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.

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From the Richmond Whig.

Address of Hon. A. H. H. Stuart before the Central Agricultural Society of Virginia, at Richmond, Oct. 28th, 1859.

Mr. President and Gentlemen of the Virginia Central Agricultural Society:

In obedience to your request, I appear here to-day, to speak to you in behalf of the agricultural interests of our State. Although distrustful of my ability to offer anything worthy of the occasion, or calculated to interest or instruct the enlightened audience which now surrounds me, I am encouraged to make the attempt, by the conviction, that the same spirit of courtesy which prompted your invitation will induce you to look with indulgence on the imperfections of my discourse.

In preparing for the discharge of my duty, the first difficulty I had to encounter arose from the magnitude of my subject, and the multiplicity of its relations to the other great interests of society. It presents itself in so many and such attractive aspects, as to create embarrassment, in making a selection of those most appropriate to the present occasion.

I know that it is customary, at anniversaries like the present, to speak of the importance of agriculture, as one of the great interests of Society;—to trace its history and progress;—to discuss its relations to the natural sciences;—to explain the diversities of soil, and the systems of cultivation appropriate to each;—to indicate the proper rotation of crops, and the best means of augmenting production;—to descant on the charms and benificent influences of rural life, and to bestow merited praise, on the public spirited projectors and patrons, of associations like that which I now have the honor to address.

Either of these topics would present a theme alike attractive and instructive, but, for reasons which I have deemed satisfactory, I propose, on the present occasion, to pass them all by, and to devote the hour that is allotted to me to the development of some practical views of the relations of agriculture to the other great industrial interests of our country.

It is unquestionably true that Agriculture is the most important interest of society. It is the principal source of production, and is, therefore, the basis of all other interests. It supplies the raw material for a large proportion of our manufactures, and infuses life and activity into all the operations of commerce. It gives occupation to

a larger per centage of our population than all others combined. But it is not an isolated interest. It cannot prosper alone. It is intimately connected with other interests, and its success or failure is, in a great degree, to be measured by the condition of those interests.

He who limits his views of agricuture to production only, can have but an imperfect idea of the subject. He has looked at it in but one of its aspects. To comprehend it fully, he must embrace a much wider field of enquiry and understand, not merely how the earth can be made to yield its richest returns to the husbandman, but, also, how those returns can be made most available for his comfort and happiness.

Of what value is production, without consumption? Of what use are abundant crops, unless some fair equivalent can be obtained for the surplus over the wants of the producer?

A correct view of the agriculture of a country, therefore, must embrace the consideration, not only of the modes by which the largest crops can be raised, but also of the means by which they can be best disposed of; or, in other words, how the best markets can be provided, and the best prices maintained.

The function of agriculture is to produce —of manufactures, to convert—and of commerce, to exchange. And, as it is obvious that a large portion of the productions of the soil are comparatively of little value, until they have been converted, by the processes of manufacture, into new forms, and the surplus has been exchanged for such commodities as the producer may need, it follows, as a necessary consequence, that there must be an intimate relation between agriculture, manufactures, and commerce.

It will readily be conceded, that if all the labor of the world was directed to the production of food, the surplus, above the wants of the producers, would be of little or no value, because there would be no demand for it. As every one would raise enough for his own use, he would not find it necessary to look to his neighbor for a supply. The surplus above the wants of the farmer would therefore be useless, and left to perish in the fields in which it was produced. To give value to it, a demand must be created for it. In the absence of such a demand it would soon cease to be produced. This demand can be created only by multiplying the occupations of the citizen, or, in other words, by withdrawing a portion of the population from the production of food and directing their labor to other pursuits. When this is effected a demand is created, proportioned to the number of laborers, who are thus rendered consumers instead of producers, and the foundation is laid for the interchange, between the different classes of laborers, of the fruits of their respective branches of industry. This interchange constitutes, in the first place, the barter,—and, in the more advanced stages of its progress, the commerce of the world.

The prosperity of the farming interest, then, depends upon the preservation of the proper relation between production and consumption. If an over proportion of the people are engaged in production, the supply will exceed the demand; the market for the products of the soil will be depressed; and the interests of agriculture must languish. If, on the other hand, occupation can be given to a large portion of the population, in the mechanic arts, in manufacturing, in mining, in navigation, and in commerce, the demand for the fruits of agriculture will be increased; their prices enhanced, and the farmer must prosper.

The benefits resulting from this division of labor are two fold. It tends, not only to enhance the price of what the farmer has to sell, in consequence of the increased demand for it, but also to cheapen what he may have occasion to buy, because of the increased competition among those who furnish such commodities as he may need.

These are elementary principles of social economy, which are, theoretically, familiar to every intelligent man. But, unfortunately, they are too much neglected in practice. I hope, therefore, I shall be pardoned for presenting them in their simplest form, as they have an important bearing on the line of thought, to which I wish to direct your attention

Whether the proper relation exists in Virginia, and the United States, between production and consumption, is a question which deserves your most serious consideration. The intelligent superintendent of the census of 1850 estimates that three-fifths of the adult population of the United States are engaged in the cultivation of the soil, and the statistics of our own State show that near one half of the adult male population are farmers, or in other words, producers of

provisions. In the term farmers, I do not include hired laborers, who are employed on farms, but only the independent proprietors or tenants, who cultivate separate farms.

The census tables of 1850 show that the whole number of white adults, in Virginia, engaged in the various professions and occupation, at that date, was 226,875. Of these, 106,807 were farmers, 46,989 laborers, 1,374 planters, and 3,747 overseers.

These figures would seem to indicate that too large a proportion of our people are engaged in the production of food; and the present low prices of almost every article of provisions confirms this impression. A larger quantity is produced than can be sold for remunerative prices. Every improvement which may be made in the system of farming will tend to a still further depression of prices, by increasing the supply. And when we contemplate the rapid settlement, now in progress, of the almost boundless grain-growing region of the Northwest, a region of unparalleled fertility, we must acknowledge, that the prospect is, by no means, encouraging to the farmer. High prices, in this country, have always been the effect of a foreign demand. This demand will always be, as it has been, fluctuating; for it depends, not only on natural causes, such as the failure of crops abroad, but upon political events which may disturb the tranquility of Europe. American farmers are, therefore, compelled to look more to the condition of things abroad than at home, in making their estimates, as to the breadth of land they shall seed, and the probable prices they will receive for their crops.

This fluctuation of prices is one of the most serious evils that can befall any country. It unsettles the value of every species of property. When prices are high the tendency is to speculation, to incur debt, and to form habits of expenditure, which, although they might not be deemed extravagant, if high prices were to continue, must prove ruinous, when, by some change in the policy of the great powers of Europe, or other cause, the foreign demand is cut off, and prices sink to their natural level.

The enquiry then forces itself upon our attention, how is this evil to be corrected?

The most effective remedy that I can suggest is, to diversify the occupations of our people; to withdraw a large number of them from agriculture, and to direct their labor to other pursuits; to build up home manufactures, to stimulate the development of our mineral resources; to encourage domestic commerce, and all the mechanic arts, and thereby create a demand for the products of our farms at home. By adopting this policy we will diminish the number of producers, —increase the number of consumers—and make some progress towards the establishment of a more just relation between the supply and demand.

And here, to prevent misconstruction, I wish to say in advance that I do not propose, upon an occasion, and before an audience like the present, to enter into a discussion of any of the controverted questions connected with the jurisdiction of the federal government over this subject—whilst I entertain very decided opinions on these questions, and have not hesitated, under suitable circumstances, to express them, I desire carefully to abstain from introducing into this discourse anything that could offend the sensibilities of the most fastidious, or be regarded as invading a field, which, unfortunately for the best interests of the country, has been dedicated to partizan strife.

When, therefore, I speak of the encouragement of domestic industry, I throw out of view, for the present, any legislation by Congress directed to that end, and limit myself exclusively to such encouragement as can be afforded by the enlightened enterprise and public spirit of our own people, aided by the co-operation of our own General Assembly.

No one will deny that every furnace, and forge, and foundry—every woolen, and cotton and tobacco factory,—every shop for the manufacture of shoes, and clothing, and saddlery,—every mine that is opened,—every house that is erected,—every ship that is built,—in a word, every enterprise that gives mechanical employment to our people, tends to promote the interests of the farmer, by increasing the demand for what he has to sell.

Let us, then, for a moment survey the extent of the field which presents itself for the employment of the labor of our countrymen.

The statistics of our foreign commerce show that the aggregate value of merchandise imported into the United States in the year 1858 was, in round numbers, 282 1-2 millions of dollars, and in 1857, 360 3-4 millions of dollars. If we analyze the tables, it will be found that of this latter

amount, about 100 millions worth could be produced, and ought to be produced, in our own country, by the labor of our own people. For example, we import of—

Copper, in various forms,	$3,617,000
Iron,	15,209,000
Lead,	2,305,000
Paper,	597,000
Gloves,	1,559,000
China and Earthenware,	4,037,000
Linseed,	3,003,000
Wine, in Casks,	2,448,000
Wine, in bottles,	1,825,000
Brandy,	2,527,000
Grain Spirits,	1,125,000
Molasses,	8,250,000
Sugar, brown,	42,614,000
Sugar, white and loaf,	154,000
Tobacco,	1,358,000
Cigars,	4,221,000
Salt,	2,031,000
Coal,	772,000
Glass,	1,166,000
Making an aggregate of	$99,819,000

Virginia alone could supply the iron, coal, copper, lead, salt, tobacco, glass and kollyrite for china and earthenware for the whole Union. Louisiana, Florida and Texas ought to produce the sugar, molasses and rum; and other States should produce the wine, brandy, distilled spirits, linsced, and many other articles now imported, in quantities sufficient for the consumption of our population. And yet, with a climate and soil adapted to the growth of all that we need, except tea, coffee and spices;—with mountains and valleys filled with iron, and coal, and salt, and copper, and lead, and gypsum;—we leave them all but partially developed, and draw our supplies from foreign countries!

An apt illustration of Virginia policy is to be found in an incident, which will probably be remembered by many of the inhabitants of this city, as it occurred within a short distance of the spot on which I now stand.

About twenty years ago, it became necessary to erect a banking house in Richmond for the use of the Exchange Bank, then recently incorporated, and although the structure is probably erected on a stratum of granite, and certainly stands within a mile of the finest granite quarries in the Union, the granite of which it is constructed was imported from Quincy, in the State of Massachusetts!

If the articles which I have enumerated among the imports were, as they shoud be, produced in the United States—if the laborers necessary to produce them were consumers instead of producers of provisions, it is easy to perceive what an increased demand would be created for the breadstuffs, live stock and other products of our farms. An ample and a steady market, would spring up at our own doors, for everything we have for sale, and prosperity and comfort would spread through all our borders.

But this view of the interest of the farmer, in the growth of domestic manufactures, and in the home market which they supply, would be very imperfect without a reference to other aspects of the subject.

The prices of all commodities are regulated, not only by the laws of supply and demand, but, also, by the condition of the currency. Gold and silver are, by our Constitution and laws, the measure of value. It is of the highest importance that this standard, by which the value of other commodities is estimated, should itself be stable and uniform. Every one would understand, at a glance, the evils that would result from having a fluctuating standard of weights and measures, and the injustice of allowing parties to contract according to one standard and to fulfill the contract by another. The injustice, in this case, strikes the mind because the standards—the yard-stick, the pound weight, and the bushel,—and the subjects to which they are applied, are material and tangible. But the fluctuations in the measure of *value*, though less apparent are not less real nor less injurious than fluctuations in the measure of *quantity*. If a party were to contract to deliver, at a future day, a hundred bushels of wheat, which, according to the present standard, would mean a quantity sufficient to weigh 60 hundred pounds, it would be iniquitous to allow the seller, when the day for the delivery arrived, to discharge his obligations by tendering a quantity that would weigh only 40 hundred; or, to compel him to deliver a quantity that would weigh 80 hundred, in payment. This would be palpable to the meanest capacity. Yet, how few realize the fact, that equal injustice is constantly being practised, in consequence of changes in the measure of value. In times of prosperity, when the balance of trade is in favor

of the United States, gold and silver are accumulated in the country. Like every other article of commerce, their value is affected to a great extent, by the ratio between the supply and the demand. When the supply is increased, the demand remaining the same, the value is diminished, and on the other hand, as the supply is diminished, the value is increased.

