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AN ADDRESS

ON

ELEMENTARY

Agricultural Chemistry,

BY

J. MUNROE LENNARD,

IN WHICH

THE SUBJECT OF FERTILIZERS IS VENTILATED,
AND THE FRAUDS PRACTICED UPON PLANT-
ERS BY DEALERS AND MANIPULATORS
OF GUANO COMPOUNDS EXPOSED;

AND

MANY PRACTICAL AND VALUABLE HINTS AND

RECIPES

GIVEN FOR COMPOUNDING MANURES ON THE
FARM, OUT OF HOME INGREDIENTS AND
THE RAW COMMERCIAL MATERIALS.

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DECEMBER, 1873.





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ADDRESS.

It is the melancholly experience of mankind that whenever an opportunity for the practice of fraud is presented, there are found plenty to step in and occupy the ground. No opportunity for such fraudulent practice ever offered better facilities than in the manufacture and sale of the so-called Guanos and Super-phosphates.

In the purchase of these the planter has no means whatever of ascertaining their constituents and manurial value. He must depend upon the laudatory statements of an interested agent, who, in nearly every case, is as ignorant of the true value of what he sells, as the farmer is of what he buys, and who, in turn, must depend upon the statements of the manipulator, who in most cases is a denizen of Yankee-land, and who believes it his religious privilege to steal from southern rebels especially, but who cares not much how or where he gets his greenbacks, so he gets them. It is at the feet of such creatures as these the hard-fisted Southerner lays his hard earnings when he buys a guano compound.

How then is the planter to guard against imposition whenever it is desirable to purchase his manures. The proper way, and indeed the only proper way, is for each planter for himself to ascertain what he needs, and then learn where to obtain and what to pay for the raw materials, and how to compound them for himself. It is this very information which we propose to give him in these pages. If in doing so we shall succeed in saving but five dollars on the productive cost of each bale of cotton to each reader of this little pamphlet, we shall have accomplished more for the prosperity and independence of our beloved South than at any time previous, although it was for her, and in the defence of her rights, we freely spilled our blood and buried a portion of our body on one of her ever memorable battle-grounds.

I here assert, and shall demonstrate in these pages, that, besides the risk of being imposed on by *spurious* compounds, the planter can purchase ingredients and make his manures at a cheaper rate than the manipulator can do it for him,

even if the manipulator is honest in his dealings and sold his compound at prime cost. Such an assertion, I know, seems incredible to the uninformed, but we shall prove its truthfulness.

For instance, the planter may, by proper fermentation, produce soluble phosphoric acid, which is one of the four ingredients essential in every complete manure; whereas the manipulator, for his purposes, can produce it only by the use of sulphuric acid, which is a more costly ingredient than the phosphate itself. Besides the manipulator must add two or three hundred pounds of water to the ground phosphate to make the sulphuric acid take; on which water the planter, to say the least, must pay freight, if he buys the manufactured article. Again, the manufacturer must hire his labor for this particular purpose; whereas the planter may perform his manipulations with labor already in his employment, and at odd times and rainy seasons, at no additional cost. The advantages here enumerated in favor of the planter, are more than sufficient to overbalance all the advantages enjoyed by the manipulator, in the way of freights and the obtaining of the ingredients at a lower rate, because purchased in larger quantity and with greater cash capital. Besides, the freights on the manufactured article rate higher than the freights on the raw materials, so that the planter by purchasing the raw materials instead of the manufactured article, saves in freight in *this* respect—saves all the freight on the water, saves all the cost on the sulphuric acid, and saves the cost of labor necessary to manipulate; and more than all, saves being imposed upon by dishonest manufacturers, saves himself the uncertainty and doubt which always attaches to the purchase of an unknown compound; and finally, saves the cruel disappointments, which too often attends the purchase of spurious and worthless articles.

These statements being true, and I defy successful contradiction, it is so manifestly to the interest of planters to ignore compounds, and deal only in the ingredients for making manures, that certainly no intelligent planter will hesitate longer which policy to adopt.

In addition, it must be remembered that the manipulator must go to large expense to introduce his article; he must advertise extensively, and publish great numbers of pamphlets and circulars for gratuitous distribution; and must pay his general agents each ten dollars per ton, and sub-agents each five dollars per ton; and then the manipulators must of course have handsome dividends out of their investment: all of which charges must be tacked on to the prime

cost, and must be paid for by the poor, duped and unfortunate consumer. So that, in ninety-nine cases out of a hundred, a manure that leaves Baltimore at a prime cost of sixteen dollars per ton, is consumed by the planter at a cost of from sixty-five to seventy-five dollars.

Now, if the planter can produce the same manure, on his own farm, at the same rates that it can be procured in Baltimore, where is the good sense in his giving to a Yankee sharper a bonus of forty dollars per ton on all the manure he uses? Are they so deserving of our bounty; or is our land so productive, that we can thus afford, so lavishly, to scatter our hard earnings? Nay, planters of the South, it is because we have not had the inclination to investigate this subject—it is because, like our mother Eve, who, while being robbed of her Eden, was charmed into acquiescence, by the oily tongue of the father of lies—we have allowed our anticipations played upon, while the sharpers have quietly rifled our pockets.

What, if now and then, a planter of sanguine temperament, and under favorable circumstances, has experienced some benefit from the use of a certain compound,—which benefits he magnifies to two or three times its proper proportions, and is, thereby, induced to give the manufacturer a flaming certificate—is that any reason why we should pay sixty-five dollars for what we can just as easily obtain for sixteen? Nonsense! nonsense!

No, planters, we will not do it longer than we can obtain that light which will enable us to avoid it,—enable us to be independent of the manipulator. It is the object of these pages to furnish *that* light. If the writer fails in this, he hopes that he shall, at least, succeed in arousing an investigating spirit upon this all important subject. We say all important, because the enriching of land, in the most expeditious and economical manner, is the corner stone of successful agriculture.

It is the foundation upon which, all permanent prosperity in an agricultural community must be built, under any system of government, or with any kind of labor, but more especially so, where the labor is all hired. It is a well recognized principle, that the more productive the farm, the cheaper will be the labor, other things being equal. Thus, a man who makes six bales of cotton to the hand pays not half so much wages, at the same rates, as the man who makes only three bales to the hand. Whenever the productive power of land is cropped down, to where the cost of production overbalances the proceeds, as is the case at present

with Middle and South Georgia and Alabama, the land has become utterly worthless for agricultural purposes. It must then, either be abandoned, or the owner must set himself vigorously to work to recuperate it.

To use a worthless compound on it in this condition, entails a double loss to the planter. In addition to the amount invested in the so-called manure, he is induced to cultivate land at a positive loss, which otherwise, would have been abandoned to pasture. Such experiments, renewed from year to year, with the same results, only varying the names of the compounds used, begets in the planter a mistrust of everything in the form of a commercial manure; causes him to despair of ever being able to bring his land up to a point of paying fertility;—weakens his energies and his efforts, and thus brings manifold injuries upon the general community. It is the duty of the patriot—the statesman and the philanthropist, to use efforts, to ward off and checkmate these evils, and he who only partially succeeds, deserves the thanks of a people, who, for eight long years, have been struggling against the giant poverty, but who, on account of the evils above named, have been simply serving as overseers on their own plantations for their Northern task-masters.

Taking it for granted, that every planter who reads this, will recognize the truth and force of the above remarks, both from his own experience and his observation upon what others have done and are doing, we will proceed directly, to the task which lies out before us.

In a brief address like this, we can do no more than sketch the most important features of Agricultural Chemistry, and throw out some practical, and as we deem, valuable hints, to assist the planter in procuring the essential ingredients; and give some rules for the compounding of them upon his own premises. The intelligent planter, who has the time and the inclination, can pursue his investigations, by the perusal of works which go more fully into the details of Agricultural Chemistry. The main object of this address, being, to arouse our planters to an investigation of this subject, and to convince them that they can educate themselves in this respect, and that it is, by no means, a heaven ordained principle, that the professors of colleges, or the manufacturers of fertilizers, should hold in their inflexible grasp, all the knowledge bearing upon a subject, so vitally connected with the march of civilization and the material prosperity of the entire race. God did not intend that our first parents, in dressing the garden, should simply perform a routine of manual labor, but that, in their efforts to improve

their Eden, they should expand their own intellects, as well as give exercise to their muscles ; and that gradually from day to day, and from year to year, they should become more fully acquainted with the wonderful laws of nature and their own being, and should thereby, constantly find fresh food for their wonder and reverence for His goodness, His wisdom, and His omnipotence. If the life of the agriculturist is to be confined to the one point, of furnishing food and raiment for his household, then indeed, is his, a sorry calling—a tread-mill work. He is indeed, a hewer of wood and a drawer of water. When he pursues his avocation as a science, as well as an art, then he dignifies his calling—he places himself upon a level with the astronomer, the chemist, the geologist and the philosopher ; indeed he makes all other sciences, subservient to, and a handmaid of, the science of agriculture. He makes his the grandest, as well as the first vocation of man, made in the image of God.

