lime, when taken out, has a dark, greenish color, and is very caustic. In this fresh condition, we do not think it well to apply it, except in small quantities, or during the cold weather of winter, when it will rapidly absorb oxygen—by means of which it is very materially altered in its effects upon the soil.

"The refuse matters which are produced during the distillation of pit coal in the Gas Works, consists of three substances: the ammoniacal liquor, the hydro-sulphuret of lime, formed by passing the gas through lime to deprive it of its sulphuretted hydrogen and the coal tar."

In some parts of Europe, the lime is bought up readily by farmers near the Gas Works. By the process through which it goes as a purifier of the gas, the lime is converted (in part) into the hydro-sulphuret—while the rest of it is free or uncombined lime.

"When mixed with the soil, or spread upon the surface, it gradually decomposes, a portion of hydrogen separates from it, and it is converted into sulphuret of lime, which, by absorbing oxygen from the atmosphere, finally becomes a *sulphate of lime* or gypsum.

We have other analyses of this article, but we believe there is no appreciable difference in them.

When fresh from the works, it may be applied to corn land during the winter, or on land devoted to raising vegetables, such as cabbage, potatoes, &c., without fear of *burning* the soil—since the rapid absorption of oxygen during this season, when it is exposed to the action of the atmosphere, converts a considerable per cent. of its bulk into sulphate of lime.

Our own practice has been to expose it to the air as much as possible, and to effect this we have let it "lay out" for several months before using.

In applying it to to the land, we have plowed it in, with wheat straw, early in spring, on land intended for corn and tobacco, and *plowed it out*, as far as practicable, during the succeeding autumn; the ground was then sowed in wheat—and with clover the spring after. We have secured "a good stand" of clover on every piece so treated; and we continue to sow it, broadcast, over our clover lots, and as much of the land in wheat as we can get over.

Some of the farmers in Scotland think the gas lime a protection against the ravages of insects—but of the truth of their opinion, we can say nothing, as we have found nothing to destroy the chinch bug, which has committed such devastation in this part of the country, that would not also destroy the crop, and prove "the remedy as bad as the disease."

We have in fresh gas lime, as the constituents

of its bulk, the hydro-sulphuret of lime, and a portion of uncombined—with from one, to one and a half per cent. of ammonia, (which it rapidly loses by exposure,) and *perhaps* a trace of iron.

This last, if it exists at all, would, we suppose, be acted on by the sulphur contained in it, in the same manner as the lime, and be converted, in its turn, to the sulphate, or copperas.

We shall be glad to hear from our Henrico friends, who have used it, the result of their experience.

Agricultural Statistics.

Among the intelligent and reflecting agriculturists of Virginia, the desire is almost universal that measures should at once be taken, under legislative authority, to collect, annually, the agricultural statistics of the State, and to disseminate them widely for public information. We say—*public* information—because while it is a subject of primary importance to the agriculturist, it concerns every department of the business of the country, and is subsidiary to them all. For all are either producers or consumers of the fruits of agricultural industry, and it is of the highest importance to both seller and buyer that the prices for its productions should be adjusted, as nearly as may be, to the quantity produced of any given article, to supply the demand (whether domestic, or foreign, or both,) when brought into market. This adjustment of price and demand to the supply of the article can only be effected with any approximation to accuracy by statistical information, so carefully collected and digested as to inspire general confidence in the aggregate results deduced from the returns which should be required to be rendered from every section of the producing region. This accomplished,—the price will be regulated by the supply, in obedience to the well-known and invariable law of supply and demand, and the producer, the consumer, and the trader, will be alike protected from the spasmodic fluctuations to which the market is always subjected when any considerable degree of uncertainty prevails as to the proper statistical basis upon which prices should rest. The general importance of this subject will be seen by the following considerations: The ultimate design of all business pursuits, beyond the procurement of a livelihood to those who engage in them, is accretion or the accumulation of property. All the surplus earnings of labor flow, by an irreversible law, into the currents of trade. Each department of social life—itself dependent upon and subservient to every other—is furnished by the exchanges effected through the mediation of commerce with the means of disposing of its surplus productions, and of acquiring, with the proceeds, from the excess of the productions of the labor of others, such articles of necessity, comfort, taste or luxury, as may be needed or desired; such commodities as add to the store of accumulated wealth; or such property—serving for capital—as may promote the increase of future production and add to the means of further accumulation.

Thus every department of human pursuit is in a measure connected with all others, and "the whole body, by joints and bands, having nourishment ministered and knit together," is in coöperative harmony with all the members, in promoting the proportionate increase of every part, according to its measure in the relations which it bears to the whole. But while this mutual dependence is seen to exist in all the departments of productive industry, agriculture is the principle of life that pervades and sustains them all. "Agriculture feeds, to a great extent it clothes us; without it we should have no manufactures, we should have no commerce. They all stand together like pillars in a cluster, the largest in the centre; and that largest is AGRICULTURE."—(*Webster.*)

Says Mr. Jay, in his masterly address presenting a statistical view of American Agriculture, &c., "Agriculture is the largest national interest of this Republic; involving, more than any other branch of industry, the wealth and welfare of the country, and the labour and happiness of the greatest number."

If then, as has been seen, agriculture is of such overshadowing importance, as one of the chief sources of national wealth and prosperity, and as supplying so large a part of the commerce of the country, its claims upon the Legislature for its intervention in its behalf, for the speedy accomplishment of so desirable—nay, so necessary a result, as the truthful registration of all the principal elements of her production, ought not for a moment to be denied, nor be further postponed by the Legislative authorities of the Commonwealth.