Let us now look at some of the practical effects of these fluctuations in the supply and value of the precious metals on the contracts of men. If a farmer contract a debt of $1,000 to-day, when wheat is worth $1 per bushel, he can discharge his debt by transferring to his creditor 1,000 bushels of wheat, or the price for which he can sell it. But, suppose he contracts a debt of that amount, payable in one or two years, and, in the meantime, the balance of trade has turned against the United States,—a rapid exportation of specie has taken place, and the quantity in the country is reduced one-half. It is plain, that the value of gold will have appreciated nearly in an inverse ratio to the quantity left. The measure of value will have changed; one dollar will now buy what it would have required two dollars to buy the year before; and the farmer will now have to give two thousand bushels of wheat, or its price, to pay the debt, which one thousand bushels would have paid, at the date of the contract. Thus, by a change in the condition of the currency, his debt is substantially doubled, because it requires double the amount of property to pay it.

We had many striking illustrations of this proposition during the commercial revulsion of 1857. In that year, our imports greatly exceeded our exports, and it became necessary to send abroad a large portion of the coin of our country, to pay our foreign indebtedness. Heavy drafts were, accordingly, made on the specie in general circulation, and on the reserved stocks in the banks. These drafts were, for a time, promptly met, but at length they became so onerous, that the banks were compelled to suspend specie payments. A panic soon followed, credit was prostrated, those who had money hoarded it, and debtors found it almost impossible to obtain coin, to discharge their obligations. Gold was nearly doubled in value, and those who were fortunate enough to have it were enabled to buy Virginia State bonds at $54 per share of $100, and all other property at similar rates of depreciation. The debtor, therefore, who relied on the sale of Virginia stocks or other property to meet his obligations, found himself under the necessity of selling twice the quantity he he had anticipated to pay his debt. And the mischief was aggravated by the fact, that the loss in all such cases, fell on those least able to bear it, and the profit accrued to the capitalist and the speculator.

These revulsions in our monetary system have been of such frequent occurrence, and have been attended with such wide-spread ruin, that it is time public attention should be directed to the discovery of the appropriate remedy. In my judgment they can only be averted by making more at home, and buying less abroad. We should incur no foreign debt which the exports of our own productions will not pay. We should keep our gold and silver at home, and thereby maintain the stability of the standard of value. If it is to fluctuate at all, it is better that the fluctuation should be in favor of the debtor than the creditor—by a depreciation in value, caused by too large a supply of gold and silver, than by a rise in consequence of a scarcity. This policy commends itself, especially, to the favor of those who are inimical to the extravagant system of credits, which has prevailed in our country. It will certainly tend to impose wholesome restraints on it by giving the creditor to understand that deferred obligations will probably be discharged in a depreciated currency.

An abundant supply of gold will also serve to develop new sources of wealth, and to stimulate industry and enterprise in every department of business.

The present is an auspicious time for the investigation of the subject, in all its relations and bearings. We are just recovering from the effects of one commercial crisis, and unless all the signs of the times are fallacious, we are fast drifting on to another. The importations of the present year promise to outstrip in amount those of 1856–'7. Already the clouds that indicate the approaching storm are visible in the horizon. Heavy indebtedness has been incurred, and there is no foreign demand for our breadstuffs Cotton will go far in liquidation, but it will not suffice to discharge it. Larger shipments of specie have commenced. The measure of value is being rapidly contracted, and prices have fallen, and will continue to fall, until they sink below the European

level. The gold and silver, which should be employed at home, is going abroad to pay for articles which ought to have been manufactured at our own doors.

Let us refer, for a moment, to the statistics of the import and export of the precious metals. The export of specie from New York and Boston alone, in the first eight months of the present year, amounted, in round numbers, to fifty-seven millions of dollars. The receipts from California and all other sources, for the same period, were about twenty-eight millions. The difference, twenty-nine millions, has therefore been drawn from the banks and the general circulation of the country.

On the 1st of January last, the banks of New York held about twenty-nine millions of specie, and at the close of August they held twenty-one and a-half millions. They lost, therefore, in the period referred to, but seven and a-half millions, and the difference between seven and a-half and twenty-nine millions, equal to twenty-one and a-half millions, must have been drawn from the general circulation, or, in other words, from the pockets of the people.

The farmers, in common with all other classes of society, but to a greater extent than any other, are now feeling the effects of this drain of the circulating medium from the country. The drafts are made, primarily, on the commercial cities. They, in turn, draw on their debtors in the interior. As long as the supply from this source continues, the commercial centres can maintain their standing, but when it is exhausted, suspension and bankruptcy, and all the evils which follow in their train, are inevitable.

The whole supply of coin in the United States was estimated, by the Secretary of the Treasury, (Mr. Guthrie,) in his report to Congress on the finances, in 1856–'7, at from ($200,000,000) two hundred millions of dollars to ($250,000,000) two hundred and fifty millions. If the export shall continue to exceed the import as it has done in the last twelve months, it is plain that it will not require many years to exhaust the stock on hand. Need I pause to comment on the countless mischiefs that would result from such a condition of things?

When will our farmers begin to comprehend their true interests, and to adopt the measures necessary to protect them? When will they learn that their prosperity is intimately—nay, indissolubly—associated with the manufactures, and the commerce, and the currency of the country? When will they understand that every dollar of gold and silver exported from the United States contracts the scale by which the prices of of their productions are to be regulated?

Gold is the medium of commerce, as well as the measure of value. By its agency all the exchanges of the subjects of commerce are effected. Withdraw gold from the country, and you at once depress the value of property—paralyze the arm of industry—stagnate the channels of commerce, and prostrate the interests of agriculture.

I proceed now to the consideration of the second topic to which I propose to invite your attention, viz: the relation of agriculture to the labor of the country.

In treating this branch of my subject, I do not propose to limit my observations to the labor which is directly employed in agricultural pursuits, but to present a brief review of its relations to the whole system of American labor, in all its departments. And, in this connection, I desire to make some remarks on the two systems of labor, free and slave, which exist in the two great geographical divisions of our confederacy; and to enquire whether it be true, as has been asserted in various quarters, and on high authority, that there is an inherent, necessary, and continuing antagonism between the two systems.

As preliminary to this enquiry, it may be proper to glance at the origin of the system of slave-labor in the United States.

History informs us, that more than a century elapsed, after the discovery of America, before any successful effort was made to establish permanent settlements of the white race on the eastern coast of our country. The first Colony was founded at Jamestown, in 1607, but for many years it had to struggle against such discouraging difficulties, that it barely maintained a precarious existence. A few years later, the Pilgrims landed on Plymouth rock, and, by degrees, sparsely populated Colonies spread themselves along the coast, from Maine to Georgia. The dangers and privations incident to the settlement and subjugation of a new country prevented rapid immigration to it; and, notwithstanding the strong inducements that were offered, in the form of liberal grants of land, the growth of the Colonies was, by no means, satisfactory to those interested. The number of laborers was in-

adequate to the efficient settlement and cultivation of the fertile lands. To supply this demand, the Mother Country, about the year 1620, resorted to the expedient of introducing into these Colonies a class of involuntary immigrants, in the persons of Africans, who had been captured in the wars between hostile tribes, in their native country, and according to their usages, sold into slavery. This policy was approved and practised by the Colonies for more than a century.

At the date of the declaration of our national independence, this system of involuntary servitude, or slavery, had become engrafted on the institutions of all the Colonies. I use the term *all* the Colonies, advisedly; for, although an impression has very generally prevailed, that slavery never existed in some of the New England States, the fact is otherwise, as may be seen by reference to the census tables. According to the census of 1790, there were 158 slaves in New Hampshire, and 17 in Vermont, and the official returns of 1830 show that there were slaves at that time in every New England State, except Vermont.

At the commencement of our national existence, therefore, a compound system of labor—partly free and partly slave—pervaded the whole confederacy.

This system continued, in all the States, until the drudgery of subduing the primeval forests, and clearing the country for cultivation and comfortable habitation, had been accomplished. Then the citizens of the northern and middle States began to turn their attention to other branches of industry, and the discovery was soon made, that while negro labor may be profitably employed in pursuits which require mere physical strength, it cannot compete, successfully, with white labor, in those avocations in which skill, ingenuity and intellect, constitute important elements. Experience also demonstrated, at an early day, that the negro race were physically unfitted to endure the rigors of a northern climate. These considerations led to a general conviction, in the Northern Colonies, that negro labor was unprofitable, and induced them to adopt measures to rid themselves of the incumbrance of an unproductive population.

And here, it may be instructive to pause, and contemplate the means by which that object was accomplished.

Some of our brethren of the North are disposed, like certain of the Pharisees of old, to thank God "that they are not as other men are," and to assume to themselves and their States great credit for disinterestedness and benevolence in liberating their slaves. I am as little disposed as any other man to withhold from them the praise to which they are justly entitled, for their many acknowledged virtues. I take pleasure in bearing testimony to their intelligence, integrity, industry, frugality, public spirit and general benevolence. But, respect for the truth of history constrains me to deny their right to be regarded as the benefactors of the negro race.

A general impression prevails, both in the North and South, that the people of the Northern States, influenced by a generous spirit of philanthropy, and a noble devotion to the cause of human liberty, voluntarily emancipated their slaves, by legislative enactments. If their legislation had been such as is generally supposed, it might well be questioned, how far it would establish their just claim to any high degree of merit, in a moral point of view; because, as I have already stated, it had become manifest, before any such laws were adopted, that the slaves of the Northern States were a burthen, rather than a benefit. The policy of those States might, therefore, be fairly attributed, rather to a disposition to rid themselves of an ignorant, improvident and unprofitable population, than to a desire to do justice to a "down-trodden" race.

But what are the facts of the case. My professional duty has led me to investigate the legislation of some four or five of the Northern States, on the subject of slavery; and I have yet to find a law of any one of them, by which a single slave has been made free. I think I may safely challenge the production of any such law, from the archives of any Colony or State of this confederacy. This is a bold proposition, but I believe it to be true. As far as I have observed, the whole system of Northern legislation has been directed, not to the emancipation of slaves, but to the removal of the slave population beyond their limits. All their laws on the subject were prospective. None of them, as far as I have been able to discover, operated to confer freedom on the slaves in being. They simply provided, that the offspring of female slaves,

who should be born within the jurisdiction of the States passing such laws, after specified dates, should be deemed free. All who were slaves at the time remained slaves. The laws were intended to operate only on the after-born children, and the rights secured to these were altogether contingent, and could never vest without the concurrence of the owner of the female slave. There was no prohibition of the removal of the females. If the owner thought proper to retain them in the State which had adopted such laws, her offspring, born after the appointed day, became free. Freedom, therefore, even to the after-born children, was not the effect of legislation alone, but of legislation and the concurrent action of the master, in retaining the female in the State, until the law could take effect on the children. Without the consent of the master, indicated by retaining her in the State, until after the prescribed date, the law would have been inoperative.