It has been determined by scientific experimenters, and the results of the laboratory, that while there are many ingredients which enter into the composition of plants, that there are but *four* which are worthy of the planter's consideration—but four, the presence or absence of which, constitute the difference between the productiveness, or the sterility, of cultivated lands. These four are: Ammonia, Phosphoric Acid, Potash and Lime. The entire absence of either one of these ingredients, in any virgin or cultivated soil, renders it completely sterile, for most of the cultivated plants. In proportion to the exhaustion of any one, or all of them, by continuous cropping, or by drenching rains, just in that proportion does the land become unproductive. All the other ingredients, which enter into cultivated plants, are supplied by the earth, the atmosphere and the water, under any and all circumstances. Out of the great number of these, Providence has ordained that the hand and mind of man, shall be concerned, to supply only the four above named. We shall not, therefore, in this address, as we are not writing a complete work on chemistry, name or discuss any others, only as they incidently affect these four.

AMMONIA.

Ammonia is formed of fourteen parts of nitrogen, with three parts of hydrogen. Nitrogen is so essential to the growth of plants, that no matter, if every other element of plant food was present in excess, without it, they could never come to maturity. Its various sources of available and

economical supply, therefore, is a question of the first importance to the enterprising agriculturist. Nitrogen may exist in the atmosphere, in the soil and in organic matter, such as the horns, hoofs and hair of animals, in the immediate presence of plants in great abundance, and yet, furnish no food ; because it is not in such a state as that it can be appropriated by the plant. Nature furnishes the crude materials, and by its slow processes, in part, prepares the food for plants. But it belongs to the intelligent hand of man, in this, as in many other things, to come to nature's assistance. In this, man manifests himself the lord of creation, as, in the beginning, it was declared of him he should be. Plants can no more assimilate and thrive upon food which has not been properly prepared, either in nature's great laboratory, or by the hand of man, than can man himself. Indeed, man and other animals, in this respect, have the advantage of the vegetable kingdom ; for nature has supplied them with teeth, wherewith, to masticate solid food ; whereas plants must take all their food either in solution or in a gaseous form.

When, therefore, nitrogen, the appropriate food for plants, is presented to them in the horns, hoofs or bones of animals, the plant has no power to assimilate it, until by the hand of man, or the slow process of decomposition, it is released from the grasp of other materials and allowed to unite with hydrogen in the form of ammonia, when it may be appropriated and assimilated by the plant. This is the form in which it is presented to plants in Peruvian Guano, fermented dung and urine, and in decaying cotton seed, &c., and is the reason why these substances produce such marked effects upon the growth of plants. But when this substance, nitrogen, is set free, by any process, and is converted into actual ammonia, it is exceedingly volatile and diffusible in the surrounding atmosphere, and unless closely guarded, or fixed by some substance as gypsum, will escape beyond the power of man to reclaim it. It has a pungent smell, and in this way may be detected escaping from a pile of fermenting cotton seed or stable dung. Quick lime has the power of dissipating, or driving this substance off into the atmosphere, and is, on this account, a very injurious element to be mixed with any manure containing ammonia. Yet this same property in lime, adds to its value as a manure, when scattered *by itself* over the land, as it causes the inorganic matters, which hold nitrogen in their embrace, to turn it loose, thus allowing the plants to appropriate it. Like all the other blessings of nature, when misapplied, it becomes a source of actual mis-

chief. Fermentation and decomposition is one of nature's processes, by which nitrogen as potential ammonia, or in its latent state, may be converted into actual ammonia, and thus brought into a state as active plant food. Now, man may hasten fermentation and decomposition, and place substances in bulk, which scattered would not ferment at all, but would decompose very slowly, thus allowing time for the ammonia, as it is set free, to entirely escape into the atmosphere. It is quite important, therefore, that the planter should heap together every substance which contains ammonia, in such a state, as to bring about rapid decomposition, at the same time, adding gypsum or land plaster, to prevent the escape of the free ammonia; and over the whole throw a layer of earth. It is a lavish waste of money to bring ammonia, in the shape of Peruvian Guano, at great cost, from the islands of the sea, until we have used every available means to produce it on our own farms, and until we cease to allow it to escape, unheeded, into the atmosphere; thus vitiating the air we breathe and breeding disease and death, instead of turning it into a life-producing and wealth-creating channel. The substances which contain actual ammonia are the solid and liquid excrements of man and animals, cotton seed, &c. The substances containing nitrogen, capable of forming ammonia, are horns, hoofs, hair and bones of animals. Swamp-muck contains also, upon average, six dollars and thirty-four cents worth of ammonia per ton. But this last should not be applied to land until it has been dried and fermented with other matters which destroys its acidity, and prepares it mechanically for satisfactory application. Dried swamp-muck may be used with much profit, as an absorbent, about the stables and cattle pens, and in the hen roost. It may be placed in hoppers, and form a receptacle for soapsuds and urine; so used, it will extract their manurial ingredients and permit the water to pass through pure and clear. If it is desirable to purchase ammonia, which we do not think will be the case if the planter uses diligence in saving his home supplies, it may be bought in Peruvian Guano, or as sulphate of ammonia.

A simple mode by which a planter may determine the quantity of ammonia in any fertilizer, is briefly described as follows: Into a small and cheaply constructed tin retort place, say 100 grains of any fertilizer, with a portion of water, and then add about 100 grains of unslacked lime and close the retort, and distill with a gentle heat over a spirit lamp, or in the absence of this, over some coals, keeping the beak

of the retort well enveloped in cold cloths, over which cold water is kept teeming whilst the distillation proceeds.

The ammoniacal value of the manure is at once determined by the strength of the ammonia (or hartshorn) which you have collected from this distillation.

Before leaving this subject, we will remark, that when piles of cotton seed are thrown out to rot, which is the custom with some, a sufficient amount of gypsum should be mixed with them, to fix the ammonia as it is set free by fermentation; and when sufficiently moistened to produce fermentation, should be covered with a temporary shelter or at least have a layer of earth thrown over them, and brought up in a conical shape. The value of the heap would be added to, if transferred to another pen or turned over after once cooling off. The reason for this is, the oxygen in the pile is exhausted when fermentation ceases. Turning over will give to the pile a fresh supply and a new fermentation will set in. The object of fermentation being to render soluable the materials, the more thoroughly this takes place, the more completely will the desired object be accomplished. If, when tearing down the pile, the ammonia is found by the smell to be escaping, more gypsum should be added. The pea and clover belong to that class of plants which draw their ammonia from the atmosphere, and hence are considerable sources of supply of that material when plowed into the land.

Any kind of decaying vegetation, beneath the surface, evolves ammonia. The carcasses of animals, in their decomposition, evolve considerable ammonia, and should, whenever practicable, be made a part of the compost heap. Indeed, no substance containing nitrogen, capable of being converted into actual ammonia, should be allowed to waste this valuable life-producing element upon the desert air; so to act, is a useless and criminal waste of one of the leading sources of wealth and comfort to the agriculturist. Substances containing nitrogen must enter largely into the food of man and beast; for this element is essential to the development of the muscular and nervous system, and to the generating of blood.

PHOSPHORIC ACID.

We will now proceed to discuss another leading and essential ingredient in every complete manure, viz, Phosphoric Acid.

This article is composed of phosphorus 43.66, and oxygen 56.34, in one hundred parts. The phosphorus, however,

and not the oxygen, is the active manurial element and object of prime consideration to the planter. Its union with the oxygen being only a convenient form for appropriation and assimilation by the plant.

Phosphorus enters largely into the composition of bones, and is essential to bone development in the human and animal system, and like nitrogen, therefore, must enter largely into the food of man and beast. If children, during their growth, and while their constitution is being formed, are nourished upon food wanting in this element, they will be wanting in proper bone development. To convert it, therefore, into bone for the growth and development of our systems, we must first feed it to the plants, and through the plants take it as nourishment into our bodies. On the other hand, the bones of defunct animals, when pulverized and rendered soluble, furnish this element as food to the plants. Thus, a reciprocal process is continually going on between the animal and the vegetable kingdom. The death of the one is the life of the other. In this way, nature is continually reproducing herself. No particle is ever lost, but, in some form, serves to sustain life. It is the province of the agriculturist so to separate, gather and prepare these particles, as to produce the maximum results in all his operations.

Until recently, the bones of animals was nearly the only source of available supply of this material. But of late immense deposits of mineral phosphates have been discovered and developed, so that the supply of this material is no longer attended with uncertainty—no longer subject to the greed of monopolies. Yet, such is the indifference and ignorance of our planters on this subject, that they have quietly permitted manipulators to purchase these ingredients from the miners at small cost, and re-sell them to the farmer under various names and varying compounds, at many times their original cost. We learn from the report of Dr. N. A. Pratt, in regard to the phosphate beds of Carolina, that this mineral deposit covers an area of forty or fifty square miles, varying in depth from six inches to twelve feet. He says: "Near the Ashley river it paves the public highways for miles; it seriously impedes and obstructs the cultivation of the land, affording scarcely soil enough to hill up the cotton rows; and the phosphates have for years past been thrown into piles on the lawns, and into causeways over ravines, to get them out of the reach of the plows." Now in order to produce or evolve phosphoric acid from these mineral phosphates, or from bones, they must first be submitted to a mechanical, and then to a chemical action. They must first be

ground, and then made soluble by sulphuric acid or some other process, such as fermentation in compost, in connection with gypsum or some other substance containing sulphur. The manipulator for his purposes—namely, the sale of the article—can use only the first method.