Petitions on this subject have been, or will be presented to the Legislature emanating from the Lynchburg, the Virginia Central, and the Virginia State Agricultural Societies. These bodies repre-

sent the agricultural interest of the State, and no doubt reflect the wishes of the entire agricultural population on this important subject.

For the Southern Planter.

Salt and Lime.

MR. EDITOR:

In reading the January number of the Planter, I observed an extract headed "Salt and Lime." Well, that was a subject upon which I have of late been thinking much, but the extract alluded to, did not altogether satisfy my mind.

My thoughts have been directed to that subject, because of an experiment made by a neighbour of mine, of sowing salt, broadcast, in a very limited quantity, upon what is usually termed in our section, over-marled or lime-burnt land.

This neighbour—a gentleman of undoubted veracity—stated to me that he had some spots in his field which had been, some years ago, overmarled by his father, so heavily indeed, that but little or no grain of any kind could be produced; the corn would look well until about knee high, and then assume a sickly, yellow appearance, and the blades finally moulder away.

After much reflection upon the subject, he determined to sow a few bushels of refuse fish salt upon the worst portion, and see what effect, if any, that application would have. He had to wait but a short time, as he relates, before the appearance of the corn was changed from a yellow to a flourishing green; in fact, the blades, the ends of which had mouldered away, took a second growth.

I asked this neighbour what chemical change, he supposed, had taken place between the salt and lime. His reply was, he did not know—but one thing he *did* know, that the effect was so manifest that the most casual observer could not fail to perceive it.

Thus stand the facts in the case. Now, facts are stubborn things, and though we cannot readily account for them, still they cannot be denied.

The extract alluded to positively asserted, that by mixing lime and common salt, a mutual decomposition of the two is effected, and two new compounds entirely different in their nature, are the result, viz: carbonate of soda and chloride of lime.

Now, chemists tell us, that common salt, in chemical language, is a chloride of the metal sodium; that chlorine has a strong affinity for the metals, but shows little disposition to unite with alkalies. They say, too, that lime is an oxide of the metal calcium, found as a natural product in great abundance in the shape of marble and common limestone, which are carbonates of lime; that the carbonic acid is driven off by heat, when it becomes caustic, or what is called *quicklime*, which, upon exposure to the air, readily combines again with carbonic acid and forms a carbonate of lime, or limestone.

Now, the question arises, will one of these two substances, salt and lime, decompose the other, and consequently form two new compounds, entirely different in their nature from the originals? Has the chlorine—one of the elements in the composition of salt—a greater affinity for the calcium of the lime than it has for the sodium of the salt? Has the carbonic acid of the lime, (for the oxide of calcium readily combines with the carbonic acid of the air) a greater affinity for the soda than it has for the lime? If it has, then it will leave the lime and unite with the soda and so form a carbonate of soda; the chlorine being set free would unite with the lime and form a chloride of lime.

Salt is recommended by some as a valuable manure. If it be a manure at all it can only be rendered so, we presume, by some decomposing agent, so that the soda, of which it is partly composed, may be set free and rendered available to the roots of plants. If lime be this agent, then we have the means at hand of rendering the vast tracts of arable land now almost worthless from too heavy applications of marl, capable of producing fine crops at a cost of a few cents per acre.

Now, with a request that *you* will give us farther light on this subject, I will close by wishing a long life and brilliant course to my old friend, the Planter.

SCHOLASTICOS.

Gloucester, Feb. 6th, 1860.

REMARKS BY THE EDITOR.

In reply to the quearies of our correspondent, we will, with great pleasure, give him our views on the subject, although we fear they will do him very little good. These we beg leave to give him, in mercantile parlance, with "errors and omissions excepted."

Some years have elapsed (we don't like to remember how many) since the study of chemistry was a part of our daily business, and even then, we don't think our proficiency would have entitled us to the honourable distinction of "Professor." We are certain, however, that if we were at that time, not particularly "brighi" as regards a knowledge of the science, we were not so "rusty" as we are now. The celebrated Dr. Chapman used to say he "had not read a book on chemistry for thirty years, and he thanked God for it." We have been posted up on the subject at a much shorter period than this, but still we are not so certain of the orthodoxy of our views, as to be able "to swear to our account."

The slaking of lime with salt-water is no new thing,—and those who have tried the experiment have, we believe, invariably spoken well of it. Lime thus prepared, has been confidently

recommended as a good application around the roots of fruit trees, and for agricultural and horticultural purposes.

We think our correspondent is right in supposing "a double decomposition" takes place in a mixture of "lime and salt." Lime has a very strong affinity for carbonic acid, (which he can readily perceive by breathing for a few moments into a glass filled with a solution of lime, when a precipitation of carbonate of lime rapidly takes place,) but we believe that soda has a *stronger* affinity for carbon than lime has.

Salt is a "chloride," "hydrochlorate," or "muriate" of soda: (for these three different names are given to the same acid,) which is composed of one part of chlorine and one part of hydrogen, added to the "oxide of sodium."

Carbonate of lime (or chalk) is composed of carbonic acid (containing one part of carbon and two of oxygen,) added to the oxide of calcium. Thus it contains, of carbon *one part*, oxygen *three parts*, added to calcium.

We believe that a mixture of lime and salt would undoubtedly produce a chloride of lime and carbonate of soda—the former of which is very easily soluble, and combines rapidly with water.

A weak solution of the chloride of lime, is said by some persons who have often tried the experiment, greatly to promote the speedy germination of seeds, and one gentleman of our acquaintance always soaks his garden seed in it for twelve or fifteen hours before sowing.