It requires no great sagacity to see that this is the whole object and tendency of their legislation, as I have already stated, not to the emancipation of slaves, but their removal to other States. It amounted, simply, to a notice to the owner to sell his female slaves before a given day, under penalty of forfeiting her increase. The practical effects were such as might have been reasonably anticipated. The owners of the females took especial care to sell them southward before the laws took effect, and in this way the unprofitable slaves were transferred to the South, where the climate was more propitious, and the productions better adapted to their peculiar capacities for labor.

This view of the effects of these laws is strongly fortified by facts derived from the census tables. We have no authentic means of ascertaining the number of slaves in any of the States, prior to 1790, and we cannot, therefore, institute all the enquiries which we might desire, but we do know that the policy of removal, miscalled emancipation, was adopted between 1776 and 1790, and was in full operation at the latter date. A reference to the census of 1790 shows, that the whole number of free negroes in the nine Northern States (including Maine) at that date, was but 27,109. The fact that the number of free negroes in those States was so small, in 1790, is very persuasive, at least, to prove, that under this much lauded system of legislation, freedom accrued to a very small proportion of the slaves of the Northern States. Much the larger number were sold to the people of the South, and the descendents of those slaves, now held under the warranty of title given by Northern venders, constitute a large portion of the slave population of the Southern States; and the purchase money paid for them by citizens of the South, contributed, in no small degree, to build up the manufactures and commerce of the Northern and Middle States.

It is also instructive to observe how the anti-slavery legislation of the North has kept pace with the increase of the growth of the great staples of the South.

It was not until the latter part of the eighteenth century, after Hargrave and Arkwright had invented the spinning-jenny and Whitney the cotton-gin, that cotton became one of the important crops of the Southern States. As late as 1794, when Gen. Pinkney, of South Carolina, enumerated to John Jay the exports of South Carolina, cotton was not included in the list.

The inventions of the great mechanics, above referred to, gave a vigorous impulse to the culture of cotton, and it has now become the most important article of American commerce.

Cotton is an article peculiarly adapted to negro labor. Its culture is simple, and requires but little skill. It can be produced profitably only in the Southern States, where the almost vertical rays of the sun, and the debilitating influences of the climate, render it impossible for the white race to perform the labor necessary to till and secure the crop. The physical peculiarities of the negro, on the other hand, fit him admirably for the work. Created with a system of pores and glands adapted to the tropical climate of his native country, he thrives and grows strong under the sultry heat of the planting States, which would cause the most athletic of the Caucasian race, to sink into hopeless prostration.

When cotton became an important crop in the South, it opened a wide field for negro labor, and created a large demand for negro laborers. The opposite condition of things in the Northern States, where it had been ascertained by actual experiment, that negro labor could not be profitably employed, naturally led both sections to adopt a policy which would tend to the transfer of

the slave population from the Northern to the Southern States.

In view of these historical facts, and logical deductions from them, it is idle to pretend that the legislation of the North was dictated by any sentiment of negrophilism. It was the offspring of an enlightened self-interest, and of those natural and economic laws, which lead to the adjustment of all things according to their just relations and affinities.

Having thus examined the principles by which Northern policy, in regard to slavery, was guided, it is proper that I should now advert to the changes which have taken place in public opinion at the South, on the same subject.

At the date of our Revolution, the agriculture of the South was in a languishing condition, and many of our wisest men attributed its want of prosperity to the existence of slavery. Washington, Jefferson, Madison, Mason, Edmund Randolph, and other sages of that day, were deeply imbued with anti-slavery sentiments. Jefferson, in his first draft of the Declaration of independence, and George Mason, in the preamble to the Constitution of Virginia, made it one of the grave causes of complaint against the British sovereign, that he had, "by an inhuman use of his negative, refused us permission to exclude negroes, by law, from Virginia." In his Notes on Virginia, and other productions of his pen, Jefferson expressed his opposition to slavery in the strongest terms, and, faithful to his principles, after long and untiring efforts, he succeeded in excluding it from the Northwestern Territory, by the ordinance of 1787.

In 1788, George Mason, who had been a member of the Convention which framed the Constitution of the United States, in his letter to the Legislature of Virginia, explaining his reasons for withholding his signature from that instrument, assigned, as one of them, its failure to place an immediate interdict on the African slave trade.

I allude to these facts in no spirit of unkindness to either section, but for the purpose of showing that neither section has been governed in its policy by the high principles of benevolence to which they sometimes lay claim. The history of the world will prove that, while individuals may be, and often are, influenced by the nobler impulses of our nature, communities are controlled by their interest. The Northern and Southern divisions of the Union constitute no exception to this rule. This fact should teach us a lesson of mutual charity and forbearance!

The fact having been established, that negro labor is indispensable for the cultivation of cotton, and that white labor can be economically substituted for it, in the production of cereals, live-stock, and everything that is grown in the Northern and Middle States, there has been a uniform tendency of the labor of the country, to adjust itself according to this standard. Slave-labor is rapidly concentrating itself in the planting States; while free-labor is fast taking possession of the grain-growing and grazing States.

Planting and negro labor have a natural affinity, which, legislate as we may, will eventually assert its power. Labor, like every other commodity, will seek the best market. It will go where it will command the highest price. This great principle of political economy withdrew slave-labor from the wheat and rye fields of the North, and it is this principle which is now draining the slave population from the border or provision States to the planting States.

The high prices of the products of Southern plantations enhances the value of slaves, and they are being rapidly sold to the planters. The interest on the prices they now command in market is almost equal to the annual value of their labor when employed in farming, and hence the farmer finds it to his interest to sell them.

The operation of this cause will be felt more sensibly every day. The acquisition of Texas, and the reclamation of the swamp lands of the Southern States, by enlarging the area of the cotton and sugar region, has tended greatly to enhance the price of negroes, and to withdraw them from Virginia, and the border States. Should additional territory be acquired in that quarter, the exportation of slaves will be accelerated, and at no distant day, it may become the pecuniary interest of Virginia to follow the lead of the Northern States, and send her slaves to the South. Everything seems to indicate a steady advance in the price of negroes. The demand for cotton is constantly increasing, and the failure of all attempts to produce it elsewhere has shown, that the world must be dependent on the United States for its supply. By a wise provision of nature, every country has the capacity

to produce the food necessary for its population. The price of food must, therefore, be regulated and restrained, by the general production of the world. But only a limited district of country is adapted to the production of cotton. It can, therefore, have but little competition in the market, and as the demand increases more rapidly than the supply, the price of cotton, and of the labor necessary to produce it, must continue to advance. No one can yet predict the effect which the extension of commercial relations with China, Japan, and the East Indies, is to have on the prices of the great staples of the South.

These facts lead thoughtful men to enquire, whether, at a future day, the line between the free and slave States, may not be more sharply and distinctly defined, than it is at present, and the institution of slavery be restricted exclusively to the planting States.

The tendency, is, certainly, in that direction at present, and a rise of twenty per cent. on the present value of slaves will lead to such an exodus, as has never yet been witnessed in Virginia, and the other grain-growing States. In this aspect, it is time that our people should consider whether the interest of Virginia will be advanced by the acquisition of additional territory adapted to the culture of cotton, when that acquisition is to be followed by the loss of a large portion of her effective labor.

This brief review of the history and progress of slavery is, I think, sufficient to show, that for the last seventy-five years, the tendency of labor of our country has been to adjust itself with reference to the productions of the different sections—free labor having acquired the ascendency in all the mechanical, commercial and farming departments of industry, and slave labor in those connected with the production of rice, sugar, cotton and tobacco.

And here, we are naturally led to consider a doctrine, which has recently been presented to the country under the most imposing circumstances. About a year ago, a distinguished Senator from the State of New York, in an address to the people of that State, expressed his deliberate conviction, that there is an inherent, and irreconcilable antagonism between the systems of free and slave labor. He said:

"Hitherto the two systems have existed in different States, but side by side within the American Union. This has happened because the Union is a confederation of States. But, in another aspect, the United States constitute only one nation. Increase of population, which is filling the States out to their very borders, together with a new and extended network of railroads and other avenues, and an internal commerce which daily becomes more intimate, is rapidly bringing the States into a higher and more perfect social unity or consolidation. Thus these antagonistic systems are continually coming into closer contact, and collision results.

"Shall I tell you what this collision means? They who think that it is accidental, unnecessary, the work of interested or fanatical agitators, and therefore ephemeral, mistake the case altogether. It is an irrepressible conflict between opposing and enduring forces, and it means that the United States must and will, sooner or later, become either entirely a slave-holding nation, or entirely a free-labor nation. Either the cotton and rice fields of South Carolina, and the sugar plantations of Louisiana will ultimately be tilled by free labor, and Charleston and New Orleans become marts for legitimate merchandise alone, or else the rye fields and wheat fields of Massachusetts and New York must again be surrendered by their farmers to slave culture and to the production of slaves, and Boston and New York become once more markets for trade in the bodies and souls of men. It is the failure to apprehend this great truth that induces so many unsuccessful attempts at final compromise between the slave and free States, and it is the existence of this great fact that renders all such pretended compromises when made vain and ephemeral.

* * * * * * * *

"I know, and you know, that a revolution has begun. I know, and all the world knows, that revolutions never go backwards."

The proposition is certainly a startling one, and it took the country by surprise.

It involves an impeachment of the wisdom of the fathers of the republic, and a condemnation of the Constitution of the United States, as an abortive effort to blend together in harmonious co-operation elements essentially incongruous and antagonistic.

Is this proposition true? Does it em

body the wisdom of a statesman, in the highest acceptation of the term, or is it the plea of a partizan, addressed to the jealous prejudices of a section.

If the two systems of labor existed together, in the same localities, competing and interfering with each other, maintaining a constant rivalry, and provoking collisions, by constant efforts to supplant each other, there might be some ground for apprehending a conflict between them. But do the facts of the case justify any such assumption? On the contrary, does not the whole past history of the country negative the idea, and show that the tendency of the two systems is to separation,—to the withdrawal of each from the field appropriate to the other, rather than to mutual aggression, collision and conflict? Where, then, is the evidence of antagonism between them?—Upon what facts does this orator, who is so swift to pronounce judgment of condemnation on Washington and Hamilton, and Madison, and Jay, rely, to maintain his mischievous dogma? If it be true, the alternative he offers is submission or disunion; abolition or revolution! Is the country prepared for such an alternative? Do our northern brethren desire to press it upon us? The events of the next year may show. Their decision will derive new and fearful significance from events that have recently occurred within our borders. Should the sentiments of the Senator from New York be endorsed and adopted by the people of the North, it will be time for the people of the South to decide what course their interests, and their honor, and safety may require them to pursue.

I, for one, cannot believe that such an endorsement will be given. The solemn admonitions of Washington have not yet been forgotten by his countrymen. His prophetic wisdom foresaw the character of the appeals which "designing men" would make to local prejudices, and, in his farewell address, he warned the people against them in these impressive words:

"In contemplating the causes which may disturb our Union, it occurs as matter of serious concern, that any ground should have been furnished for characterizing parties by geographical discriminations, *Northern and Southern, Atlantic and Western*, whence designing men may endeavor to incite a belief that there is a real difference of local interest and views. One of the expedients of party, to acquire influence with particular districts, is to misrepresent the opinions and aims of other districts. You cannot shield yourselves too much against the jealousies and heart-burnings which spring from these misrepresentations. They tend to render alien to each other those who ought to be bound together by fraternal affection."

Let the people of the United States look on this picture and on that! Here are the counsels of Washington—there the Senator from New York. Let the people choose between them!

Washington teaches that while it may be the province of "designing men" to foment local jealousies—to array section against section—to divide, that they may rule, as heads of dominant factions, it is the higher, and nobler, and holier mission of the patriotic statesman, to reconcile differences of opinion—to bring order out of chaos—to blend opposing forces into harmonious action, for the public good.