He is compelled to use sulphuric acid, which is a very costly ingredient. Indeed, enough acid to properly dissolve a ton of phosphate, is far more costly than the phosphate itself. Both methods are open to the planter, and the latter is far preferable, on account of its simplicity and economy. To illustrate, the planter may take a ton of mineral phosphate, which ground and sacked at the mills, will cost from fifteen to twenty dollars per ton, and mix with a ton of gypsum, or land plaster, which ought to cost from fifteen to twenty dollars laid down, and then mix with ten ton of cotton seed, which at twenty cents per bushel are worth \$120, making the whole cost not more than \$160 for the twelve tons. The cotton seed should be dampened before mixing the phosphate and gypsum, so as to produce fermentation. If allowed thus to remain a sufficient length of time the following process takes place: The sulphur in the gypsum having a greater affinity for the lime in the phosphate than the phosphorus has, unites with the lime and sets the phosphoric acid free. This is the identical result which the manipulator accomplishes by the use of his costly sulphuric acid. The above process will not take place, except under fermentation. Any manurial substance which will ferment in bulk as lot manure, will produce the same result as the cotton seed. Thus, the planter may produce his own phosphoric acid and is entirely independent, in this respect, of the manipulator.

Thus it will be seen the planter can produce on his own farm twelve tons of a valuable fertilizer, at a cost of one hundred and sixty dollars, or at about fourteen dollars per ton. If he buys from the manipulator he pays sixty-five dollars per ton, and gets a manure which, pound for pound, is no better than the home-made article. Now, lest some may question these statements, I refer them to a recent work on "American Manures," by Dr. W. H. Buckner, of Philadelphia, which work no planter can read without profit, and to which I most conscientiously refer all persons desirous of investigating more fully all these questions. It has been determined by analysis that cotton seed hull contains, in one hundred parts, 19.90 phosphate of lime. But this, like the mineral phosphate and the bone, though not to so great an extent, is not readily soluble. It will pay the planter to use every available means to render this phosphate in his

cotton seed soluble before manuring with them, if, while doing so, he is careful to prevent the escape of the free ammonia. It is the height of folly in a planter to sell his cotton seed at fifteen or twenty cents a bushel to an oil mill or for any other purpose, and then pay a high price for guano, which, often times, pound for pound, is worth no more than the cotton seed which he has disposed of for a mere song. It is strange indeed that cotton planters have not yet learned to properly appreciate cotton seed as a manure, and how to manipulate them to the best advantage. I am satisfied that if an acre of land is brought up to a proper degree of fertility, and its soil not allowed to be washed away by the rains, that it may be cultivated almost indefinitely in cotton, if all the seed are returned to the land and no cattle are allowed to tramp the land and eat up its foliage. Cotton exhausts land less than any other of the cultivated plants, if nothing is taken off but the lint. But, on account of its clean culture, it leaves it more liable to be damaged by the rains. If, however, the seed is taken off with the lint the land parts with some of the best elements of its fertility. At the close of this address I will append a report on "Cotton Seed Oil and Fertilizers," submitted to the Atlanta Manufacturers' Association, showing the great value of the cotton seed hull alone as a fertilizer. The planter may utilize such bones as accumulate about his premises by pounding them with a hammer after they have lain for a while in moistened ashes, and then remixing them with strong ashes moistened with water, and so continuing the process of pounding, stirring and watering at intervals until all the parts are thoroughly dissolved. A slight inducement to the little negroes, with a plug of tobacco occasionally to the large ones, would cause to be accumulated in one year's time, on any plantation, a pile of bones that would astonish the proprietor.

POTASH.

The next ingredient of a complete manure, which claims our attention, is potash. As every farmer is familiar with this substance, on account of its soap-making properties, it is unnecessary to waste space in its description. It enters largely into the ash of all cultivated plants, thus showing its indispensable connection with their growth and perfect maturity. So largely does it enter into the composition of Indian corn that that plant is denominated by writers on agricultural chemistry as one of the potash plants. It should

be the main ingredient in any manure for the potato. Indeed neither corn or potatoes can be profitably raised on land which does not contain plentifully of potash. All porous, sandy soils, which have been cultivated for any length of time, are exhausted of this ingredient. Its extreme capability of entering into solution with water, and passing off with its flow, or of permeating with it into a porous subsoil, is demonstrated by the common ash-hopper. Clayey soils being more tenacious and less permeable to water, are not so readily exhausted of their potash. Besides, being of a granitic formation, they abound more largely in potash from the outset. May not this be one reason why corn, wheat and Irish potatoes, all of which contain largely of potash, grow to greater perfection on clayey than on sandy soils? On this account, we do not think it so needful that a manure abounding in potash should be used on a soil composed of clay as on a sandy soil. This hint will serve, in some degree, to guide the planter in the selection of his manures. If a soil already abounds in potash it is a waste of money to pay a high price for manure of which it is one of the prime ingredients. Every farmer has noticed the increased vigor with which all cultivated plants grow, especially on a sandy soil, where a brush pile has been recently burned. This is due mainly to the potash in the ashes of the heap. With this knowledge every provident planter will save all the ashes about his premises, both leached and unleached, and apply them near the surface on his corn or potatoes. Whenever *vegetable matter* is plowed in, it adds to the supply of potash in the soil. We will here remark, that vegetable matter, whether green or dry, ought always to be plowed in very shallow. The reason for this is, the more thoroughly organic matter is excluded from the action of the atmosphere the more effectually is its decomposition prevented. This is shown by logs and poles which are found at great depth beneath the surface, and which, when exhumed, are entirely undecayed, and yet a few months' exposure to the air will entirely decompose them. Another reason for the shallow turning of vegetable matter is, that potash and other soluble salts have a tendency to pass, in solution, down to the subsoil. One of the advantages of clover and pea, as recuperatives of soils, is that they send down a deep tap root and bring back to the surface the soluble salts.

But it should rejoice the agricultural world to know, that recently vast mines abounding in potash have been discovered in Germany. Dr. Lee says on this subject, in the July number of that excellent journal, the *Plantation*, that "some

of our readers may be interested to learn that the kaiuit, or salt of potash, so largely imported into this country, is sold at the mines by the Governments that hold the property at eighteen cents per one hundred pounds. A German, familiar with the management, says in the *Country Gentleman*, that 'manipulators and speculators are trying to induce the Governments to sell this mineral still cheaper for their benefit.' We do not blame anyone for trying to make a fortune out of any fertilizer in Europe or America, yet, looking to the interests of farmers and planters, it is easy to see that this potash salt, so desirable on our light, sandy and gravelly soils, should come to our fields with as little commissions, freights, and handling by manipulators, as possible. * * * * The farmers of Georgia and South Carolina should send a competent man to the Government officers who control these saline deposits, buy their kaiuit in first hands, at the mines, and ship it to Savannah and Charleston as cheaply as possible."

We see from the above extract that if the Patrons of Husbandry continue to flourish, as we believe they will, and carry out the objects of their organization to the fullest extent, it will not be long before the cultivators of these sandy soils will be able to obtain this prime article of fertilization at figures reasonable and every whit compensatory.

LIME.

The next ingredient of a complete manure which we shall discuss, is lime. This, like potash, is an article of such common use, that it would seem hardly necessary to describe it, yet how little are its beneficial effects and its proper application in agriculture, understood. The driving of carbon out of limestone by the action of fire, produces quick lime. This will slake, either by the application of water direct, or by absorbing moisture from the atmosphere when exposed for any length of time. In air slaking, lime possesses the property of re-absorbing carbon from the atmosphere, and thus, when spread upon land before slaking is re-converted into insoluble limestone to a considerable extent. When used for agricultural purposes therefore, it should always be slaked in bulk, and better still, with sod thrown over it before spreading. It should also be spread upon the surface after turning the land, and before harrowing. The reasons for this are, that lime always has its best action in connection with the atmosphere. It possesses no volatile properties which escape by being in contact with the atmosphere. Its

tendency is always to percolate downwards, and if turned under remains too deep beneath the surface to benefit the growing plants. Lime, if applied in large quantity, will improve the texture of soils by rendering clay soils more friable and more permeable to the roots of plants, and gives more tenacity to soils too open and porous, thus rendering them more retentive of moisture. Lime corrects the acidity of soils, and is a most wonderful decomposer of organic matter. Too little attention has been paid to lime as a manurial ingredient. As a specific, it may be applied with profit to the pea and clover. Quick lime should never be mixed with any ingredient containing ammonia, as it possesses the quality of dissipating it.

Having now suggested all the important thoughts, which at this time, occur to us in regard to the four ingredients of a complete manure, we will proceed to give a few tables or formulas for the compounding of manures from the raw commercial material, and will then add a few miscellaneous suggestions, together with a comparative analysis of some of the most popular fertilizers of the day, when our work will be finished for this occasion.