Salt is so easily soluble, that we do not suppose it is necessary that any "decomposing agent," should be brought to bear upon it to make it available plant food. We cannot account for its action satisfactorily to ourselves in preventing "firing" in broad-leafed crops; but we commend to our correspondent the articles in our November and present numbers, furnished by two experienced tobacco growers, on its use as a manure for that crop, and recommended by them as a specific remedy for the "firing" which is so apt to injure the leaves when guano is applied to the land.

The experiment alluded to by our correspondent, in which he speaks of the beneficial application of salt to "lime-burnt" land, we are very glad to receive. It is a troublesome and tedious job to restore land labouring under an excess of lime, to a fertile condition. We don' *know* that an application of salt to such soils would remedy the evil; but we believe it would, on the supposition that the lime would be thus converted, in part, to the chloride, which is more easily soluble, and could by moisture be carried down to the roots of plants all ready for immediate assimilation. It is well known that lime-burnt land bakes hard, and becomes too hot in time of drouth. Salt is deliquescent, or absorbs moisture, and thus its presence in such soils would subserve the double purpose of moistening and cooling it, since cold is produced by it, when from the addition of moisture, it passes from a solid to a liquid state.

We append the following notes, taken from a Compendium of "Hare's Lectures on Chemistry:"

"*Berzlius* divided inorganic bodies into *Halogen*, (or generators of salt,) *Amphigen*, (or such as unite to form either acids or the base of a salt,) and *Radicals* (or such as unite with other bodies to form *acids or bases*, but *do not form* acids or bases with each other.

"Dr. Hare, of Philadelphia included the Halogen and Amphigen bodies in one class, and denominated them '*Basarigen* bodies,' viz: Oxygen, Chlorine, Bromine, Iodine, Fluorine, Sulphur, Selenium, and Tellurium. Of those, Chlorine, Bromine, Iodine, and Fluorine, belong to the class of *Halogen* bodies—the other to the *Amphigen*.

"The compounds of chlorine are divided into chloro-acids, and chloro-bases, and the termination is given to the latter of *ide*, as, for example, *chloride of calcium*.

"Chlorine with Hydrogen, forms the acid called Muriatic, composed of equal volumes of the two. *Salt is a chloride of Sodium*."

For the Southern Planter.

Enquiry as to Salt on Tobacco Land.

Mr. Editor,—I read with interest an article in the Nov. number of the Southern Planter, under the caption, "Salt a Preventive of the Firing of Tobacco," by W. M. Watkins. Feeling desirous to learn something more definite upon the subject, so that I may avail myself of the benefit of an experiment, I make the following enquiries, and would be much obliged to Mr. Watkins if he would respond to them:

1st. How much salt (if applied alone) would be sufficient to the acre—i. e., to a light (tolerably) sandy soil?

2d. If applied with a concentrated manure, what *kind?* and in what proportions? and how much of the mixture should be applied to the acre?

3d. At what *time* should the application be made, and *how?*—i. e., whether broadcast or in drill? If broadcast, should it be harrowed or ploughed in?

Not knowing Mr. Watkins' address, I ask the

insertion of this in your valuable monthly, hoping his eye may fall upon it, and that the information desired may be obtained in time for the coming crop. Should he not observe this, perhaps you, Mr. Editor, could give the desired information.

R. Y. Henley.

King & Queen Co., Va., Jan. 23d, 1860.

As considerable time must elapse before our correspondent, Mr. Henley, can hear from Mr. Watkins, through the columns of the Planter, it may be desirable that the information which he seeks should be communicated at an earlier date—not that we would supersede the communication asked from Mr. Watkins, which we hope to receive in time for our April number—but that the inquirer, in the mean time, may avail himself of the experience of another successful tobacco planter. Dr. R. H. Nelson, of Hanover, corroborates the opinions expressed by Dr. Spraggins and Mr. Watkins, on the efficacy of salt in preventing the firing of tobacco while standing on the hill. He ploughs his land for tobacco as early in the fall or winter as practicable, that the ameliorating influence of freezing may be exerted upon it. In the spring he again ploughs it, and after a thorough harrowing, he lays it out by furrows run at the distance of three feet three inches apart; and taking three of these as affording a convenient width for the sower, ground alum salt is sown at the rate of one bushel to the acre. The land is then thrown into beds between the furrows above described; and with no other attention except what is required to keep down weeds, it so remains until the planting season, when it is thoroughly prepared for receiving the plants. Dr. Nelson has pursued this plan for several years, with entire success, even on land which before had nearly always produced tobacco injured by firing.

He uses salt upon all his ploughed land to which he applies manure.--[Editor.

The Weekly Southern Planter. Published at Jackson, Mississippi. By Powers & Cadwallader. Terms: $2 a year. Wilson A. Parker, Editor.

We place on our exchange list this new and promising Weekly, with whose first numbers we are much pleased.

We wish it "good luck," *and as it bears all of our name, and more besides*, we cordially greet it as "one of the family."

Our own interests, as well as the feelings of our heart, combine to induce the wish for *unmeasured prosperity to all Southern Planters.*

Broom Corn and Corn Brooms.

Mr. P. Horton Keach, of this city, is about establishing a factory to supply us with brooms, and consequently he will wish to purchase broom corn enough to supply us with the genuine home-made article.

We are promised an article on the culture and preparation of broom corn for market, which as soon as we receive it, we will lay before our readers.

Hon. Judge Mason, of Iowa, who made himself so popular with the inventors of the country, while he held the office of Commissioner of Patents, has, we learn, associated himself with Munn & Co., at the Scientific American office, New York.