The idea that the tide of slavery, which, for three-quarters of a century, has been constantly receding from the North, is about to reverse its flow, is as absurd as to suppose that the waves of the Atlantic will again sweep over the crests of the Alleghanies. The people of the North cannot be imposed on by any such shallow sophistry.

But looking at the question in another aspect—has the South anything to fear from Northern aggression.

I answer, unhesitatingly, nothing whatever! This answer is dictated not only by a reference to the provisions of the federal constitution, which forbid all such aggressions, but by other and still more cogent considerations. I know that constitutional restrictions, and parchment guarantees, and the rights intended to be guarded by them, may be trampled under foot, and therefore do not always present a safe bulwark of defence.

But there is another, and in deference to the nomenclature of the author of the doctrine on which I am commenting, I will call it "a higher law," which men never violate wilfully, and which will ever remain sure and steadfast: I mean, the *law of self-interest!* If all higher considerations should fail—if the men of the North should be deaf to the appeals of justice—if they should prove regardless of all their constitutional and legal obligations, and feel

disposed to violate the rights of the Southern States, they would be restrained from doing so, by the knowledge of the fact, that the blow which prostrated the interests of the South would inflict an immedicable wound on the prosperity of the North.

Where, then, I repeat, is the evidence of antagonism between the interests or the labor of the North and of the South? Those who are disposed to indulge in narrow and contracted views of subjects may fancy they see evidences of an "irrepressible conflict" between heat and cold; light and darkness; summer and winter; the centripetal and centrifugal forces; and a thousand other objects in the material world, which seem to be irreconcilable; yet, under the rule of a wise and benificent Providence, how beautifully all these apparently opposing elements work together in harmony, to accomplish the wonderful designs of Him whose hand directs the machinery of the universe!

When the scales are removed from the eyes of such as I have mentioned, they discern that the only discord was in their own wicked hearts, and that the seeming antagonism in the elements of nature was but harmony not understood!

So, it often happens, in regard to political affairs, that men whose minds are misled by local interest, or distorted by party prejudices, can see nothing in the progress of events but evidences of clashing interests and "irrepressible conflicts," while, to those who survey the same objects, from a loftier stand-point, every element is seen to be performing its appropriate functions, for the development of some wise and benificent result.

How strangely must that mind be constituted, which can perceive a tendency to antagonism in two systems which move in different orbits, and have entirely different functions to perform; systems widely separated, geogrophically, and whose influence is felt only in the benefits which they reciprocally confer on each other!

Southern labor is devoted to the production of articles unsuited to the climate and labor of the free States. Its great staples are cotton, sugar, tobacco and rice. Of these, but one, tobacco, and that to a small extent only, can be produced north of the Delaware.

On the other hand, the labor of the free States is directed to the cultivation of grain and the feeding of live-stock, and to manufactures and commerce, and other pursuits which are better adapted to the habits of their people, and the qualities and peculiarities of their soil and climate.

How, then, can the labor of one section come into competition with that of the other? Do not the productions of the North find their best markets in the South? Are not the slaves of the planting States the largest consumers of the coarse woolens, and cottons, and shoes, and hats made by the labor of the North? Do not the planters also buy a large portion of the finer goods, and furniture, and hardware, and machinery, and carriages, and saddlery, and agricultural implements manufactured at the North?

And does not the the South supply the North with its cotton, and sugar, and rice, and tobacco, and other commodities, in their crude condition, ready to be converted by the labor and skill of the North, into the most valuable subjects of commerce? How then can there be antagonism between two sections of country, and two systems of labor, whose productions, and whose avocations, are so widely different? Antagnism implies opposition,—rivalry,—competition,—the interference of one with the other. But here, there is nothing of the kind. Neither produces what the other can profitably produce—on the contrary, each produces precisely what the other cannot produce, but what the other needs. Each offers to the other a good market for what it has to sell. An exchange, mutually beneficial, takes place between them. Both are enriched by it. The product of slave labor helps to pay the wages of the free labor of the North, and the product of free labor helps to pay to the owner of slaves the expense which he incurs, and the profit which he makes, by his operations on his plantation. Each section, and each system, consequently, contributes to the prosperity and wealth of the other. They are mutual benefactors, instead of antagonists. The relations between the two systems have become so intimate, and so interwoven with each other, that they can no longer be regarded as separate, independent systems, but are, in fact, harmonious elements of one great system of American labor. The truth of this proposition will be manifest, if we will turn our thoughts, for a moment, to the consequences which would ensue from a disturbance of the relations, which now happily subsist between these elements.

If slavery were, by common consent, abolished throughout the United States, we cannot doubt that the consequences would be similar to those which followed emancipation in the British West India Islands. Wherever the negro is found, his nature is the same. Their indisposition to labor has become proverbial. It exhibits itself, not only in their native country, and in the sultry climate of the South, but also amidst the bustle and activity of the Northern and Western cities, in which they congregate. They labor only under the pressure of necessity, and only to the extent which that necessity imperatively requires. As soon, therefore, as the discipline and compulsory authority of the master was withdrawn, they would sink into habits of idleness, which would leave the plantations of the Southern States, like those of Jamaica, desolate and uncultivated. They would seek a precarious subsistence, by irregular effort, and by depredations on the property of those around them. The production of the great staples of the South, would rapidly diminish, and ultimately they would cease to be articles of export. White labor could not be substituted, because experience has shown, that the white race cannot endure the exposure to the sun and atmosphere, which is necessary for the production of cotton, tobacco, sugar and rice. The abolition of slavery would, therefore, be equivalent to the banishment of those articles from the manufactures and commerce of the country. And what mind can conceive, or what pen portray, the consequences to the business, and comfort, and happiness of the civilized world! It would involve the destruction of countless millions of dollars of capital in the South, vested in lands, and in slaves and stock and machinery necessary to cultivate them; and in the North, in the factories erected to work up the products of Southern labor, and to produce all the fabrics necessary to supply its wants. It would involve the prostration of domestic trade, manufactures, and the mechanic arts —the stagnation of foreign commerce—the derangement of the balance of trade and rates of exchange—disastrous convulsions in the monetary system—the serious injury of our shipping interests—a decline in our national resources—the paralysis of industry in all its departments—a general depression in the value of property, and a scene of bankruptcy and ruin to which the history of our country affords no parallel.

Such would be some of the more prominent and direct results of that system of emancipation which deluded enthusiasts and selfish agitators would seek to accomplish.

But the picture is, by no means complete. It is plain that the evils I have enumerated, would fall with more crushing force on the interests and people of the North, than on those of the South. But, there are others peculiarly affecting the free States, which should not be passed over in silence.

Who, that has visited the Northern States, has failed to note, with pride and pleasure, the evidences of prosperity and comfort that greet his eye at every turn? Well cultivated fields—neat farm-houses—thriving villages—cities thronged with a busy and enterprising population—factories, furnishing employment to thousands—harbors crowded with shipping—wharves loaded with the merchandise of the most distant lands—all bear testimony, which cannot be mistaken, to the material prosperity of the people. Innumerable school-houses, and churches, and noble institutions, devoted to literary and benevolent purposes, in like manner attest the attention which is bestowed on the culture and development of the moral and intellectual faculties of the citizens.

Explore the sources of all this wealth and prosperity—enquire what stimulates this industry into activity?—what gives vitality to this extensive domestic trade?—what freights these fleets of merchantmen, on their outward voyages, and supplies the means of buying the home-bound cargoes?—in a word, what sustains this whole system of industry, and equalizes the balance of trade between our own and foreign countries? Every enlightened man will answer that the productions of the planting States, the fruits of slave labor, contribute more than all other causes to these great results!

If, then, this system of labor should be suddenly overthrown, by emancipating the slaves of the South, and the substitution of a worthless, indolent, pauper population in place of the active, well-disciplined, and vigorous slaves who now supply the productive power of the South, who can compute the amount of injury that would accrue to the North? Strike the single article of

cotton from the commercial schedules, and what would become of the factories, and commerce, and navigation of the North; and of all the interests dependent on them? Let business men answer the question.

But these are not the only evils, that would enure to the people of the non-slaveholding States, from such a policy. If the Southern slaves were liberated, they would, naturally, desire to remove from the scenes of their labor and humiliation, and seek abodes among the people of the North, whose sympathy had cheered them in their bondage, and whose homes and hearts, they would reasonably infer, were open to receive them. The three millions of liberated slaves, thus left free to choose their own places of residence, would soon scatter themselves, in the Northern and Western States, in quest of the means of substance. The better class would at once come into competition with the laboring population of the North, in all the more simple employments for which they were qualified, and the draymen, hackmen, cartmen, porters, hotel-waiters, stevedores, domestic servants, day-laborers, and others of like occupations, would doubtless find them formidable rivals, who would supplant them, or greatly reduce the profits of their callings. Much the larger proportion, however, from their natural aversion to labor, would refuse to work, and with their families, sink into the lowest depths of destitution and wretchedness; and the jails, alms-houses, and penitentiaries of the North would be their only refuge from starvation. They would become an intolerable burthen, and all classes of society would rise up to expel them. Under these circumstances, I can readily see how the tendency to a "conflict" between the black and the white laborer would become "irrepressible." The white laborer whose avocation had, heretofore, been respectable, and who had been accustomed to receive wages adequate for the support of his family, would not tolerate the competition of those who would degrade the dignity of labor, and underbid him in his business. The tax-payers would not submit to the burthen of maintaining an idle and thriftless population. The land-holder would not be content to have near his premises a class whose subsistence would be eked out by pilfering. A conflict would necessarily ensue—a conflict of clashing interests, and hostile races brought into immediate collision—a conflict which must necessarily result in violence and bloodshed.

Is this picture overdrawn? I refer those who think so to the riots that have already occurred from these causes, in Cincinnati, Philadelphia, and other cities and townships in the non-slaveholding States. And when it is remembered that but a few hundreds of free negroes, and these above the average of their race, for freedom is generally conferred on the most worthy, or acquired by the most thrifty, have led to such outbursts of popular indignation and violence, what would be the consequence of having THREE MILLIONS OF THEM, of all ages, sizes, classes and conditions, precipitated on the non-slaveholding States!

I maintain, therefore, that precisely the opposite of the proposition of the distinguished Senator from New York is true. As long as slavery exists, it will retain the negro population in the Southern States—it will keep them separate and apart, and prevent their coming into competition with the laboring classes of the North—and the fruits of their labor will be auxillary to the interests of the white race.

But the moment they are emancipated, the present line of demarcation between the two systems of labor will be eradiated. The levee, which confines the negro race within the Southern States, will be broken down, and a deluge of free negro migration will pour its desolating flood over the whole North and West, sweeping before it the peace and happiness and best interests of the people. The Northern States will then discover, when it is too late to repair the mischief, that they have rashly and wickedly undone all that was done for them by the wise policy of their earlier statesmen.

Were I a Northern man, therefore, and disposed to assume the championship of Northern interests, I would admonish my fellow citizens not to aid in the emancipation of the slaves of the South, but to remonstrate against it, and to resist it by all fair and honorable means, as fraught with incalculable mischief to the free States. I would conjure them to leave the whole subject in the hands of those immediately concerned, and of Him, who, although his purposes cannot be fathomed by human sagacity, we know, shapes the destiny of nations, and ordereth all things wisely and well.