It occurs to us here, however, to remark that planters are much perplexed on account of the varying opinions of writers on agriculture and of the practical farmers themselves, to determine the proper depth at which to apply manures. Manures abounding in any of the three elements, potash, lime, or phosphoric acid, should always be placed near the surface, for the reason they are soluble and because of the percolating tendency of water, holding them in solution, they are carried downwards below the roots of plants. It is true, the earth acts as a filterer and purifier of water, but it is only after it has passed to considerable depth beneath the earth's surface, and not even then, that it becomes entirely pure. As, witness, in the midst of densely crowded cities how soon the water in wells and springs become foul and unwholesome. This is mainly attributable to the fact that the water, as it permeates the earth, carries with it from the surface the putrid and saline matters. On the other hand, manures abounding in actual ammonia, as Peruvian Guano, and valuable mainly on account of the presence of that ingredient, should be placed at a good depth beneath the surface; because this gas has a tendency to diffuse itself in the surrounding atmosphere, and tends always, to approach the surface. These hints will serve to guide the planter in the proper application of manures.

We learn from Dr. Buckner's work on "American Ma-

nures," that by taking 1,207 lbs. of ground mineral phosphate of the Carolina productions, and moistening with 289 lbs. of water, and then applying to the mass 553 lbs. of sulphuric acid, that a ton of super phosphate, of the very best quality, may be produced. The cost of such a super-phosphate, including the labor of mixing, would be about twenty-seven dollars per ton. Super-phosphates, of much inferior quality to this, are usually sold to planters at fifty dollars per ton. To the above may be added two hundred pounds of Peruvian Guano, mixed with fifty pounds of gypsum, or instead, two hundred pounds of the crude sulphate of ammonia, with two hundred pounds of the kainit salts; and you have manure which will produce good results upon any crop.

The following receipts have been used with satisfactory results by some on cotton :

Sulphate Ammonia.....	60	pounds.
Nitrate Soda.....	40	"
Land Plaster.....	300	"
Bone Dust.....	200	"
Salt.....	1	bushel.
Ashes.....	1	"

Good earth in sufficient quantity to make a ton.

The above ingredients cost about twenty dollars per ton.

Recipe for making the Chattahoochee Fertilizer.

Sulphate Ammonia.....	60	pounds.
Muriate Potash.....	20	"
Nitrate Soda.....	40	"
Ammoniated Dissolved Bones.....	200	"
Land Plaster.....	300	"
Salt.....	50	"

670 "

Reduce the above to coarse powder and mix 1,330 lbs. dry muck or virgin soil, then pass all through a sieve and put up in barrels, &c., tight, ready for use.

COMPOST.

Landreth in his Rural Almanac, for 1874, says that compost is incomparably the best of all manures for vegetables.

He might have added for field crops also. The only advantage highly concentrated, mineral and acid fertilizers, have over the compost, is in the facility of application. When Southern farmers, however, begin to appreciate the

necessity of contracting the area of cultivated crops, they will learn to attach more importance to compost manure. Below we give a receipt and some directions for the construction and management of a compost heap.

Take four two-horse loads, or 4,000 lbs. barn yard, or stable manure, and the same quantity of *dried* swamp muck, or rich earth out of the jams of fences, &c., or woods mold, and to these add twenty-five bushels, or 750 lbs. cotton seed, mix well together. Then mix *together* well 200 lbs. ground bones and 200 lbs. gypsum, or land plaster, and add to the heap—shoveling all together and cover with a temporary shelter. If there is sufficient moisture in any of the ingredients to produce fermentation (and there usually is in stable manure,) it is not desirable to add any water. Permit this heap to lie several months at least before using—the longer the better as it improves by age. If, after the pile has fermented and cooled off, it is shoveled over, it will improve it. If while tearing down for this purpose, or for use, the free ammonia be found by the smell to be escaping, more gypsum should be added. Let all who deem it too much trouble or too slow a process, to make compost heaps after this style, consider whether or not it is more troublesome and vexatious to do this, than it is to give mortgages on cotton not yet planted for bogus Guanos. A compost after above manner cost as follows:

Lot Manure.....	4,000	pounds.....	\$4 00
Dried Muck.....	4,000	“	4 00
Cotton Seed.....	750	“	5 00
Ground Bones.....	200	“	3 00
Land Plaster.....	200	“	2 00
<hr/>			
Total	9,150	“ Cost.....	\$18 00

Thus four and a half tons of a valuable manure is obtained at a cost of \$4 00 per ton.

The above manure, if tried in the laboratory of the Chemist, will be found to contain as much ammonia and soluble phosphoric acid, and lime, per ton, as many Guanos for which planters pay yearly from \$40 to \$60 per ton, and of necessity will produce as good results in the field.

The making of compost heaps should be a weekly and almost daily employment of the farmer. Little by little, the huge piles should be made to grow. Into these should be mixed not only the stable, hog and cow manure, but the night soil, the dropping of the henery, ashes, leaves, straw, soapsuds, brine and old mortar, and to every load twenty pounds of gypsum.

Nothing connected with the farm—not even the care of the plow-stock—deserves more constant attention than the making of manure heaps.

The amount of manure on hand at planting time, should be regarded as the farmer's capital stock upon which to base his year's operations. The inquiry of merchants in the Spring, when planters are seeking credit, should not be how many acres will you have in cotton, but how much home-made manure will you have to use on your crops? The answer to the latter question will serve as a more correct index to the certain payment of the planter's dues—if that payment depends upon crop results—than any other that could be asked.

Dr. Buckner shows, by his analysis of American manures, that the Watson & Clark Superphosphate, which sells at \$45 per ton, is intrinsically worth to the planter \$16 87 per ton. The planter pays two and a half times what it is worth.

Also, that Rhodes' Superphosphate, which sells at \$50 per ton, is worth to the planter \$8 80; or in other words, \$50 is four and three-fifth times what it is worth.

Also, that Berger & Butz's Excelsior Superphosphate of Lime, which sells at \$50 per ton, is worth \$17 35.

And that the Magnum Bonum Soluble Phosphate, which sells at \$52 per ton, is worth \$17 69.

And that Whan's Raw Bone Superphosphate, which sells at \$52 per ton, is worth \$13 99.

Also, that the Soluble Pacific Guano, which sells at \$50 per ton, is worth \$19 98.

Also, that Baugh & Son's Raw Bone Superphosphate, which is sold at \$50 per ton, is worth \$13 73.

And that E. Frank Coe's Superphosphate of Lime, which is sold at \$52 per ton, is worth \$23 52.

And that Moro Phillips' Superphosphate of Lime, sold at \$50 per ton, is worth \$15 39.

Also, that the Excellenza Ammoniated Soluble Phosphate, sold at \$56, is worth \$34 93.

And that Bowers' Complete Manure, sold at \$52 per ton, is worth only \$9 62.

Also, the Patapsco Guano, sold at \$55 per ton, is worth \$31 25.

And that Needles' Improved Superphosphate of Lime, sold at \$47 per ton, is worth \$2 96.

Also, the Bromophyte Fertilizer, sold at \$40 per ton, is worth the nominal sum of \$3 84.

It will be seen from the above, that the remarks made in

the opening of this address in regard to the impositions practiced upon planters by manipulators, were well founded. The first edition of the book from which these facts were gleaned has been exhausted, and the second edition is now being sold, and yet, so far as the writer of these pages has any knowledge, the proprietors nor the agents of these compounds have not even attempted to controvert the statements. They have acted upon the principle that the least said is the easiest mended.

The author of this address finding that on account of the advertising influence of guano dealers and agents that a pamphlet form was the only channel through which he could arrest public attention, determined hence upon its publication. And he believes that planters especially, and the public generally, will not be wholly unappreciative of his efforts for the public good. If, as is said, "it is sweet to die for one's country," it is certainly pleasant to live and labor in the quiet walks of peace for the advancement of true science and the material prosperity of one's own neighbors and countrymen.

VEGETABLE MOLD.

In the further discussion of this subject it is proper to remark that decaying vegetation on and beneath the surface performs an important, and almost indispensable part, in the growth of plants. In its decay it exerts a dissolving influence upon the surrounding mineral constituents of the soil, and in the form of mold, absorbs and retains the valuable gases—giving them out to plants as needed. It serves, also, to retain moisture and is an excellent antidote against seasons of severe drouths. It serves to create warmth in the soil, and thus produces a more generous growth of plants in the early spring, and checkmates the chilling and unfriendly influence of cold nights and early frosts upon tender vegetation. It is indeed the great conservator, regulator, and modifier of the mineral elements in the soil, and over the sudden changes of the atmosphere and overfloods and drouths. Indeed, it is not safe or advisable to use a highly concentrated and high-priced manure upon a soil (especially if sandy) which has been quite or nearly exhausted of its vegetable matter. With such a manure, on such a soil, some one of the disasters to which crops are liable during a long season and slow maturity, as we have in the South, are almost sure to befall the crops. This, in part, explains why, for the last several years, the old lands of Middle and South Geor-

gia and Alabama seems to be fated to ill luck from some one of the many disasters to which this section is incident. And this is why the same field, under the stimulating influence of a mineral manure, produces good crops one year, when the seasons are all favorable, and the next year treated in the same way and with the same manure, but with unfavorable seasons, produces scarcely enough to pay for the preparation of the land.