Scientific Artisan.

This is a highly valuable paper, *particularly* for machinists and mechanics of every kind. To their notice we especially commend it. It is liberally ornamented with engravings of new inventions.

Accounts.

The book-keeper desires us to say that he will next month send out his bills for amounts due by subscribers, and that he has already sent out a good many—to all of which he invites a speedy response.

The bills will be found in the first leaf of the Planter, and if any errors are detected in them, we are always ready to rectify them.

Our Office, 148 Main Street.

We are glad to see our subscribers and friends here, whenever they are disposed to pay us a visit or—a subscription. Let them come on business or pleasure, we have a welcome for them, and should be glad to make the personal acquaintance of every good man among them, or that they may bring with them.

Our neighbor, Jos. Stern, (a scientific optician) occupies a part of the building, and can supply everybody in want, with spectacles, stereoscopes, microscopes, &c., &c. He kindly allows us to show to *our* friends his stock of *pretty things*, which is extensive and varied; so then the friends of the Planter will please remember (if they are fond of pictures) that they can pass a part of their time here in amusement, free of cost.

Our Journal.

Our thanks are due to several friends for the increase of our subscription list lately. We have been gratified to see it growing, and are encouraged to say of our paper, that its prospects are brightening every month.

While we do not stand upon the house-tops and proclaim our own as "the best agricultural paper in the world," we try hard to make it, so far as *we* can, as good as the best, and we are grateful to all of our friends, who think well enough of our efforts to induce them to recommend us to others, for their good will and friendly aid.

To our brethren of the press we return our cordial thanks for their kindly notices of The Southern Planter. To render it acceptable and reliable to the public, as an agricultural journal, is simply our duty, and shall be also our pleasure; and every mark of approbation we receive, cheers us on in our work.

Agents.

MR. A. T. MUCHLER, of Aylett's, King William county, Virginia, is authorised to receive subscriptions for us, and to receipt for them in our name.

The bills due us in the counties of King William, Caroline, Essex, and the lower part of Hanover, (Old Church and the Court-House,) are now in his hands, and we will be greatly obliged to our subscribers, with whom Mr. M. may meet, to settle their accounts promptly.

MR. T. B MONTAGUE is our Agent at Gloucester Court-House.

Subscribers in that county will find their bills in his hands.

American Guano.

Will any of our subscribers, who have tried this article of manure, give us the result of their experiments for publication? We observe in some of our Southern exchanges commendation of it as suitable to corn and cotton.

We tried it (on a small scale) on our oat crop in 1858, and perceived no good effect from it whatever. We shall try it again the present spring on corn, and we hope it will be cautiously used by a good many of our farmers, so that we may be assured of its merits. Below we give the opinion both of the editor of the *New England Farmer* and the *Maine Farmer*, who are practical agriculturists. The opinions of both these gentlemen have great weight *with us*, and while we would advise caution in its use, we think it should have a *fair trial*, as it may prove a valuable aid to some of our crops, and we are in favor of using any kind of manure on our farms, "*if it will pay*" to do so.

Letter from Dr. Holmes, Editor of the Maine Farmer.

OPINIONS OF THE AMERICAN GUANO.

WINTHROP, ME., Oct. 19, 1859.

Dear Sir:—I have made use of the American Guano that I purchased last spring, and am well pleased with it as a fertilizer. I tried a comparative experiment with it in the following manner. A portion of a cornfield was marked off. The American guano was used in the hill, say a gill to each hill; beside this I applied the Peruvian guano in the same way and quantity, and beside this the fish guano in the same manner and quantity. All the rows of corn did well, and I could see no particular difference between them. This proves your American guano to be equally as good as other kinds; or, in other words, equally as good as what has hitherto been considered the best.

I have not had opportunity to give it a fair trial as a top-dressing to grass land, but intend to do it next spring. There does not appear to be so much free ammonia escaping from the American guano as from the Peruvian, but it seems to contain enough of it, and as far as I can judge from its action on crops, and not by actual chemical analysis, it contains as much of the other fertilizing ingredients, such as phosphates and other salts, if not more than the Peruvian.

With much respect, yours truly,

E HOLMES.

REMARKS.—In confirmation of the opinion which Dr. Holmes has formed of the value of the American guano, we will state that we have used it for two seasons with the happiest results. The first trial of it was on corn where its effects were distinct through the season; the corn coming on earlier in the spring, growing faster, with a dark green color, and producing abundantly in the ear. This last season we tried it through the centre of a field of corn with similar results. It also produced carrots and potatoes, without other manure, of most excellent quality, and liberal in quantity. On beats and parsnips the result was equally marked. But the point to which we attach the most importance is, that it may be used on any crops as a stimulant and fertilizer in the hill, without endangering the germination of the seed, and thus give corn, or other plants requiring a long season, an early start, and secure their perfection before the time of frosts. In our short, cold and wet springs, it is essential to give the corn crop an early growth, and this we have secured by the use of the American guano, better than in any other way.

We hope our farmers will generally try it, and

that the price will be kept within moderate limits, so that all may avail themselves of its advantages.

We publish the following circular, received from the Commissioner of patents, that our readers, who have been accustomed to receive seeds from that department, may know that for reasons stated below, there will be no distribution of them this year:

UNITED STATES PATENT OFFICE,
February 2, 1860.