Let us, then, by common consent, discard

from our minds and our hearts all these unfounded notions of antagonism between different parts of our common country. Factious agitators have existed in every age—sacred history teaches us an instructive lesson on this subject. In the early days of Christianity, we are informed, the members of the church of Corinth were blessed, above all others, with spiritual gifts. To one was given wisdom, to another knowledge, to another faith, to another the gift of healing, to another the working of miracles, to another prophecy, to another discerning of spirits, to another divers kinds of tongues, to another the interpretation of tongues. All these gifts proceeded from the same spirit, and all were intended to work together for one common object—the salvation of man and the glory of God! But the possessors of these various gifts, mistaking diversity for discord, began each to exalt himself above his neighbor, and to vie with him in the display of his endowments. A learned biblical commentator and historian (Thomas Scott) informs us that "this gave rise to vain glory, envy, corrupt emulations and repinings, which were equally opposed to piety and charity."

Thus it would seem that the very abundance of the gifts bestowed on the Corinthians became the chief source of danger to their spiritual welfare.

This led the great Apostle to the Gentiles to administer to them a rebuke for their dissensions, full of wisdom and profitable for instruction. After adverting to the munificent endowments which they had received at the hands of God, and the improper use they were disposed to make of them, he said, (1st Corinthians, chap. 12 :)

"For, as the body is one, and hath many members, and all the members of that one body, being many, are one body, so also is Christ.

"For by one spirit we are all baptised into one body—whether we be Jews or Gentiles,—whether we be bond or free, and have all been made to drink into one spirit.

"For the body is not one member, but many.

"If the foot shall say, because I am not the hand, I am not of the body, is it therefore not of the body?

"And if the ear shall say, because I am not the eye, I am not of the body, is it therefore not of the body?

"If the whole body were an eye, where were the hearing? If the whole were hearing, where were the smelling?

"But now hath God set the members, every one of them, in the body as it hath pleased him.

"And if they were all one member, where were the body?

"But now are they many members, yet but one body.

"And the eye cannot say unto the hand, I have no need of thee; nor again the head to the feet, I have no need of you."

These words of counsel and admonition were addressed by St. Paul, eighteen centuries ago, to the factious Corinthians. But they were written and incorporated into the Holy Scripture, for the instruction of all nations and all ages. May not the people of the United States learn a lesson of wisdom from them?

No nation ever possessed such a heritage as we enjoy. Providence has lavished on us every blessing in the richest profusion. With a territory stretching from the Atlantic to the Pacific ocean, and almost from the Tropical to the Arctic region, we embrace within our limits every variety of soil and climate, and an aptitude for every production essential to the comfort and happiness of man. If we were isolated from all the rest of the world, we have within our own borders every material element of national prosperity and greatness. And, as if with the design of securing perpetual harmony and union between the different parts, Providence has wisely ordained a natural and necessary division of labor between them, by adapting each to particular staples and occupations which are unsuited to the climate and soil of the others. The Southern States produce the cotton, sugar, rice and tobacco necessary for the whole country. The North supplies the skill and labor to manufacture the raw material into such fabrics as are required by the other sections. And the Middle States furnish the food for the North and South. Neither can successfully compete with the other in its peculiar department of industry. Each is benefitted by the exchange of its surplus productions for those of the others, and they thus reciprocally minister to each others wants. And by a remakable departure from the general law of nature, which requires large streams to seek their outlet to the ocean, by the shortest route, the great father of rivers, instead of flowing eastward to the Atlantic,

pours his vast volume of waters in an almost due southward course, from the northern limits of the Confederacy to the Gulf of Mexico, thus passing through all the great divisions of our country, and furnishing a highway for commerce between them unequalled in extent and excellence on the face of the globe.

If the climate, soil and productions of our whole country were similar, competition and rivalry might engender ill feeling between the different parts. But each has its separate gift and their natural diversities, instead of being elements of discord, are sources of union, harmony and strength.

But, like the foolish Corinthians, some of our people are disposed to indulge "in vain glory, envy, corrupt emulations and repinings," which are alike opposed to truth, charity and patriotism.

To all such may we not, reverently paraphrasing the language of the Apostle, say "For as the body is one and hath many members, and all the members of that one body, being many, are one body, SO ALSO IS OUR COUNTRY!

"For by one spirit are we all baptised into one body, whether we be Jew or Gentile, bond or free, and have all been made to drink into one spirit—*the spirit of the Constitution!*

"For our *Confederacy* is not one member but many. If the *North* shall say, because I am not the *South* I am not of the *Union*, is it, therefore, not of the *Union?*

"And if the *East* shall say, because I am not the *West*, I am not of the *Union*, is it, therefore, not of the *Union?*

"If the *whole country* were *manufacturing*, where were the *cotton and sugar growing?*

"If the whole were *agricultural*, where were the *commercial and manufacturing?*

"But now hath *the wisdom of our fathers* set the *separate States*, every one of them, in the *Union* as it hath pleased *them.*

"And if they were all one *State*, where were the *Union?*

"But now are they *many States*, yet but *one Confederacy.*

"And the *East* cannot say unto the *West*, I have no need of thee; nor, again, the *Northern States* to the *Southern*, we have no need of you.

"And whether one member suffer, all the members suffer with it; or one member be honored, all the members rejoice with it!"

These are the teachings of inspiration! And I appeal to my fellow citizens in all parts of the country, if they do not convey to us an instructive lesson of practical wisdom and patriotic duty!

Let us, then, in everything that affects the interests of our country, cultivate a comprehensive, catholic, national sentiment! Let us discard from our confidence and our councils all "fanatical agitators" who attempt, by any device whatever, to array one portion of the Union against another. Let us remember that, while each section has its appropriate function to perform, each is essential to the welfare and security of the whole. Let us bear in mind that "the liberty and independence we possess are the work of joint councils and joint efforts—of common dangers, sufferings and success." Instead of fostering local jealouses, and striving to inflame one section against another, let me urge you, fellow citizens, in the impressive language of Washington, to raise up your minds and your hearts to a just appreciation "of the immense value of your National Union, to your collective and individual happiness, so that you may cherish a cordial, habitual and immovable attachment to it—accustoming yourselves to think and to speak of it as a palladium of your political safety and prosperity—watching for its preservation with jealous anxiety—discountenancing whatever may suggest even a suspicion that it can in any event be abandoned, and indignantly frowning upon the first dawning of every attempt to alienate any portion of our country from the rest, or to enfeeble the sacred ties which now link together the various parts!"

To Measure Hay Stacks.

More than twenty years since, the following method for measuring hay, was taken from an old publication. I have both bought and sold by it, and I believe it may be useful to many farmers: Multiply the length, breadth, and height into each other, and if the hay is somewhat settled, ten solid yards make a ton. Clover will take from ten to twelve solid yards per ton.

Five hundred and twelve cubic feet in a compressed or well settled mow is regarded equal to a ton of good hay.

Kentucky University.

[The UNIVERSITY of KENTUCKY was duly installed on the 21st of September, 1859. Among the interesting proceedings on the occasion, PRESIDENT MILLIGAN delivered his inaugural address, the introductory part of which contains such a philosophical train of thought upon the still comparatively obscure subject of educational development, that we cannot resist the inclination to lay it before our readers.—ED.]

PRESIDENT MILLIGAN'S ADDRESS.

Mr. President; Gentlemen of the Board of Curators; and Fellow Citizens of Kentucky.

It has already become a proverb, that "The present is the age of improvement." There is not a branch of science within the wide range of human knowledge, that has not been more or less enriched by contributions from some of the master minds of the nineteenth century.

It is not, however, so much in the department of the sciences, as it is in that of the arts, that we excel our predecessors. It is not so much in the discovery of truth, as in its varied applications to the practical purposes and conveniences of life, that we are in advance of all past generations. Some of the most sublime discoveries in science were made by the Galileos, the Keplers, the Bacons, the Lockes, and the Newtons of even the seventeenth century. But these discoveries were to most persons of that age what the gold mines of California were to the wild tribes of the West. Very few then knew how to appropriate them.

But now all is changed; or at least, is rapidly changing. Every thing is now assuming a more highly practical tendency. Agriculture and the mechanic arts are greatly improved by the application of science; our rivers, lakes, and oceans are navigated by the power of steam; information is carried from city to city, and from continent to continent, with the velocity of lightning; and in a word, every thing is onward and upward and Westward.

A question then rises just here of very great interest to every true philanthropist: What is the cause of all this? To what particular agency or instrumentality does this state of universal improvement owe its origin and its progress? Why does the nineteenth surpass every preceding century in all the elements of wealth, power, and civilization.

This question has been very differently answered by different classes of individuals. The mere politician who is wont to contemplate every thing through the medium of political glasses, has usually found his answer in the great improvements that have been recently made in the science of government. But this does not satisfy the more enlightened and inquisitive metaphysician. The question still occurs to him, whence this great improvement in political science? It is an effect: and it must have a cause as well as the recent improvements in agriculture, horticulture, and the other arts and professions.

The Christian philosopher who stops not with the consideration of second causes, but who is accustomed to trace every event in the history of human progress up to the Divine will, or rather to the Divine nature, where all true philosophy ends, will, of course, refer all this to the agency of Him who made the universe; who governs it; and who is now evidently directing all things to the speedy introduction of that glorious era, when "the wolf shall dwell with the lamb; and the leopard shall lie down with the kid; and the calf, and the young lion, and the fatling together, and a little child shall lead them."

To this general solution of the problem, I have no objection. It certainly presents to us a very just and rational conception of the whole matter. But it does not meet the specific object of our present inquiry. Our question does not refer to Divine but to human agency. We do not ask, what has God done, but what has man done, under the Divine guidance, to bring about this happy state of society, Or, to be still more particular, what is the first link in the chain of human instrumentalities that has given rise to this wonderful progress in all the elements of modern civilization.

Waiving for the present, the consideration of all the merely speculative theories of human progress, I hesitate not to affirm my solemn conviction, that the true answer to this question is to be found only in the superior education of the nineteenth century. This is the grand "*primum mobile*," the great efficient mainspring of all the schemes that man has ever devised and executed for the elevation, civilization, and beatification of his race.

But let me not be misunderstood here. We often differ in our conclusions, merely because we use different nomenclatures. We often use the same word to represent very different and distinct ideas. This is particularly true of the term *education*. But few words have a wider currency; and yet very few are more imperfectly understood. The popular meaning of this term is extremely erroneous. It is generally used, as you are all aware, in the sense of acquiring and storing away ideas; which, like so many measures of wheat, oats, or barely, are to be retained in the graneries of the human mind; or to be dealt out to the highest bidder according to the wholesale or retail prices of such gross commodities.

But as its etymology denotes, it primarily and properly signifies a process just the reverse of all this. It is not the treasuring up in the mind of any thing "*ab extra*;" but it is the developing, moulding, harmonizing, adjusting, polishing, and refining of that which is within the man himself.

This idea is so fundamental, that I beg to illustrate it with all possible simplicity, even before this very intelligent audience. As the occasion is somewhat elementary, I will no doubt be excused for introducing, at this point, a few very plain and elementary suggestions.

Allow me then in the first place, and by way of illustration, to call your attention to the world of wonders, that lies concealed beneath the surface of even the most simple organized substance. Who, for example, that has never witnessed the mysterious process of vegetation, could imagine, "*a priori*," that a single grain of corn is susceptible of such a development as we every year behold? True, indeed, without the influence of certain external agencies, its vital energies would remain forever latent. This may be well illustrated by the grains of corn that are sometimes found in the Egyptian pyramids, and among the ruins of ancient cities. But, by the application of heat, light, moisture, and electricity, the germ is quickened into life. We have first the root; next the blade; then the stalk; after that the blossom; then the ear; and finally the full-grown corn in the ear. It is now, allow me to say, an educated grain of corn. Whether it has been properly educated or not, depends of course, on circumstances.