Now, if land by a long system of clean culture has been exhausted of vegetable matter, the first step to be taken in its recuperation is to work this vegetation back into it. This may be done in many ways. We will make only one or two suggestions on this point, leaving the planter to his own experience and the suggestions of his own mind in this simple process. In the first place, the growth of small grain, with the straw and chaff returned to the land, followed by a crop of peas plowed in, is in most cases the readiest method. When practicable, leaves and woods mold may be carted upon the land. If the land is to be cultivated before resupplying the vegetable matter, it should be manured with well rotted compost, composed largely of litter and swamp muck, rather than with concentrated fertilizers. If, as is to be believed, merchants and factors fail in 1874 to furnish planters with means to run their farms on the old schedule, they will be compelled to sow a good portion of their lands in grain or abandon them to a crop of weeds. This panic wind will then blow some good to the cotton belt. Providence sometimes compels people to do what they ought to do without being compelled.

It is a waste of time and money to put manure of any sort upon land subject to water sob. The way to treat such land is, first, to drain it if practicable, and then treat it with lime. If not practicable to drain it at reasonable cost, it had better be converted into permanent meadow.

Our farmers have allowed their great haste to become rich, to lead them into many serious and grievous errors. The principle upon which farming in the South has been conducted since the close of the war, especially in the negro belt, is radically wrong. In the general scarcity of money and despondency, which prevails among the farmers of the South, they are but reaping the legitimate fruits of their folly. We have sown to the winds, and we are fast reaping the whirlwind. Instead of setting out, in the beginning, to increase our capital, by permanently enriching our lands, and keeping that object constantly in view, so as to give us the greatest possible margin between the cost of production

and the sale of the products, we have given them, from year to year, exhaustively clean culture, only dosing them occasionally with a little stimulating compound (not a little but a great deal) at an exorbitantly high price. We have cultivated all our lands, both good, bad and indifferent, on borrowed capital, at a high rate per cent., thus making ourselves the slaves of the merchants and capitalists. We have exhausted our lands, so that they are no longer capable of producing remunerative crops. Our young men, seeing the situation, are hurrying off to the West. We have created an unnatural demand for labor, and have thus caused the laborers to demand exorbitant wages.

The remedy for all these evils is not in a change of legislation, not in making war upon legitimate trade, not in quarreling with all the balance of mankind, but let each planter for *himself* go to work to bring his land up to its maximum grade of production. Let him make haste slowly. He cannot do this all at once. Let him recognize the fact that farmers do not loom up into fortune and competency at a sudden bound. Let him consider that farmers do not grow rich so much by the net proceeds of the farm as by the gradual enhancement of the value of his lands. Let him determine that however great the temptation to do otherwise, he will cultivate only such portions of his land as will surely remunerate him for the labor; the balance he will turn out to pasture or to rest, that nature may bring her forces to bear to assist him in its recuperation. The planter cannot improve all his lands at one time; he must take small portions, and expend all his energies upon that. He must study the laws of nature, and learn to direct his efforts intelligently to this end. Life is too short to expend in misdirected efforts, however laudable and legitimate the end sought to be accomplished. We cannot afford to expend time and money experimenting upon matters which science and experience have already determined. Let us, therefore, study the indications of science and acquaint ourselves with its teachings. If we have not the cash means to conduct our operations, let us, nevertheless, run as near upon our own bottom as it is possible for us to do.

Let us keep this cardinal principle ever in view, that whatever is worth doing at all is worth doing well. No planter should be satisfied with mediocrity in his calling. Ambition, when well directed in an honorable pursuit, is a divine principle.

“The following amounts of different crops have been, year after year, raised from an acre of ordinary land, by the

proper application of manures : Wheat, 25 bushels ; rye, 30 bushels ; corn, 50 bushels ; oats, 50 bushels ; barley, 30 bushels, two tons of hay. What has been done can be done again. A *determination to do* and the application of the proper means are all that is required. Only when such crops are raised can farming be said to be a successful and remunerative business. How common is the complaint among our farmers, that after allowing ordinary wages for their own labor, and paying expenses, they do not realize legal interest on the money invested in their land and improvements. This need not, and should not be the case. In many parts of England, more is paid yearly as rent than would purchase land equally as good in this country ; yet these renters not only live well but frequently become wealthy."

The above extract is from Dr. Buckner's work on "American Manures." Our readers will not take offense at our quoting from and referring to so often such an excellent author. Indeed, as we have remarked before, they would all do well to purchase such works, and read and study them much oftener than many of them do their Bibles. Leave the business of creation to take care of itself, and cease to spend your time in hearing and telling news, and reading sensational newspapers. We do not grow wise or learned by such employment. Our time is too valuable to spend in such a way. One such book as the one referred to above, thoroughly read and diligently studied, will add more to a farmer's stock of information about his own business—make him every way more intelligent than all the newspaper reading of a lifetime. What need we concern ourselves about the particulars of the Fisk homicide, or any other like circumstance happening among the high-strung dandies of the day. Yet it is not uncommon to see a knot of farmers, with mouths open, in a listening attitude, while some one reads the minutest particulars of a commonplace incident, which some newspaper reporter has been paid to work up into a sensational style on purpose to catch the attention of such feather-heads. Such practices beget inattention to business, and eventually almost destroys one's powers and taste for investigating properly any subject. It is next to impossible to get an audience of planters together to listen to the discussion of any matter pertaining to farm improvement. Oh ! they say such discussions are dry ! Well, is it any wonder they are dry, to minds which for years have been fed upon nothing but sensational spices and condiments, such as many of the newspapers of the day are wont to furnish. Farmers,

let us be wise, and as we, when we thresh our grain, separate it from the chaff and use only the wheat for the nourishment of our bodies—no more think of filling our minds with chaff than we would our stomachs.

RENTING.

The one-year renting system, as now practiced in the South, is a bad one—bad for the country, bad for the owner of the land, and bad for the renter. It effectually puts a check upon all efforts at improvement. Wherein is the owner benefitted, if he secures two hundred dollars in currency and sustains that much damage to his land? He is simply converting the fatness of his land into money; taking from his principal and adding to his interest pile; taking from his right and putting into his left pocket. This process adds no wealth to the country. It encourages the renter to shiftless habits, which will eventuate in his life-long poverty.

The better plan, by far, is to lease the land for a term of five, or better still, ten years, and obligate the lessee to return the land in, at least as good condition, as at first. Then all the rent charges will be that much good interest to the owner, without damage to his capital. The placing of a written obligation upon the renter to improve the land will serve as an additional stimulus to the fact, that himself will reap the benefit of such improvement. Whenever the one-year rent plan is entered into, the owner of the land should always secure the cotton seed and the manure produced on the place, to be returned to the land.

As germane to this suggestion, we will give below some tables showing the amounts of fertile elements taken off the land by various crops. Twenty-five bushels of wheat, with the straw, takes from the land:

Ammonia.....	51.89	pounds.
Phosphoric Acid.....	26.10	“
Potash.....	35.70	“
Lime.....	13.35	“

These ingredients are worth, at least, one-fourth the value of the wheat. If, therefore, the farmer rents for one-fourth the wheat, he pays for what he gets its full value, and gets no interest on his investment.

Fifty bushels of corn takes from the land, with the stalk and the cob:

Ammonia.....	40.22	pounds.
Phosphoric Acid.....	39.31	“
Potash	74.78	“
Lime.....	18.57	“

Fifty bushels of oats, with the straw, takes from the land:

Ammonia.....	45.25	pounds.
Phosphoric Acid.....	14.39	“
Potash	13.59	“
Lime.....	9.21	“

Fifteen hundred pounds seed cotton takes from the land:

Phosphoric Acid.....	34.6	pounds.
Potash.....	87.6	“
Lime.....	40.6	“

Together with a large percentage of ammonia contained in the seed. The remarks applied to wheat in this connection, are applicable to corn, oats and cotton.

We see from this the absolute necessity of returning to the land each year as much of these elements as are taken from it, if we keep it up to its original grade of fertility. If we do this out of our own purse and yet receive only one-fourth of the proceeds of crops raised on the land, we will soon find there is not much money in the operation. It may be in point here to remark, that land is not exhausted of any one element of fertility so rapidly by varying the kinds of crops from year to year as when cultivated in the same crop for a series of years together.

I now cast this little waif upon the great sea of literature and await with some degree of interest its reception by the farmers of the South. If this slight effort of the author should meet with encouragement, he may be induced to extend his efforts to add to our agricultural literature. I now dedicate this little address, which has cost the author not many hours of labor in its writing, to the hard-fisted farmers of that land which produces the fleecy staple. It is with them, and their interest, he is identified, and it is for their prosperity he is willing to labor to the end.