"SIR:—The following extract from the forthcoming agricultural report of the Commissioner of patents will explain the reason why the distribution of the various kinds of domestic seeds, which have heretofore been sent out from this office, is dispensed with during the present fiscal year:

'Owing to the reduced appropriation made by Congress for agricultural purposes for the fiscal year ending June 30, 1860, the office has been compelled to reduce its expenses and confine its action to a more limited sphere than heretofore. In doing this, it was found necessary either to decline purchasing for distribution the usual varieties of garden and field seeds, or to abandon the experiment of propagating the tea and various other foreign plants and grape-cuttings for which orders had been given. The expenses which had already been incurred in their procurement would hardly justify the office in throwing them aside. It was accordingly deemed advisable to apply the remainder of the funds solely to the procuring of information and preparing the material for the agricultural report, and to the propagation and distribution of such varieties of foreign seeds and cuttings as had been already engaged. These were of such nature, that if they had been distributed throughout the country immediately upon their receipt the probability is, that very few of them would have reached their destination in a fit state for propagation. The tea-seeds, more particularly, arrived in such a condition, that it was of the utmost importance to plant them at once. For this purpose, large propagating houses were erected upon the Government grounds, north of the canal, between 4½ and 6th streets. These structures now answer well the purpose for which they were intended, as is exhibited by the fact that we have ready for distribution over 30,000 well rooted tea-plants; 12,000 foreign and domestic grape-vines; 900 rooted seedless pomegranate cuttings, and various foreign, medicinal, and ornamental plants. These will be ready for distribution during the present winter, and the ensuing spring.'

"Yours, very respectfully,
"WM. D. BISHOP, Comm'r."

We are indebted to the Commissioner also for the following letter, published in "the Constitution," (a newspaper published in the city of of Washington,) on a subject which cannot fail to interest our readers:

Italian Bees.

PARIS, January 19, 1860.

In accordance with my instructions from the Patent Office, I arrived in the country of the Italian Lakes in April, 1859, and commenced searching for Italian bees.

I wandered about among the hills of this delightful region and examined many hives, but could not feel satisfied that any of them were of the pure Ligurian stock. The Italians are not a careful people, and it is difficult to find among them sufficient knowledge or skill to keep pure any kind of stock. The approach of hostile armies stopped my further researches for the time, and I was obliged to wait until the conclusion of peace for further efforts.

In the following September, as I was about leaving my Swiss home for another trip into Italy, I learned that an intelligent Bavarian, named Hermann, had established himself in the Grisons, and had devoted himself with much enthusiasm to the culture of pure Italian bees, which he collected wherever he could find them, but mostly from the vattelin.

I visited him at once, examined his hives, and was convinced that they were pure. I purchased of him for the Department to the full amount I was authorized to expend, and ordered them to be sent by the Arago on the 19th of October from Havre. By some unaccountable delay they were not shipped until December 28th from Genoa. They are doubtless now on their way, and will, on their arrival in New York, be forwarded at once to Washington. I sent by the same vessel a few hives for my own use, and, in order to ensure the thorough introduction of this breed, I have purchased one hundred additional hives for myself, which will be shipped next month, and from which, during the ensuing summer, I shall be able to supply many who may desire them.

Since I last communicated with the Department, I have had additional intercourse with European agriculturists, and am increasingly impressed with the great value of this species. It was not introduced into Northern Europe until 1853, and its introduction is every year more appreciated as a new era in bee culture. Its introduction into the United States may no less constitute a new era, and the Patent Office will deserve the gratitude of the country for its efforts to obtain it. This will be the better understood when the profits of bee culture shall be so generally appreciated that every farmer will have his hundred hives, the inmates of which will gather up the multitude of sweets which now are lost, and yield to their owner, according to his care, from three to ten thousand pounds of honey, or, according to Langstroth's lowest estimate, five hundred dollars per annum profit. It cannot be doubted that the Italian bees will entirely take the place of our common species, for the reasons: first, that they will endure the cold better; 2d, that they swarm twice as often; 3d, that their queens are abundantly more prolific;

4th, that the working bees begin to forage earlier and are more industrious; 5th, that they are less apt to sting, and may be easily tamed by kind treatment; 6th, that the queen may be so educated as to lay her eggs in any hive in which she is placed, while the bees of such a hive, deprived of their own queen, will readily receive her; 7th, that its proboscis is longer, and it can reach the depths of flowers which are entirely beyond the efforts of the common bee. The importance of this last superiority cannot be too highly appreciated; 8th, that a young queen, once impregnated, will continue fertile during her life—from four to seven years. This quality will insure pure brood, till the whole country is filled with them; 9th, that they are far more brave and active than the common bee, will fight with great fierceness, and more effectually keep the moth out of the hive.

They can be easily distinguished by a broad yellow band around the abdomen.

I feel assured of their susceptibility to entire domestication, for I went in among them without any protection, unless a cigar could be considered such. My companion uncovered the hives and took out the bees, which swarmed around me in great numbers, but did no harm, except one, whom I treated rather roughly when he alighted on my finger.

It is the custom of the Italians to take them up on the highest Alps, and I therefore feel certain of their great hardiness.

I believe that this bee will soon prevail in the United States and drive all others out of culture. This will result from a conviction everywhere of the large profits to be derived from its propagation and its labor. To import a hive of full size from Europe will cost from twenty to twenty-five dollars.

It may be, therefore, safely assumed that, for a couple of years to come, the demand for these bees will be very great, at ten dollars for a queen impregnated, which will produce thirty thousand workers and at least fifty queens in one season. For, perhaps, three years more, their value will be five dollars, and less, until the country is fully stocked with them.