Now all this is very analogous to the education of the infant man. His is the most complex of all created constitutions. He is a perfect microcosm within himself. He has a material body; an animal soul; and a god-like spirit. These again are endowed with numerous and various faculties, each of which, by the use and application of proper stimuli, is susceptible of the most wonderful and astonishing development. How amazing for example, is the difference between the muscular powers of the child and of the full grown Goliah! Or between the mental powers of the infant Newton, and those of the philosopher Sir Isaac, whom God

> "To mortals lent, to trace his boundless works
> From laws sublimely simple."

We do not of course pretend, by any system of education, to make every man a Newton. There is a natural limit to the development of every organized substance, whether vegetable or animal, beyond which no created power can extend it.

> "For education ne'er supplied
> What ruling nature has denied."

The educator creates nothing. He produces neither mind nor matter. He merely develops, moulds, and polishes the raw material. But if he cannot make the moss bloom as the rose, if he cannot cause the daisy to tower aloft like an oak of Bashan, or like a cedar of Lebanon, he may nevertheless develop every faculty in each particular individual, to the full extent of its own natural capacity.

This, then, for the sake of distinction, we may call the first element of education. But it is only in theory that we can separate the developing from the moulding, polishing, and refining process. While our latent powers, energies, and susceptibilities are being brought out from the deep recesses of our being, by each one's being exercised on its own appropriate objects, they all receive at the same time a particular cast; they are, as it were, moulded in the types of the educator: they are either brought into a state of more active and sympathetic harmony, or they are crushed beneath the fetters of the most inexorable and oppressive despotisms.

This is so very obvious that it scarcely needs any illustration. It is a matter of daily consciousness, with every youth, that the performance of any one action begets in his system an increased facility for its repetition. This again, strengthens the same tendency, and so on till a corresponding habit is formed. We all remember with

what fear and trembling we made our first essay in the simple art of chirography. To form the first letter of the alphabet required at that time a very considerable effort. But now it almost forms itself; that is, it forms itself, if we have been so fortunate as to form a habit in harmony with the natural laws and constitution of our chirographic organs. But otherwise, the die is cast. The decree of habit is, Let the fully developed hand that is cramped now, be cramped forever.

This is a very simple and familiar illustration of the force and power of habit over all our faculties of body, soul, and spirit. So plastic indeed is the infant constitution, that it may be easily cast into almost any mould whatever. We do not, of course, by this, intend to indorse the absurd dogma that "Man is a mere creature of circumstances." Not at all. Such a hypothesis has no foundation whatever in fact. There is evidently in the mind of every man a natural affinity for truth, just as there is in his body a natural tendency to assume the upright position. But we all know that the human frame has in its infancy been distorted into a thousand hideous forms; and we are just as painfully conscious that the infant mind has been as often cast into false systems of politics, philosophy, morality, and religion. The present chart of the civilized world is a melancholy illustration of this fact.

How exceedingly important, then, it is that during the process of education all the faculties of every youth should be so exercised on their corresponding and appropriate objects as to secure their full and complete development, and so as to form, at the same time, habits in harmony with his own primitive constitution, and with the relations that he sustains to the entire universe. This is a matter on which there is no room for exaggeration. Here it is that all the powers of language become utterly bankrupt, and every attempt at hyperbole falls far short of expressing the simple, eternal realities and consequences that are involved in the education of every son and daughter of humanity.

The third object or element of education, is the acquisition of useful knowledge. Knowledge is the food of the soul:

"Man loves it dearly: and the beams of truth
More welcome touch his understanding's eye
Than all the blandishments of sound, his ear,
Than all of taste, his tongue."

When, therefore, a man's whole constitution has been developed, moulded, polished and refined to the fullest extent of its capabilities; when all his faculties have been made to harmonize with each other, and with the laws and principles of the physical, intellectual, and moral universe; when his mind has been filled with knowledge, and his heart with wisdom; then, and not till then, can it be said with propriety that he has been perfectly educated. He may indeed have a strong and athletic physical constitution; he may have been well instructed in many of the arts and sciences; but a perfectly rational and complete education he has not received, while any of the things specified are wanting.

You now comprehend what I mean, when I say that education, in its proper and comprehensive sense, is the basis of all that tends to elevate, enrich, adorn, and refine human nature. And not only so, but I am sure that you also now fully acquiesce with me in the justness of the sentiment. Indeed, it is only necessary to state the premises, and the truth of our proposition follows with all the clearness and force of a mathematical inference. For if matter is not capable of self-improvement, if it is mind that discovers and that applies all the elements of wealth, power, and whatever else pertains to the individual, the social, and the general good of mankind, then it clearly follows that its success in all this must ever be in the ratio of its own education. Of what use, for example, is the gold of California, the coal and iron of Kentucky, or the diamonds of Golconda, to the man who has neither the intelligence nor the wisdom that is necessary to appropriate them?

We boast of our civil and political institutions; and well we may, for they are the very best under the broad heavens. But of what use would they be, with all their varied and multiplied excellences, to the savage tribes of the West! or even to our Mexican neighbors? The fact is, that men always have had, and that they always must and will have, laws and institutions corresponding to their own mental and moral development. Deprive the rising generation, therefore, of what is properly implied in the art and mystery of education, and you at once render worthless all that was ever purchased by the blood of our Revolutionary fathers; you virtually annihilate our whole scheme of civil government; you destroy our system of

internal improvements, with all the varied comforts and conveniences of social life: you seal the Bible; shut up the fountains of human happiness; and convert this whole land, which is now beautiful as the rose of summer, and delightful as the fragrance of autumn, into one vast, dreary, and howling wilderness.

The greatest problem, then, that man was ever required to solve is the problem of his own education. To show how human nature may be best developed and moulded, and in all respects adapted to the ends and objects of its being and destiny, is to do more for the elevation and general good of mankind than did Columbus by the discovery of a continent. And the man who does most for the execution of the plan is, next to its projector, the greatest benefactor of his race.

I have not the vanity to suppose that I have made the great discovery. An experience of more than twenty years in this most difficult of all the arts, has convinced me that the problem is not yet fully solved. It remains for a second Peter, bearing the keys of the Kingdom, to reveal the mystery.

Some things, however, follow very clearly from the premises now before us. If education consists, as I have said, not merely in the acquisition of knowledge, but primarily and chiefly in the development and proper discipline of all our faculties, then it is evident, for example, that it must of necessity be a very long, laborious, and expensive process; that there is in fact no royal road to it; but that it requires the combined influence of the nursery, the common-school, the academy, the college, the church, and the university to complete it. These, I repeat, are all essentials. Take away any one of them, and the chain of means is broken; our whole system of education is rendered inefficient; and the feeble, irregular pulsations of society will soon indicate that a fountain of life has been exhausted, or, at least, that the stream has been diverted from its proper channel.

I am aware that all do not think so. I know there are some very honourable men, even in the Commonwealth of Kentucky, who seem to regard our colleges and universities as non-essentials, if not indeed as public nuisances. They refer us to a Franklin, a Washington, and a Clay, who, without a collegiate education, have gained for themselves a name and a reputation as enduring as the annals of our Republic.

But these men forget that the sage of Boston, the hero of Mount Vernon, and the orator of Ashland were nature's favorite sons. They also forget that each of these illustrious patriots and statesmen deeply deplored his own want of a thorough course of collegiate instruction and discipline. They forget that Franklin, strongly recommended the study of the ancient classics, especially to professional men; that Washington was the founder of a college which still does honor to his name and memory; and that Mr. Clay was always the sincere friend and eloquent advocate of a thorough and liberal system of public instruction.

But we need not the testimony and advocacy of even a Franklin, a Washington, or a Clay, in behalf of our colleges and our universities. To test their real value and importance in a scheme of education, we have only to look into their own intrinsic merits; we have only to inquire what has already been accomplished through their instrumentality, and how much of the world's comfort, happiness, and prospective civilization still depends on them.

For if education is a blessing to society, why should it not be made as general and as thorough as possible? Why stop with the instruction and discipline of the common-school and the academy, while there is so great a demand for the very best educated mind in all the relations of life?—What would now be the condition of the world, had colleges and universities never been established as a means of education? How many would now have the Bible faithfully translated into their own living vernacular? Where would now be the fifty million copies of the Word of Life that have revealed to all nations the strait and narrow way that leads to honor, to glory, and to immortality? What would we now know of those polished arts and inventions that

——"have humanized mankind,
Softened the rude, and calmed the boisterous mind?"

Where would now be most of those standard works of literature and science which are at once the guide of the farmer, the mechanic, the pedagogue, the lawyer, the physician, and the statesman?—Is it not perfectly obvious to every student of history, that nearly all the great improvements that have recently been made in the arts and in

the sciences may be traced, either directly or indirectly, to minds that have been thoroughly trained and disciplined in the halls of our colleges and universities? And is it not just as obvious to every man of reflection, that upon such minds we must always rely even for the preparation of text books to supply the wants of the nursery and the common-school, to say nothing of the solution of those higher and more complicated problems on the demonstration of which must ever depend the progress of Christian civilization?—Take, for example, the most popular text-books that are now used in the common-schools of Kentucky. Who are their authors and compilers? Is not almost every child in this Commonwealth familiar with the names of a Webster, a Goodrich, an Olmsted, a Davies, a McGuffey, and many others who, having graduated with the highest collegiate honors, devoted much of their subsequent labors to the preparation of text-books for the education of youth? Regard this question, then, as we may, it is evident that the common-school is just as dependent on the university as the university is on the common-school.

But I have no desire to introduce invidious comparisons. I do not wish to array the higher against the lower classes of our literary institutions; nor to discuss their comparative value as elementary parts of our social system. As well might we array the head against the heart, and contrast their influence on the life, the health, and the activity of the body. No, my fellow-citizens, let there be no antagonism between the nursery, the common-school, the academy, the college, the church, and the university. Let them ever be united; and let them always co-operate in the great work of qualifying each successive generation for more enlarged spheres of usefulness and happiness on earth, as well as for the higher, purer, and holier enjoyments of heaven.

Wax and Rosin for Painting.

To oil coats there is this objection, that they require a comparatively long time to dry. When oil of turpentine is used, though it evaporates fast enough, it leaves the painting soft; and although, by the addition of some other substances, the drying may be hastened, it even then takes up too much time, and leads to the substitution of whitewash and other water. Mr. Alluys now proposes a mixture which yields a coat of paint that will dry as fast as whitewash, but leave as durable and elastic a coat as that of oil. To prepare it, instead of more linseed oil, as usually, he adds to the paint, ground in oil, a solution of wax and rosin in spirits of terpentine. The mixture thus prepared has the appearance of common oil and paint, and acts like such. On the evaporation of turpentine, it leaves a coat sufficiently hard to bear gentle rubbing without coming off. Barreswil has reported some experiments with this mixture, and finds, that although it becomes sufficiently dry and hard after a time, it does not equal a good oil coating in this respect; but he has no doubt that for some purposes it will be found quite desirable. He gives the following formula for its preparation: 10 parts of pure yellow wax are dissolved in the same quantity of linseed oil, and 5 parts of rosin in 8 of spirits of turpentine, at a slow heat, (in separate vessels,) until quite liquid, when they are taken from the fire and mixed, with constant stirring, until they thicken. In this condition the mixture serves for out-door and store work. If to be applied with ground paints, it is thinned with spirits of turpentine, as required.

Dingler's Polytechnic Journal.

A Timely Warning.

A short time ago, we were sitting in our office, cogitating upon the depravity of mankind, when there came a loud and peculiar rapping at the door. Very politely we gave the invitation to 'come in,' the door opened, and a gentleman in black entered, and handed us his card. The gentleman in black, the card informed us, was Mr. Satan!

"How dy'e do now-a-days?" said he.

"Just tolerable thank you," we answered.

"About to get up some local and miscellaneous?" he asked.

"Yes," we responded; "about to write an article to delinquent patrons."

"Why are your subscribers delinquent? You publish an excellent paper," he remarked.