The author of this address, while presenting its objects to the merchants and business men of Columbus with a view to offer such as desired an opportunity to put in advertising cards, was occasionally greeted with such remarks as these: “Do you think the farmers can be taught anything? Why, they are the greatest set of boobys and asses in the world; they don’t want to know anything else but where they can

buy guano and bacon and corn on a credit." One said, "Why, the guano dealers would pay you more not to publish your pamphlet than you can ever hope to realize out of it otherwise. The farmers haven't enterprise, intelligence and forecast enough to appreciate it." From the manner of others I was led to infer that the dread of the adverse influence of dealers and their agents prompted their action more than the entire planting community. I was led to conclude verily the manipulators, dealers and their myriads of agents are a power in the land when they can close the mouths of business men, control transportation, monopolize the mineral beds, manipulate State officials, throttle the press, and occupy chairs in our agricultural colleges. I became more fully impressed with the importance of the work and determined to press it to an early publication. I make these remarks merely to enlighten farmers as to the estimation in which their conduct, by the all-cotton system, has caused them to be held by the balance of the community. Having lost their money by a speculative system of farming they have lost in influence and public esteem. The only way to regain that influence and esteem, for planters, and the planting profession, which is their rightful due, (for are they not lords of the soil?) is to determine to ask as few favors as possible—mind our own business—keep out of the hands of the sharpers—stand by and encourage one another, and above all, leave speculation to the speculators. Our business is to make food and raiment. The business of our wives and our daughters is to become educated in household duty and domestic economy—not to be making milliners' show-cases of themselves, but to make home happy, and a place to be longed for by their cheerful and angel presence and personal supervision.

It affords me pleasure to call attention to the business cards to be found in this address. To advertise in *this style* in the present stringency, bespeaks for them a liberality in business which planters will do well to note. It shows that though panics may prevail, and war alarms may float upon the breeze, *they* at least, are determined not to furl their sails—determined not to be outstripped in their claims upon public patronage in any respect.

PROTECTION.

That the laws of Georgia are inadequate to protect the farmer from base imposition by Guano manipulators, is apparent from the fact that we have had Guano inspectors, in

high pay, and yet it has been to the people as though no such officers existed. If the laws are not inefficient, then those who have had their execution in charge, have been recreant to a high trust, and should be held to an accountability.

I learn that numerous suits for Guano purchased, have been tried by the Superior Court, now in session in Muscogee county, and have invariably resulted in favor of the plaintiff. For this, the farmer may blame himself. Our laws will protect the purchaser of an article, whenever it can be shown to the satisfaction of the court and jury, that there has been a failure of consideration upon the part of the vendor. But how do farmers undertake to show this? They go into Court and show that the dealer guaranteed nothing, but that, by the testimony of their neighbors and employees, their crop results were not satisfactory. This leaves the matter in such uncertainty, that the Court charges the jury to find for the plaintiff, and the jury so finds. The farmer goes away feeling that the decision of all human tribunals are uncertain—that he has been most wofully swindled—blaming everybody and everything but himself, when he, most of all others, is to blame for the unfavorable results.

Now, if farmers would take the precaution, when they purchase a Guano compound, to require of the dealer a guaranteed analysis, the result would be quite different. If a dealer will not furnish an analysis of his article, it is prima facie evidence of an attempt to defraud. Shun him as you would the pick-pocket. If he will not guarantee his article to be as good as the analysis indicates, it is as though a man would sell you a horse and refuse to guarantee his soundness. Now business is business, and law is law, and when farmers take things on trust, and trust to chance for things to come out right, and when it comes out wrong, then call on the law for protection, they may look to be worsted.

But, says the farmer, the article may be as good as the analysis indicates; and yet my knowledge of chemistry is so meager, I could not tell whether I was paying too much for the article or not.

Just so, but I opine that hardly any chemist in Georgia, if presented with the published analysis and asked his opinion of the intrinsic value of the article accordingly, but would give it freely and candidly, especially if informed that if an analysis became needful, his services for that purpose would be engaged. Druggists would soon, if not already so, post themselves upon the market value of ingredients, if asked by farmers to do so. So that no man need be helpless

in this, except him who is wilfully so. Now then, what about the guarantee? As already remarked, the Courts will protect the purchaser, if failure of consideration is *clearly* shown. Then if crop results are not satisfactory, and the farmer deems himself to have been imposed upon, if he has the guaranteed analysis, and has preserved a sample of the Guano, let him join in with a few of his neighbors, similarly situated, and pay five dollars each to a competent chemist, to have the sample analyzed. Then when he goes to Court he will not need to go on uncertainty—he will not need to drag his neighbors and employees to town to spend weeks in idleness, waiting for the day of trial. Turn the matter over into the hands of your attorneys, and go about your business, never fearing the result. Indeed, under the status of the case, the dealer, rather than suffer exposure, and run the risk of a counter-suit for heavy damages, would rather play quits, and would never dream of instituting a suit. Your case would be gained without the test of law. Now it is easier to do things right than it is to do them wrong. First avail yourselves of the rights you have under the law, and then for what is lacking, amend your law. You are the law-making power; for are you not “lords of the soil?” Talk about the want of protection to a people who rule themselves; nonsense. Are you not men, and are you not free men? Protect yourselves, and if in this you fail, then like the frogs in the fable, ask for a ruler wise enough to rule and protect you.

THE GAIN.

If, through the reading of this pamphlet, the farmer is enabled to obtain for twenty dollars, what would otherwise have cost him \$60, then by an expenditure of twenty-five cents he has saved \$40. Investments of this kind will soon bring farmers out of financial despondency, and wreath their countenances with complacency. If the author could but secure to himself one-tenth part of what he believes would be saved to the general community by the reading and practicing of the knowledge herein set forth, he might say to himself, as said the man in Scripture, “now soul take thine ease, for thou hast much goods in store for many years.” But, whether the enterprize serves to put pennies into his pocket or not, he has already experienced much pleasure in its preparation, and will rest in the consolation of having put forth an honest effort to benefit his kind.

If he has been harsh in his strictures upon certain classes,

it is because the occasion required plain talk. Now let him who dissents from the facts and opinions herein stated, hesitate not to handle them as roughly as he may, for it is by discussion that truth is made to appear. The author's pride of opinion is not so strong, but that he is desirous that truth should prevail, even at the sacrifice of his own theories and interest. So then, gentlemen, you that are of a contrary belief, draw your quills.

Now, kind reader, when you have finished perusing this pamphlet, if you have found merit in it—if it has afforded you instruction and entertainment, do not lend it around to your neighbors, but lay it on your shelf for future and continual reference, and for the instruction and entertainment of your farmer boys. Twenty-five cents is a very small pittance, and the author needs it. Tell your neighbors about it, tell them to do as you have done, go and buy a copy; and I will be ever yours truly.

A. M. BRANNON,

Wholesale *and* Retail Druggist,

COLUMBUS, GEO.

Having had some experience in buying

CHEMICAL FERTILIZERS,

I offer my services to the Planters for any thing in that line.

NEW WAGON YARD!

Conveniently located, near Disbrow's Livery Stable, and East of Swift, Murphy & Co's Warehouse.

Good stalls and shelter for stock, and comfortable quarters for men.

Will pay the highest prices for Dry Hides, Rags, Beeswax, Dried Fruit, &c., at the Yard.

DANIEL R. BIZE, Prop'r.

COLUMBUS, GA.

BEDELL *and* WARE

Wholesale and Retail Dealers in

Boots and Shoes

of all kinds; also

Leather and Shoe Findings.

148 Broad Street, Columbus, Ga.

We make a specialty of the Common Sense Shoe for Farmers, and of the old reliable Virginia Stitch Down. All of our stock was made for our own trade, and we guarantee all goods to give satisfaction. *No wetted goods sold.*

Mr. L. J. HARVEY is with us and would be pleased to see his friends and customers.

W. F. TIGNER, DENTIST,

OVER CHAPMAN'S DRUG STORE,
Randolph, between Broad and Oglethorpe Streets.
COLUMBUS, GA.

Special attention given to the insertion of artificial teeth,
as well as to operative Dentistry.

J. H. HAMILTON,

Wholesale and Retail Dealer in

Bagging, Ties, Bacon, Sugars, Salt,
Coffee, &c., &c.,

Always on hand a full stock of

Plantation and Family Groceries.

Junction Franklin, Warren and Oglethorpe Streets.
COLUMBUS, Ga.

No charge for Drayage.

TIFF. T. MOORE, PHOTOGRAPHER,

At Van Riper's old stand.

Will execute in a manner to suit his customers, all kinds of Sun
Pictures, embracing the Photograph from Carte de Visite to Life
Size, which includes the

PORCELAIN, MEZZOTINTE, REMBRANDT, MEDAL-
LION, VICTORIA, and CABINET CARDS;

Each of which is a beautiful and distinct style of Picture, in the highest de-
gree the art has ever attained. Also the cheap, durable and agreeable ME-
LAINOTYPE, including Ferrotypes, Ambrotypes, Gems and Bon Ton Cards.

All of which will be guaranteed to suit purchasers, at rates as low as any.

WM. BEACH & CO.

96 Broad St., Columbus, Ga.

Dealer in

Hardware, Cutlery, Iron, Steel, Agricultural Implements, Paints, Oils, Glass, Chemical Paint, Castings, Fairbanks' Scales, Hoe's Saws, Rubber Belting, Wagon Material &c

W. H. ROBERTS & CO.

Wholesale and Retail Dealers in

STOVES, HARDWARE,

Wood, Willow & Glass Ware, Crockery &c.