As soon as the demand fails, the possessor of them is thrown back upon their labor for his profit. Their labor will be more productive than that of the common bee, and Langstroth gives the produce of the latter from thirty to a hundred pounds of honey for each hive, besides the wax. His lowest estimate is five dollars profit per hive.

A German writer says, that from one Italian queen he obtained more than one hundred and thirty fertile young queens, but I state fifty as a safer number. The great value of this breed is the safety and ease with which they can be handled and divided up. When it is recollected that each hive will make fifty others in the first year, and consequently, twenty-five hundred other the second year, and then, when the demand fails, each colony or hive will produce honey to the value of five dollars, it will be readily conceded that its money power will speedily settle the question of its general introduction.

It must not be forgotten, however, that success in this, as in all high breeding, requires care and attention, and for want of this some may be disappointed in their results. The facts I have stated are asserted by the best agriculturists in Europe, and may be considered reliable.

With regard to some other points in the description of Italian bees I find my notes confirm entirely the remarks and letters given in Langstroth's valuable book, and will, therefore, not repeat what you can read better there.

Every one interested in bees should not fail to buy this book and read it. In no other can he find so much valuable information, or learn so well what veritable slaves of the lamp these little insects are, giving to their masters three-quarters of their earnings, and demanding in return no food and but little more attention than a woman or intelligent child can give.

To this book I must also refer you for the best mode of introducing Italian queens to our native stock, or dividing up whole Italian colonies. I cannot perceive that the German or Italian mode differs materially from it.

Trusting that the bees will reach you safely, I remain, very respectfully,

S. B. PARSONS.

WILLIAM D. BISHOP, Commissioner of Patents.

Commercial and Agricultural Value of Certain Phosphatic Rocks of the Anguilla Isles, in the Leeward Islands.

To the Editor of the Mark-Lane Express.

SIR,—A few weeks ago I perceived in your journal a communication from Sir Roderick Impey Murchison, V. P. R. S., to the *Journal* of the Royal Agricultural Society of England, respecting the commercial and agricultural value of certain phosphatic rocks of the Anguilla Isles in the Leward Islands; conveying information which cannot be made too generally known, nor too highly appreciated, either in a commercial or national point of view. For no sooner had the researches in organic chemistry during the last twenty years explained the elaborations of vegetable economy, and reduced agricultural operations comparatively to definite laws, by defining the nature and determining the relative proportions of these elementary and compound bodies ever present and indispensable to the mature development of whatever crop it is the object of the farmer to cultivate, then arose the question, from whence was an adequate supply of those indispensable inorganic constituents to be derived. For, notwithstanding there are many subjects connected with the daily operations of the farm

yet to be discussed, it is generally admitted by all acquainted with the great achievements in modern agriculture, that wherever a commensarate amount of capital and science are brought into operation in this important field of national industry, few investments are calculated to ensure more certain and remunerative returns; and none conferring more permanent good upon the country at large, as it directs the energies and enterprise of a vast portion of the community to be expended in a cause which must inevitably expedite the general development of our agricultural resources, and augment to an indefinite extent the annual produce of the soil. Now, to render the present refined state of chemical analysis subservient to the daily operations of practical husbandry, it is not only essentially necessary that the farmer should know the nature of the mineral and saline ingredients extracted from the soil by the crops raised, but that he should have the means of restoring to the land any of those ingredients indispensable to the proper development of a crop of which it may be deficient. For example, I need only remark that either roots or cereals will vegetate with considerable luxuriance up to a certain period of their growth, during which time they had expended their sustenence in the formation of cellular tissue; and for the want of alkaline and earthy phosphates, and azotized matter, the plants cannot attain proper maturity, and we obtain bulk with little nutritious virtue.

To enable the practical farmer to fully comprehend the important mission assigned to inorganic matter in the economy of vegetable physiology, it is only necessary to estimate the quantity of these substances removed from the soil by a ton of each of the following grasses:

Inorganic Substances.	Italian Rye grass Hay.	Clover Hay.		Lucerne Hay.
		Red.	White.	
	Lbs.	Lbs.	Lbs.	Lbs.
Phosphoric acid	9.00	10.00	20.00	29.00
Potash	17.00	26.00	24.70	30.00
Soda.....	7.50	3.50	10.70	13.70
Lime	13.25	55.60	45.25	107.75
Magnesia	3.00	17.20	14.00	7.25
Oxide of Iron..	1.00	1.50	3.50	.75
Sulphuric acid	4.25	6.75	12.40	9.00
Chlorine.....	2.00	4.00	5.10	6.75
Silica.....	81.75	5.10	6.00	7.40
Alumina	Trace.	Trace.	Trace.	Trace.
Total quantity	138.75	129.65	141.65	211.60

From the above statement it appears that the mineral and saline ingredients extracted from the soil by the different grasses cited consists, in the aggregate, of alkaline and earthy phosphates, but assimilated in very different proportions by the respective plants named.

Thus we find, by contrasting lucerne with rye-grass, that the former extracts from the soil close upon 380 per cent. more of these materials than the latter, showing that one species of grass may be cultivated with advantage upon a soil totally incompetent to produce the other, without the agriculturist can avail himself of the means to correct the defect. And the history of all ancient states establishes the fact, that no system of culture can compensate for the inordinate quantities of these valuable substances removed from the soil in remote parts of the country in the form of milk, corn, cattle, or any other form the produce may assume, without we return the quantities equivalent to those removed. As soon as the great fertilizing power of phosphatic compounds was known, the attention of many of the leading scientific men of the day was directed towards discovering a source from whence a permanent supply could be had. And at that time it was currently reported that a considerable deposit of phosphate of lime existed in the Spanish province of Estremadura; but after a personal survey of the deposit by Dr. Daubeny, it was found unavailable to the purposes of British agriculture, chiefly arising from the expense of transport.