We felt flattered by a so distinguished opinion, and answered: "Yes, we feel proud of our paper; but cannot say the same of a majority of our subscribers. More than half of them owe us."

"You astonish me," he exclaimed. "And," he continued, "can't you do anything with them?"

"It seems not," we answered.

"Well," said Satan, "I am sorry I hav'nt made their acquaintance ere this. They'll just suit me! Make out the list: "I'll take them!" And with a polite bow, His Majesty of the "Iron-works" departed.

—Delinquent reader, this may be fiction, but we fear it will prove to be a reality. Take warning thereof, and pay the printer.

Dress of the Japanese Women.

The dress of the Japanese women is simple, but graceful. The robe which crosses the breast, close up to the neck, or a little lower, according to the taste of wearer, reaches nearly to the ground, and has loose sleeves, leaving the waist free. This robe is confined round the body by a shawl, which is tied behind in a bow, the ends flowing.—Everything in Japan, even to dress, is regulated by law; and the sumptuary laws have been very strict until lately, when contact with Europeans appears to be bringing about a slight relaxation. The color worn by all classes of men in their usual dress is black, or dark blue, of varied patterns; but the women very properly are allowed, and of course avail themselves of the privilege, to wear brighter dresses. Yet their taste is so good that noisy colors are generally eschewed. Their robes are generally striped silks of gray, blue, or black, the shawl some beautiful bright color—crimson, for instance—and their fine jet-black hair is tastefully set off by having crimson crape, of a very beautiful texture, thrown in among it. Of course we speak of the outdoor dress of the women—their full dress within doors is far more gay.—*Amer. Ruralist.*

Coal Ashes as a Fertilizer.

Wm. Leonard of South Groton, Mass., gives the following statement in the N. E. Farmer, of his experience with this material as a manure:

"On an old mowing field too much run down, we top-dressed a square piece of ground fairly with clear coal ashes, early in the spring. While the crop was growing, at all stages the difference was perceptible. When ready for the scythe, it was more in quantity; and as to quality, it produced about equal parts of herds grass and red clover. If the clover was not introduced by the agency of the ashes, we know not how it was introduced; for four years none was seen there before, or in any other part of the field, and this was the only clover seen in said field the past season. Both grass and clover was more vigorous, green and lively within the top-dressed square, and just as visible all around was the exhausted crop, which said as audibly as grass could say, in its declining state, that it had received no such assistance from this individual fertilizer.

"On the hill-side not at all renowed for its wealthy properties in soil, we planted the Davis Seedlings and Jenny Lind potatoes, in clear coal ashes, half a shovel full in a hill. Below, on equally as good ground, we planted the same kinds of potatoes in compost manure, and the coal ashes, single handed, turned out the largest, best, fairest, and most numerous quantity of potatoes. In reality, they were the best raised on the farm. Almost side by side, in compost manure, our potatoes were somewhat infected with rot; in the ashes they were all healthy and sound almost to a potato."

Renovating Orchards.

The *Gardners' Monthly* says: "Established orchards, on thin or impoverished soil may be renovated in the following manner: If a tree has been planted, say fifteen years, and attained the size we might expect in that time, get, say ten feet from the trunk, and dig a circle two feet deep all around it, and fill in with a good compost; the effect the next season will be quite marked. If the tree is older or younger, the distance to start with the circle from the trunk, will of course be proportionate. A top dressing will also be of great assistance, as well as a vigorous pruning out of all weak or stunted branches. Moss and old bark should also be scraped off, and if the trunk and main branches can be washed with a mixture of sulphur and soft soap, much advantage will follow.

"Old decayed bark on fruit trees is always a sign of a want of vigor. When a tree is growing thriftily it cracks this old bark so freely, as to make it easily fall off; but when the tree is weak and enfeebled, the bark often becomes indurated before it has got cracked, and in this state the tree becomes what gardners call 'hide-bound,'

and artificial means must be aborded to aid the tree to recover.

In the cherry and plum trees this is easily done, by making longitudinal incisions, through the bark with a sharp knife. In the peach and apricot, also, I have employed this process with advantage, in spite of learned theories, which have attempted to show up the absurdity of the practice."

The Seckel Pear.

A writer in the Minnesota *Times*, speaking of the fruits, gives the following account of the Seckel Pear:

About the year 1761, a Frenchman was banished from his native country, and settled on the "neck" below Philadelphia. This point of land, then deemed valueless, is a low marsh, lying between the Delaware and Schuylkill rivers, immediately above their confluence. He built his "cabin" on the bank of the Delaware. Some years after taking possession, he observed a small tree growing up near his door. He guarded it with scrupulous care. It proved to be a pear tree. When of sufficient age to bear fruit, he found, much to his suprise, that the pears were of a superior quality and luscionsness. Carying some to market they attracted attention, and were speedily sold. For two score years he derived quite a revenue from that source, obtaining fabulous prices.

I have been told by persons fully acquainted with the facts, that in some instances he obtained *thirty* dollars a bushel. From the fact that "Peter," (his name) was in the habit of hanging his "sickle," a useful harvest implement, on a branch of said tree, it took the name of the "sickle" tree. Modern parlance has refined said vulgarity into "Seckel." The art of grafting not being practised then to any considerable extent, and "Peter" not wishing to impair his exclusive monopoly, permitted no one to obtain shoots. When he died, in 1821, he bequeathed his possession to Stephen Girard.

These strange beings had long been neighbors; but a portion of the time inveterate enemies. A reconciliation was brought about in the following singular manner: Girard had a trench cut near the boundary line of "Peter" of considerable depth, for the purpose of draining his land. When a "high tide" was in, this trench was nearly full of water. It so happened, one day, that "Girard" tumbled in said ditch, and was unable to extricate himself and called loudly for help.

His enemy Peter heard the dolorous cry and cautiously approached to ascertain the cause. Girard was almost suffocated by the muddy water. It occurred to his mind that it was a happy time to exort *favorable peace*. He accordingly proposed his own somewhat selfish terms. The well nigh drowned Stephen gladly acceded, and Peter signed and sealed the provisions thereof by pulling his heretofore bitter adversary out of the awful ditch. The peace so unauspiciously inaugurated, was preserved inviolate, to the death of "Old Peter," and Stephen Girard became his sole heir.

After Stephen Girard became the fortunate possessor of old Peter's heritage he permitted grafts to be taken from the old Seckel tree. By this means the variety was extended. From this one tree all the numerous Seckel pear trees, throughout the length and breadth of the Union at the present day, originated. Probably but few even of our intelligent fruit growers are aware of this indisputable fact.

From the American Agriculturist.

Horses Need Air and Light.

If anything can be done to add to the comfort and health of the horse, no animal deserves more to have such an effort made. Our stables should be constructed with special reference to his comfort and health, and to these all other accessories must yield.

Our fathers' and grandfathers' barns were of the wide, old-fashioned sort, with all manner of loop-holes and air-holes: between the vertical boarding you could put your whole hand. They were originally tight, but when well seasoned, there was light without windows, and the pure air circulated freely. Here was perfect ventilation, and yet talk with those same men about the necessity of ventilating a stable, and they are ready to prove that they have kept horses all their lives, who did well, worked well, were always in fine health and spirits, and that a ventilator is only a fancy idea—one of the new-fangled notions of the present generation.

Our stables have been improved in architectural beauty, and in more permanent form of construction; they are pleasing to the eye, tight, proof against the wind and

weather, and with solid walls of brick and stone—all of which the poor horse would gladly exchange for the pure, fresh air, of which he is now deprived.

In providing for the necessities of a horse, it would be well to ask ourselves, how we should like to be placed in the same situation. If it is healthy for a man to live day and night in a close, damp cellar or underground apartment, then it is healthy for a horse. If it is healthy for a man to live on the lower floor, in an unventilated apartment, with a manure and root cellar beneath him, whose pestiferous miasmas are penetrating every crack, mingling with the foul air he breathes, and rising still higher, permeating the food he consumes, then it is healthy for a horse. But why argue against barn cellars and ill-ventilated apartments?—the proof is abundant to all who want it, and he that cannot be convinced, must cease to wonder why his horses have diseases of the skin, the lungs, the eye, etc., or the glanders, the grease, the scratches, and other diseases that are directly traceable to the impure atmosphere in which he compels them to stand and breathe.

We would, therefore, in the construction of a stable, endeavor to provide against these evils. Build root cellars and other cellars entirely distinct from the barn—at least not directly under the horse stalls; let there be a free circulation of air under the floor, and particularly so throughout the stable apartments. Ventilate the horse stable through the roof, and entirely independent of the other portions of the barn; let the connection between the horse stable and the hay mow be closed tight, except when hay is being delivered. Ventilate the carriage-house through the hay mow and roof.

Let your horses' heads be towards the side or end of the barn, and provide the head of each stall with a fair sized window: a horse wants, under all circumstances, whether tired, sick, or well, plenty of light. When there is light and plenty of fresh air, it is a common practice to turn the stalls the other way, and keep the horse somewhat in the dark. A good horseman knows that a horse enjoys light and air as much as he does himself, and he will thrive better in the coldest winter on the lee side of a hay stack, than he will in a badly ventilated barn, however comfortable it may be otherwise. It is stated that, if the gases exhaled from a horse's body were confined around him by a gas-tight bag, they would cause his death in twenty-four hours, allowing him at the same time to have his head out and to breathe the pure air.

If you want satin-skinned horses, in fine health and spirits, ready at all times to work or to drive, a thorough system of ventillation will be one very important step towards it.

A manure shed should be built outside the stable, and sufficient only to afford protection from wind and rain, with a door connecting with the barn, and running to the floor of the stable, which should only be open when the stable is being cleaned. The exhalations of the manure heap are then not permitted to return to the stable—nor should any of the gases generated in the stable, be allowed to pass into the carriage room or hay mow.

As a matter of economy, it is just as cheap to build a stable calculated to give a horse the greatest amount of comfort, as to build it in any other way. Cellars are handy arrangements, and in the first cost it may be cheaper to put them under the barn, but a few years' experience will show the heaviest balance on the debit side.

GEO. E. WOODWARD.

New York, April 1860.

Geological

INFUSORIAL DEPOSITS WITHIN THE CORPORATE LIMITS OF THE CITY OF RICHMOND.

At a recent meeting of the Boston Nat. Hist. Society, Prof. W. B. Rogers presented some masses of infusorial earth from the tertiary strata of Virginia and Maryland, and gave a description of the geological and other conditions in which this and the associated deposits exhibit themselves in and near Richmond, in the former of these States.

The tertiary formations which underlie the wide plain extending from the seaboard to the eastern margin of the granitic and gneissoid rocks, approach their termination along this meridian, in a series of strata, which are separated by only a short interval from the irregular granitic floor. A little further towards the west they reach their boundary, partly by a rapid thinning away, and in part by abutting, along the hill-sides, against the indented shore of these ancient rocks, here rising to the level of the general upland surface.

In the deep ravines leading into the valley of Shockoe Creek, especially on its western side, we meet with several extensive exposures of the tertiary strata, one of which embraces nearly the whole thickness of both the Eocine and Meocine formations, as locally developed in this neighborhood. In all these localities, the *Infusorial deposit* is found occupying a position immediately above the upper limit of the Eocine stratum, or separated from it by a thin layer of whitish or of more or less ferruginous clay. Like the associated beds, it fluctuates in thickness, as traced from one neighboring exposure to another, varying from twenty to upwards of thirty feet at the different localities on the north side of the valley, and presenting, when measured some years ago on the opposite or Church Hill side, a thickness of nearly fifty feet. In addtion to the microscopic fossils, which, in a more or less perfect condition, make up so large a portion of the mass, this deposit presents a few casts of shells of well-known Meocine forms, of which the Astarte undulata may be mentioned as of the most frequent occurrence. It also contains imperfectly preserved remains of a slender creeping plant, as well as fragments of woody stems and branches, flattened and converted into lignite, and in some cases filled in all directions with the perforations of a Teredo.