MANUFACTURERS OF

Tin, Sheet Iron and Copper Ware.

109 Broad Street, Columbus, Ga.

Sole Agents for Filley's celebrated Charter Oak Stoves.

JOHN W. BROOKS

DEALER IN

DRUGS AND MEDICINES,

Perfumery, Paints, Oils, Patent Medicines, Glass, Pure Wines and Liquors, Dye Stuffs, &c.

Also sole proprietor and manufacturer of

BROOKS' CELEBRATED CHILL & FEVER PILLS,

and Brooks' Buchu, or "Epping's Buchu Improved."

107 Broad Street, Columbus, Ga.



Wheeler & Wilson

Highest Premium
Lock Stitch

Sewing Machine,

The simplest, cheapest, and best
Sewing Machine in the world.

Over 900,000 now in use.

They are sold fully warranted and
by a responsible Company of known
reputation, and entire satisfaction
guaranteed.

SALESROOM 84 BROAD ST.

COLUMBUS, GA.

W. B. ORR, Agt.

J. I. GRIFFIN,

106 Broad Street, Columbus, Ga.

IMPORTER AND DEALER IN

DRUGS, MEDICINES,

ENGLISH CHEMICALS,

FRENCH PERFUMERY,

And all Articles usually kept on hand by Druggists.

Physicians' Prescriptions Carefully Compounded.

FASHIONABLE MILLINERY.

Mrs. L. A. LEE,

75 Broad St., Columbus, Ga.

KEEPS CONSTANTLY ON HAND THE

Latest Novelties of the Season.

HAIR GOODS, JEWELRY,

AND

Children's Ready-made Clothing.

Orders respectfully solicited.

CIRCULAR LETTER.

H. & M. Pure Soluble Fertilizer A

We are now receiving orders for this Pure Fertilizer for next season delivery, so as to be able to meet the demand.

Col. F. J. MOTT, R. C. PATTERSON, LUTHER W. WALKER, J. S. CLARK, J. KIMBROUGH, L. M. BIGGERS, GEO. H. THOMPSON, and other prominent Planters using it, will kindly answer all inquiries as to its merits.

This Fertilizer, from its analysis, will yield at least eight per cent. more lint than the best manipulated Guano.

Price for Phosphates and Chemicals sufficient to make one ton, \$25 cash.

ISAAC I. MOSES CO.

At old stand of HALL, MOSES & Co.

Or at COLUMBUS IRON WORKS.

Capt. W. JOHNSON;

At Office Central Line Boats, Agent.

COLUMBUS, GA., Aug. 1, 1873.

DIRECTIONS FOR USE.

Take articles furnished (Bag of Chemicals excepted.) 600 lbs. Phosphates and Alkalies. Add 1,000 lbs. stable scrapings or alluvial soils, and 300 lbs. Cotton Seed. The 100 lbs. Chemicals dissolved in 30 gallons of warm water.

Make alternate layers of above articles, and sprinkle each layer with the solution. Pull up in close pile and let stand two weeks; then cut it through from top to bottom, with hoe, until thoroughly mixed. It is then ready for use.

Quantity, 200 lbs to the acre, medium lands. 250 lbs. per acre on poor lands. This will give you the finest Fertilizer now offered in the market, at less money by half, and guaranteed.

ISAAC I. MOSES CO.

COLUMBUS, GEORGIA,

Have now in stock:

SULPHATE AMMONIA,
NITRATE SODA, PHOSPHATES,
LAND PLASTER, GERMAN SALTS.

And will supply all Chemicals for Agricultural uses, of warranted qualities, and at a small advance on Importation Prices.

DR. HOOD'S EUREKA LIVER MEDICINE.

THE BEST IN THE WORLD.

After thirty years' experience in the practice of medicine, I have discovered the best SPECIFIC for LIVER DISEASE ever offered to the public. I will guarantee it to give satisfaction in all diseases arising from a TORPID or diseased Liver. This preparation is not a patent medicine, put up to cure all diseases, but only those diseases which always attend a diseased, inactive Liver—such as Headache, Loss of Appetite, Nausea, Biliousness, Heartburn, Vertigo, Costiveness, CHILL AND FEVER, &c., &c.

The EUREKA is entirely vegetable in its composition. No mercury in it to poison the system; and you will find it will do you more good than Calomel or Blue Mass. It will not make you sick, or gripe you in the least. Ladies who are enciente need not apprehend any trouble by using it. Give it to your children when they have the Colic, or are sick from eating too much, and it will relieve them in a very few minutes.

Below you will find a few of the many certificates sent me by those that have experienced its wonderful curative properties.

TRY IT AND BE CONVINCED. FOR SALE BY

E. C. HOOD & BRO.,
COLUMBUS, GA.,
AND DRUGGISTS AND MERCHANTS GENERALLY.

TESTIMONIALS.

COLUMBUS, GA., March 7th, 1871.

DR. E. C. HOOD—Dear Sir:—I have used your "Eureka Medicine" in my own case, and prescribed it for many others, in every instance reported, with satisfactory results. In disorder of the Stomach and Liver, I consider it a safe, reliable and efficient remedy. Very respectfully yours, &c.,

J. W. PITTS, M. D.

LUMPKIN, GA., June 10th, 1872.

DR. HOOD:—Up to two months ago I was greatly troubled about every month with bilious attacks, and found nothing that acted like the Eureka, although I had taken Simmons' Regulator, Vinegar Bitters, and others. I now have no trouble with biliousness, and unhesitatingly say that the Eureka is the best Liver Medicine in the world.

J. R. CHRISTIAN, Ed. Lumpkin Telegraph.

From Rev. T. T. Christian, Presiding Elder Columbus District.

DR. HOOD:—Having used your Eureka in my family, I cheerfully recommend it to all who may need a good liver tonic. It has given me great relief while suffering from dyspepsia, and from its use my digestion is wonderfully improved.

Yours truly,

THOS. T. CHRISTIAN.

COLUMBUS, GA., January 20th, 1872.

DR. E. C. HOOD—Dear Sir:—It gives me pleasure to favorably recommend your Eureka preparation for disorders of the Liver, Stomach and Bowels. It is an agreeable preparation, and is readily borne by the most delicate stomachs. The public may be assured it is no patent medicine, as it is prepared by Dr. E. C. Hood, who is regular practitioner of medicine.

Respectfully,

WM. W. FLEWELLEN, M. D.

Having tested the virtues of Dr. Hood's "Eureka Liver Medicine" in my practice, I have no hesitancy in recommending its use in those afflictions arising from a disordered state of the digestive organs.

T. F. BREWSTER, M. D.

Columbus, Ga., Sept. 4, 1871.

UPOTOIE, GA.

DR. HOOD:—I obtained a few bottles of "Eureka" from Mr. Clayton. I consider it the best medicine for children I ever used. Indeed it is a first-class family medicine, and I never intend to be without it in my family again. Send me one dozen bottles.

JOHN D. ODOM.

WILLIAMS, PEARCE & HODO,

WHOLESALE AND RETAIL

GROCCERS,

No. 20 BROAD ST., COLUMBUS, GA.

Special Inducements to Grangers.

F. J. SPRINGER,

WHOLESALE AND RETAIL DEALER IN

GROCERIES & PROVISIONS

OF ALL KINDS.

WINES, LIQUORS, CIGARS, &c.

SPRINGER OPERA HOUSE.

Corner Oglethorpe & Crawford streets, Columbus, Ga.

H. F. EVERETT,

DEALER IN

FANCY AND FAMILY

GROCERIES.

Country Produce Bought and Sold.

Corner of Oglethorpe and St. Clair Streets, near the Market.

SPRING VILLA LIME,

MANUFACTURED BY

THE SPRING VILLA MANUFACT'G CO., Lee County, Ala.

The attention of consumers is invited to a consideration of the merits of this new Lime, which, from the "Tests" made during the past Season, has proved itself Superior in "Strength" and "Purity" to any Limes in the country, both for Masonry and Agricultural purposes.

The Top Rock of the Quarry, from which it is taken, burns a dark color, and for all purposes except whitewashing and inside finish is best, analysis showing it to contain *88 per cent. Carbonate of Lime. The Lower Rock produces White Lime and is superior for Whitewashing and last coat of Plastering, making a smooth and beautiful finish. It contains 62 per cent. Carbonate of Lime, possessing Hydraulic Properties.

The Dark Lime is almost equal to Cement and valuable for use in wet and damp places, and requiring from 50 to 75 per cent. more of sand than any ordinary White Lime. The attention of Planters is particularly invited to this Lime, as its great Strength makes it a most valuable Fertilizer and is as superior for Agricultural purposes as for Masonry.

Orders addressed to the undersigned will secure prompt attention. Special Rates secured for Car Loads to all principal points in Georgia and Alabama.