Indeed, various and extensive explorations have been made by many eminent professional and scientific gentlemen throughout the entire range of the cretaceous series of strata; and although many of these deposits contained phosphoric acid, except the phosphatic fossils of Suffolk and Essex, discovered by Professor Henslow, and now extensively used as a substitute for bones in the manufacture of superphosphate of lime, little was effected to promote the interest of agriculture. And however much an adequate supply of mineral manure was felt at that time, its value in agricultural operations has much increased since the passing of the Corn Law, inasmuch as the farmer has been compelled, from the low price of grain, to turn his attention more to grazing. And if attention is directed to the rearing and fattening of cattle and sheep, an ade-

quate supply of earthy and alkaline phosphates becomes more imperative, as they enter largely into the structure of all animals, and necessarily form the most valuable portion of the food they consume. For instance, phosphate of lime forms from 50 to 60 per cent. of all the bone reared and exported from the farm; and the alkaline phosphates constitute from 70 to 75 per cent. of the ashes of both flesh and blood, also forming about 80 per cent. of the ashes of the most valuable food for cattle and sheep.

After chemistry had elicited the important part assigned to these phosphatic compounds in both animal and vegetable life, it will be admitted that a plentiful supply of those ingredients is of the greatest importance to practical agriculture. And it is with that view that I now point out the Island of Sombrero as the means of supplying these necessary requirements of the day.

The Island of Sombrero was visited as early as 1814 by an English gentleman, and again about 1825, on which occasion a report was made to the British Government; but it was not until 1856 that the Americans discovered this extraordinary deposit of *phosphatic guano*, and at once took possession of the island. and since that time large quantities have been imported into the Southern States to replenish the exhausted tobacco and cotton fields, and which has been attended with surprising effect.

Since Sir R. I. Murchison's communication appeared in your journal, I have had an opportunity of examining a cargo of a thousand tons discharged in the port of London, *ex* "Rochambeau," from which the accompanying specimens are selected, and are equally rich in phosphatic compounds as those which Sir Roderick had analyzed from the same island, varying from 75 to 90 per cent., according to the nature and locality of the strata from which the specimen is taken. The geological formation of the island appears to be marine and phosphatic breccia, and constitutes the most valuable source of mineral manure at present available to the agricultural requirements of the age; and fully impressed with the belief that good will result from its peculiar properties being generally known throughout our agricultural districts, I have ventured to submit these observations for your consideration, if you deem them worthy a place in your widely-circulated journal.

A Modern Agriculturist.

Is it Anybody's Picture?

There's neighbour S——. He's content with his farm, and believes that draining is too costly to be practiced, and sheds will not pay as protection to stock. He leaves a dilapidated fence in front of his dwelling, backed by a row of scraggy peach trees. His wood-yard is the space in front of the house, consisting of an unsightly pile of green logs, to be cut up as occasion requires. His barn! the roof decayed and ragged, with the boards here and there missing from the sides; an open yard, where all winter a herd of lowing cattle may be seen, pinched with cold, and trampling his fodder under their feet. His farming implements! are few and simple. Go into the road, and there by the fence where they are carefully placed when not in use---you will see them. An old wagon with an older box stands there ready to drop to pieces by its own weight, a three cornered drag rests confidingly against it, while a little away off is the plow which by the wear and tear it has been subjected to might be referred to any age since Methusaleh. Neighbour S——, believes one plow will answer for all purposes, and all soils, and thinks new inventions in this line humbugs. In the spring he yokes a pair of poor starved oxen, that have lain out to freeze in the open yard last winter, hitches them to his plow and proceeds to spring plowing. He usually gets into his field by letting down the fence; an easy task by the way, for the corners are all down, or thrown this way and that, till he cannot easily make it worse. He usually begins in wet weather, as his team is too light to plow when it is dry. He plows shallow, his teams are not strong enough to plow deep. He don't subsoil, it would take another team. When harvest comes, he wonders why his fields yield but half a crop!

Such are men---I will not say farmers who disgrace the pursuit of agriculture. But their number is lessening. Stupid must be the man indeed who does not improve in this age. Every appliance science and art can bring is placed in the hand of the farmer. He has but to signify his wants, and the inventor is ready to devote years in his service. He but asks and he receives. The leaven in working, and the farmer for intelligence stands equal to the best. If he does not, then he is to blame. If he will not read and think, if he will not strive to im-

prove, then he merits contempt, and should be degraded, not only by other professions, but by all true farmers, as a reproach on the honor of their calling.—*Ohio Cultivator.*

Influence of the Surface Soil.

There is something remarkable in the influence on vegetable growth of the upper stratum of the soil. Take, for example, its effect on the growth of young trees. If a young peach tree, for instance, is allowed to stand in a good soil, which from neglect becomes hardened and crusted on the surface, it will make but a few inches growth in a single season. But if, instead of becoming crusted, the surface of the soil for only an inch or two downwards, is kept mellow, and daily stirred, the growth of the tree will be more than double, and sometimes more than quadrupled, although the roots may all be below the stirred portion. A more striking difference occurs when the surface is allowed in one instance to become coated with grass, and in the other is kept mellow. Although the roots of the grass extended downwards but a few inches, yet we have known this mere surface-coating so to retard the growth of large peach trees, that they would not make more than three or four inches growth, while similar trees, standing in mellow cultivated ground, grew from two to three feet in a season. The roots of the trees were mostly a foot below the surf ce.

We do not propose here to discuss the theory of this remarkable surface influence, but merely to point out the facts, and to suggest some important practical hints.

Manure for trees and crops operates in two important ways. The first and most obvious is by its direct supplies to the small rootlets in the soil. To afford such supplies in the best manner, it should be finely pulverized, and minutely diffused through the soil at just such a depth as the roots of the trees and crops extend; neither wholly buried deep, nor left wholly near the top; but be intermixed through every part. This mode we do not propose to speak of at present. The second way is its influence on the crust of the surface, as already alluded to. On very light sandy or gravelly soils, this influence is less important, so far as the mellowing effect of manure mixed with the surface is concerned. On such soils, there is little to hold or retain its fertilizing portions, and it is soon dissipated and lost. Straw or coarse litter, strictly as a mulch, is better here than manure merely. But on clayey soils manure becomes highly advantageous. It combines with and mellows the crust in a most efficient manner. The great advantage which it possesses when thus applied to clay soils is not only in softening the hard crust to which such soils are liable, but in the ready combination which is effected between the clay and the volatile manure.

There are various ways in which surface manuring and mulching with straw benefits crops. Among others a most important one is shelter in winter. The soil about young trees and plants, if perfectly bare and hardened by exposure, radiates heat upwards towards a clear sky on a cold winter night with great rapidity. A very thin coating of manure or litter is a great protection. Hence the benefit derived from the winter mulching of young fruit trees. In severe regions, the difference between the success and failure of dwarf pears, has sometimes resulted from this alone. Exposed crops of winter wheat have been saved from winter killing by surface manuring in autumn with thin coarse material.

The protection which such a coating affords the soil and the plants upon the surface from severe cutting winds, is frequently of great importance. A screen of trees, or a high, tight board fence, often saves young trees or plants from destruction; and next to such a screen is a mantle covering the bare earth.

The great practical question arises, how much and how frequently is it most profitable to manure the surface? What proportion of the manure applied should be diffused through the soil, and what proportion left at the surface? At what season of the year should the work be performed? We have tried but a limited number of experiments to determine those points, and those not of much accuracy; but their general teaching was in favor of autumn or early winter manuring, if to remain upon the surface of untilled land, or to be plowed in, in the spring; and on tilled clay lands a small portion of the manure left on the surface, and only harrowed in in the spring or early summer, has had a good and sometimes excellent effect. On light soils, surface manuring during the summer has proved but little benefit, even if harrowed in the top soil. We believe the subject is one worthy of further examination.—*The Country Gentleman.*

Be A Man.

BY REV. JAMES W. HAMILTON.

Cease your whining, cease your fretting,
Cease your railing at your lot;
There's no time for useless dreaming,
These complainings profit not.
What if life is not all pleasure,
Fretting won't relieve the pain;
Noble souls have never leisure
At misfortunes to complain.

Meet misfortunes, drooping willows,
As the sailor meets the storm;
Just to ride upon its billows,
Till they bear him to his bourne.
Catch the breeze, or you'll succeed not;
Life's for labour, not for sport,
Quiet seas thy way will speed not,
Calm's won't bring thee into port.

If you would yourself be happy,
You must happiness impart;
Bless your neighbours all around you,
'Twill return to your own heart.
Let your sympathies flow outward,
With the sorrowful condole;
Let your smiles be like the sunshine,
Cheering every weary soul.

All which you may be desiring,
May not be within your power;
Yet what God is now requiring,
Is, do well the present hour.
Go, relieve life's present sorrow,
Let not indolence prevail;
He who waits until to-morrow
To do good, will surely fail.

Let your aim be high and holy,
And your motives strong and true;
Life has pleasures for the lowly,
Life has something still to do.
Idle hands are always weary,
Selfish nature knows no joy;
Loving souls are ever cheery,
Toiling spirits never cloy.

Onward, upward, mounting higher
On each wave-top as it rolls,
Fill your heart with manly fire,
Labour is for noble souls.
Fight God's battles till your Master
Bids you lay your armour down,
He has a reward prepared,
Bear the cross and wear the crown.

Make your Mark.

In the quarries should you toil,
Make your mark:
Do you delve upon the soil,
Make your mark:
In whatever path you go,
In whatever place you stand,
Moving swift or moving slow,
With a firm and honest hand,
Make your mark.

Should opponents hedge your way,
Make your mark:
Work by night and work by day,
Make your mark:
Struggle manfully and well,
Let no obstacles oppose;
None, right-shielded, ever fell
By the weapons of his foes:
Make your mark.

What, though born a peasant's son,
Make your mark:
Peasants' garbs may warm the cold,
Peasants' words may calm a fear;
Better far than hoarding gold
Is the drying of a tear!
Make your mark.

Life is fleeting as a shade,
Make your mark:
Marks of *some* kind *must* be made,
Make your mark:
Make it while the arm is strong,
In the golden hours of youth;
Never, never make it wrong;
Make it with the stamp of truth:
Make your mark.

Live for Something.

Live for something, be not idle,
Look about thee for employ;
Sit not down to useless dreaming—
Labour is the sweetest joy.
Folded hands are ever weary,
Selfish hearts are never gay;
Life to thee hath many duties—
Active be, then, while you may.

Scatter blessings in thy pathway!
Gentle words and cheering smiles
Better are than gold and silver,
With their grief dispelling wiles.
As the pleasant sunshine falleth,
As the dew descends on earth,
So let thy sympathy and kindness,
Gladden well the darkened hearth.