**CLEMONS & JAMES, Gen. Agts.,
Columbus, Ga.**

*We give the analysis of our Lime; also, of the Chewacla Lime by Prof. Mallet, of the University of Virginia:

	Spring Villa Lime.		Chewacla Lime.
	Dark.	White.	
Carbonate of Lime.....	88.15	62.60	53.09
Carbonate of Magnesia.....	7.40	32.91	41.91
Sesqui Oxide of Iron and Alumina..	1.21	2.06	17
Insoluble (Silicious) Residue.....	2.36	1.86	4.39
Organic Matter and Moisture.....	37	24	18
	99.83	99.67	99.74

W. R. KENT,

102 BROAD STREET,

Manufacturer of

Saddles, Bridles, Harness, COLLARS, WHIPS,

And all other goods in that line.

My Goods are of my own make, and made by hand—*Warranted to give entire satisfaction.* My stock is large and complete and for sale at prices to suit the times for small profits. I would be glad to give you an evidence of that fact. My stock consists in part of

SADDLES, &c.	HARNESS, &c.	BRIDLES, &c.
McClellan Saddles,	Buggy Harness,	Riding Bridles,
Texas “	Carriage “	Halter “
Morgan “	Trotting “	Plow “
R. E. Lee “	Rockaway “	Wagon “
Beauregard “	Double “	Buggy “
Stonewall “	Express “	Carriage “
Kent “	Stage “	Round “
English “	Wagon “	TRUNKS.
Shafton “	Lead “	Saratoga Trunks,
Spanish “	Team “	Ladies’ “
Mexican “	Plow “	Gentlemen’s “
Side “	Cart “	Zink “
Boys’ “	Goat “	Sole Leather “
Old Man’s “	Wagon Breeching,	Packing “
LEATHER.	Plantation Harness.	Valises,
Harness Leather,	OIL CLOTHS.	Satchels,
Sole “	Black Enameled Oil Cloth	Carpet Bags,
Upper “	Fancy “	Girths,
Calf Skins,	Imitation Mahogany “	Plow Hames,
Kip Skins,	“ Marble “	Wagon “
Sheep Skins,	Mole Skin Oil “	Buggy “
Enameled Leather,	Rubber Buggy Aprons,	Back Bands,
Dash “	“ Army Blankets,	“ Band Hooks,
Patent “	“ Cloth,	Plow Chains,
Wagon Lines,	Horse Blankets,	Wagon “
Buggy “	Lap Robes,	Halter “
Carriage “	Buggy Umbrellas,	Breast “
Plow “	Feather Dusters,	Plow Collars,
Bridle Reins,	Horse Brushes,	Wagon “
Shoe Thread,	Main and Tail Brushes,	Buggy “
Saddlers “	Curry Combs,	Carriage “
Saddlers Silk.	Fancy Dog Collars.	Halters.

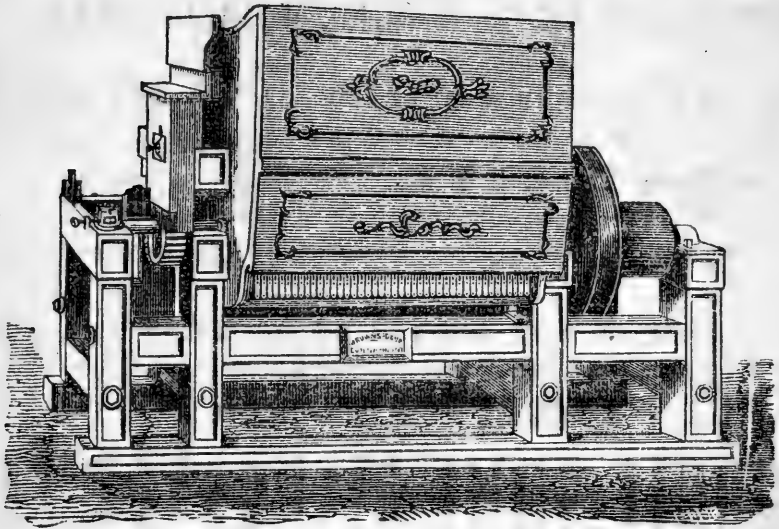
SADDLERY AND HARNESS HARDWARE OF ALL KINDS;

CARRIAGE TRIMMINGS. SHOE FINDINGS, &c.,

Saddle, Harness and Shoe-Maker’s Tools. I repair Saddles, Harness, Trunks &c., at low rates, and take orders for all kind of new work. I pledge myself to duplicate any Northern Bill.

W. R. KENT.

TAILOR COTTON GIN.



MANUFACTURED BY

W. G. CLEMONS,

Successor to W. G. CLEMONS, BROWN & Co.

COLUMBUS, GA.

This Gin has no superior for *Speed, Light Draught,*
and *Good Sample.*

Orders addressed to the undersigned will meet with
prompt attention.

W. G. CLEMONS.

Office on Oglethorpe street,
Next door to the Episcopal Church.

December, 1873.

GEORGIA HOME SAVINGS BANK, COLUMBUS, Ga.,

J. RHODES BROWNE,

President.

GEO. W. DILLINGHAM,

Treas'r.

Receives Deposits in sums of One Dollar and upwards, allowing interest at the rate of 7 per cent. per annum, compounded **Four Times a Year.**

By the terms of the Company's Charter, the entire Property of the Company, and the private property of the Stockholders, is pledged for the obligations of the

SAVINGS BANK.

INCORPORATED 1859.

GEORGIA HOME INSURANCE CO., COLUMBUS, Ga.

Capital and Assets \$500,000.

J. RHODES BROWNE, Pres.

S. S. MURDOCH, Sec'y.

GEO. W. DILLINGHAM, Treasurer.

Offers indemnity against loss by fire on all classes of insurable risks, at adequate rates.

LOSSES PAID IN 14 YEARS \$950,000.

GEORGIA HOME BANK COLUMBUS, Ga.

J. RHODES BROWNE, Pres.

GEO. W. DILLINGHAM, Cash'r.

TRANSACTS A

GENERAL BANKING BUSINESS,

Receives Deposits.

Buys and sells Exchange, Bonds, Stocks and Coin.

Collections made on all accessible points, and immediate returns made, without charge beyond the current rate of Exchange.

The Patapsco Guano Co's

AMMONIATED SUPER-PHOSPHATE

In again calling the attention of our friends and patrons to the above Fertilizer, for which we have been the General Agents at Columbus during the past six years, we desire to say that the article offered by us the coming season will, if anything, be superior to what we have heretofore sold. Dr. Liebig, the manufacturing chemist of the Company, has labored each year to make such alterations or additions as *practical tests* in different sections of the country have suggested, and we feel safe in asserting that those of our patrons who have purchased yearly from us will bear out our statements.

At the commencement of a season, during which purchasers will, to a certain extent, be guided in their selections by *the prices* of articles offered, we would say that the Company we represent are influenced more by a determination to maintain the high reputation of their Super-Phosphate, than a desire to place a *cheap article* upon the market; and that while we yield to none in the superiority of our Fertilizer, we do not propose as dealers to compete, offering *the special inducement of low prices*.

Owing to the increased demand last season we were compelled to disappoint some of our friends. We expect this winter to command a sufficient supply to meet the wants of the trade, and will be prepared to offer the usual discounts and accommodations to wholesale dealers, as well as to fill promptly orders for small lots. Since last season we have removed our office from Gunby's building to the warehouse formerly occupied by Mr. Wm. H. Young, on Oglethorpe Street, next to the Episcopal Church, where we will be pleased to see our friends.

CLEMONS & JAMES, Agents.

Columbus, Ga., December 1st, 1873.

HOME MADE FERTILIZERS.

Pure Chemicals at Lowest Rates!!!

VIZ:

Sulphate of Ammonia.

Muriate of Potash.

Nitrate of Soda.

Ammoniated Dissolved Bones.

Nova Scotia Land Plaster.

Bone Superphosphate of Lime.

And all other ingredients for making Fertilizers.

Purchase early and Manipulate at Leisure.

Materials for making one ton, according to well tested formulas, from \$10 to \$25. Mixed with vegetable matter, cotton seed, rich soil, or stable manure, makes a more reliable fertilizer than can be bought for three times the amount.

Formulas for mixing supplied to our customers.

TERMS CASH.

Address

HOLSTEAD & CO.

**Agricultural Depot,
COLUMBUS, GA.**

I Never Speculate—Steady Receipts suit me best.

No man can become wealthy who puts his money where it earns nothing.

It is poor economy to make money and then bury it.

A deposit of \$5 per week in The Savings Department of the Eagle and Phenix Manufacturing Company will produce in five years \$1,754 10; in ten years \$4,111 60; in fifteen years \$7,279 60; in twenty years \$11,537 28. Amount deposited in twenty years \$5,200; accumulation of interest \$6,337 28.

Eagle & Phenix Manuf'g Co.,

Columbus, Ga., has over \$1,650,000 assets above and beyond every debt of any kind it owes. All this is pledged by Special Act of Legislature, and all the Private Property of 243 wealthy Stockholders is likewise pledged for the protection of Depositors and and those holding Certificates of Deposit.

Deposits can be drawn without notice.

Seven per cent. interest is paid, compounded four times a year.

TO SAVE IS TO GROW RICH.

Little and Often Fills the Purse.

If you would Know the Value of Money, go try to Borrow some.

Economy is the Mother of Wealth; Interest is its Life Blood.









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