The material of the Infusorial stratum is generally of a very fine tetxture, admitting of being bruised between the fingers into an almost impalpable powder, singularly free from gritty particles.

Although usually of a light-gray, almost white color, it includes in some localities layers of an ashy tinge, which are, however, not inferior to the rest of the deposit in the abundance of their minute organic forms. It has throughout a tendency to lamination in a horizontal direction, and towards its upper limit is so distinct as to cause it readily to separate in their crumbly plates. But of all its mechanical peculiarities, its great lightness is the most characteristic. From experiments made many years ago, Prof. Rogers found that, when pure and quite free from moisture, this material, in its ordinary state of compactness, has a weight only one-third as great as an equal bulk of water. The minute silicious fossils for which this deposit has long been noted, belong, as is well known, almost entirely to the family of Diatomaceæ, and includes a very large proportion of Cosinodiscus and allied forms, where exquisitely thin plates, lying in parallel positions in the mass, have probably contributed to the laminated structure before referred to. The number of such frustules and other silicious skeletons in each cubic inch of the pure material can only be reckoned by millions, and a cubic foot would contain a multitude far exceeding in number the entire human population of the globe.—*Annual of Scientific Discovery for* 1860.

Action of the Soil on Vegetation.

The late Professor Gregory left the following summary of recent views relative to the action of soil on vegetation:

1. Way, and after him, Liebig, has shown that every soil absorbs ammonia, and also potash, from solutions containing them or their salts, generally leaving the acid, which takes up lime, &c., from the soil in solution. The ammonia and potash, which are absorbed in very large proportion by arable soils, are rendered thereby quite insoluble.

2. Arable soils absorb also silicic acid in very considerable proportion, and it also becomes insoluble.

3. Arable soils also absorb the phosphoric acid of phosphate of lime, or of ammoniaco-magnesian phosphate, apparently soluting the acid, which also becomes insoluble.

4. Hence the soluble ingredients of manures cannot be conveyed to the plants in the form of a solution percolating the soil, (such as liquid manure, or a solution formed by rain-water with the acid of carbonic acid,) since such a solution is deprived of its dissolved ingredients by filtering through a very moderate amount of soil.

5. Hence, also, as the food of plants must thus be fixed in the soil in an insoluble form, it is plain that it can only enter the plant in virtue of some power or agency in the roots, which decomposes the insoluble compounds in the soil, and thus renders soluble the necessary matter.

6. The absorbent power of soils is partly chemical and partly mechanical, as is the case with charcoal.

7. The quantities of alkalies, of phosphates of ammonia, &c., capable of being supplied to plants by rain-water, after it has been percolated through the soil, even supposing the whole to be assimilated, does not amount to more than a mere fraction of what the plants contain.

8. The theory of the transference of ammonia, potash, silica, phosphates, &c., from the soil to the plant, is not yet understood; but the old theory, that the rain conveys the food to the plant directly, is certainly not the true one.—*Edin. New Phil. Journal.*

Diseases of Plants.

Great obscurity attends this department of botany, and much remains to be done ere a system of vegetable nosology, (*nosos* disease Gr.) can be completed. It is, however, of great importance, whether we regard its bearing on the productions of the garden or the field. Some have divided the diseases of plants into *general*, or those affecting the whole plant and *local*, or those affecting a part only. A better arrangement seems to be founded on their apparent causes, and in this way have been divided by Lankester into four groups. 1. Diseases produced by changes in the external conditions of life; as by redundancy or deficiency of the ingredients of the soil, of light, heat, air, and moisture. 2. Diseases produced by poisonous agents, as by injurious gasses, or miasmata in the atmosphere, or poisonous matter in the soil. 3. Diseases arising from the growth of parasitic plants, as Fungi, Dodder, &c. 4. Diseases arising from mechanical injuries, as wounds and attacks of insects.

Plants are often rendered liable to the attacks of disease by the state of their growth. Thus cultivated plants, especially such as become succulent by the increase of cellular tissue, appear to be more predisposed to certain diseases than others. Concerning the first two causes of disease, very little is known. Absence of light causes *blanching*, which may be looked upon as a diseased state of the tissues. Excess of light may cause disease in plants, whose natural habitat is shady places. Excess of heat is sometimes the occasion of a barren or diseased state of some of the organs of the flowers, and frost acts prejudicially on the leaves, stem and flowers. By excess of moisture, a dropsical state of the tissue is induced.

Concerning the influence of atmospheric changes on plants, very little has been determined. Many extensive epidemics seem to depend on this cause. Thus, the late potato disease must be traced, apparently, to some unknown miasma conveyed by the air, and operating over large tracts of country; the disease probably affecting some plants more than others, according to their state of predisposition, and in its progress leading to disorganization of the textures, alteration in the contents of the cells and vessels, and the production of Fungi, &c. In the early stage of the disease, a brown granular matter was deposited in the interior of the cells, beginning with those near the surface. For some time the cell walls and starch-grains remained uninjured, but were ultimately attacked, the former losing their transparency, and the latter becoming agglomerated in masses. Subsequently to this, parasitic organisms of various kinds made their appearance, cavities were formed, and rapid decay took place. Among the vegetable parasities were detected species of Fusisporium, Oidium, Botrytis, Capillaria, Polyactis, &c. The prevalence of hot or cold weather, the amount of light and moisture, changes in the atmosphere, and electrical conditions of the air and earth, are in all probability connected with epidemic diseases. By some, the late potato disease is attributed to supposed evaporation and transporation, depending on the hygrometric state of the atmosphere. The vessels and cells are said to become charged with fluid, stagnation of the circulation takes place, and thus disease and death are induced.

Gangrene in plants, is caused by the alterations in the contents of the cells, leading to death of a part. In succulent plants, as Cactuses, this disease is apt to occur. Sometimes excision of the diseased part checks the progress of the gangrene. *Canker*, which attacks apple and pear trees, is a kind of gangrene. Some of the most important diseases of corn and other agricultural crops, are owing to the production of Fungi. These have been divided into: 1. Those attacking the grain, as Uredo fœtida or pepper-brand. 2. Those attacking the flower, as Uredo segetum or smut. 3. Those attacking the leaves and chaff, as Uredo Rubigo or rust. 4. Those attacking the straw, as Puccinia graminis or corn mildew.

Smut-balls, pepper-brand or *blight* is a powdery matter, occupying the interior of the grain of wheat, &c. When examined under the microscope, it consists of minute balls, four millions of which may exist in a single grain, and each of these contains numerous excessively minute sporules. It is caused by the attack of the Uredo Caries, or fœtida. In this disease the seed retains its

form and appearance, and the parasitic fungus has a peculiarly fœtid odour, hence called *stinking rust.*

Smut, or *dust-brand*, is a sooty powder, having no odour, found in oats and barley, and produced by Uredo segetum. The disease shows itself conspicuously before the ripening of the crop. Bauer says that in 1-160,000th part of a square inch, he counted 49 spores of the uredo.

Rust, is an orange powder, exuding from the inner chaff scales, and forming yellow or brown spots and blotches in various parts of corn plants. It owes its presence to the attack of Uredo Rubigo. It is sometimes called *red gum*, *red robin*, *red rust*, and *red rag*. Some consider Mildew (Uredo linearis) as another state of the same disease.

Those Fungi which are developed in the interior of plants, and appear afterwards on the surface, are called *entophytic* (*entos* within, and *Phuton* a plant Gr.) Their minute sporules are either directly applied to the plants entering their stomata, or they are taken up from the soil. Many other Fungi grow parasitically on plants, and either give rise to disease, or modify it in a peculiar way. Among them may be mentioned species of Botrytis, Fusisporium, Depazia, Sclerotium, Fusarium and Erysiphe. Fusisporium solani is considered by Martius as the cause of a certain disease in the potato. In the recent potato disease the Botrytis infestans, a species of Fusarium and other Fungi, committed great ravages, spreading their mycelium or spawn through the cells of the leaves and the tubers, and thus accelerating their destruction. Berkeley, Morren, and Townley consider the Botrytis as the cause of the disease. Various species of Botrytis also attack the Tomato, Beet, Turnip and Carrot. A species of Depazia sometimes causes disease in the knots (joints) of Wheat. A diseased state of Rye and other grasses, called *ergot*, owes its production to the presence of a species of Spermœdia. By the action of the fungus the ovary becomes diseased and altered in its appearance, so as to be dark-coloured, and project from the chaff in the form of a spur. Hence the name of *spurred rye*. The nutritious part of the grain is destroyed, and it acquires certain qualities of an injurious nature. Spontaneous gangrene is the consequence of living for some time on diseased rye. Ergot has been seen in Lolium, perenne and arvense, Festuca pratensis, Phleum, pratense, Dactylis glomerata, Anthoxanthum odoratum, Phalaris arundinacea, &c.

Fruits when over-ripe are liable to attacks of Fungi, which cause rapid decay; wood also, especially Alburnum or sap-wood, is injured by the production of Fungi. Dry rot is the result of the attack of Merulius lacrymans, which in the progress of growth, destroys its texture, and makes it crumble to pieces. Some kinds of wood are much more liable to decay than others.

The diseases caused by attacks of Fungi may be propagated by direct contact, or by the diffusion of the minute spores through the atmosphere. When we reflect on the smallness of the spores, the millions produced by a single plant, and the facility with which they are wafted by the wind in the form of the most impalpable powder, we can easily understand that they may be uaiversally diffused and ready to be developed in any place where a nidus is afforded. Perhaps some of the diseases affecting man and animals may be traced to such a source. Quekett found that he could propagate the ergot by mixing the sporules with water, and applying this to the roots.

In order to prevent these diseases, it has been proposed to steep the grains in various solutions previously to being sown. For this purpose, alkaline matters and sulphate of copper have been used. In all cases, the seed should be thoroughly cleansed. Smut and pepper-brand have been averted by these means. In the case of the latter, diseased grains are easily removed by being allowed to float in water, and the grains that remain are washed with a solution of lime, common potash, or substances containing ammonia, which form a soapy matter with the oil in the fungus. A weak solution of sulphate of copper acts by destroying the fungus. To prevent wood from dry rot, the process of kyanizing and burnetizing have been adopted: the former consists in making a solution of corrosive sublimate enter into the cells and vessels; the latter, in impregnating the wood with a solution of chloride of zinc. Creosote has also been used to preserve wood. Boucherie proposed that a solution of pyrolignite of iron should be introduced into trees before being felled, by making perforations at the base of the trunk, and allowing the absorbing power of the cells and vessels to operate. This plan does not appear to have been successful, although reported favourably to the French

Academy, and also recommended by Mr. Hyett.

Other diseases in plants owe their origin to *insects*. *Earcockles*, *purples*, or *pepper-corn*, is a disease affecting especially the grains of wheat. The infected grains become first of a dark green, and ultimately of a black colour. They become rounded like a small pepper-corn, but with one or more deep furrows on their surface. The glumes spread open, and the awns become twisted. The blighted grains are full of moist white cottony matter, which, when moistened and put under the miscroscope, is seen to consist of a multitude of minute individuals of the Vibrio triciti, or eel of the wheat. The animalcules deposits their eggs in the ovary, and their young are hatched in eight or ten days. Henslow calculates that 50,000 of the young might be packed in a moderately sized grain of wheat. The Vibrio retains its vitality long. It will remain in a dry state for six or seven years, and when moistened with water will revive. The Wheat-fly, or Cecidomyia tritici, is another destructive insect. It deposits it oggs by means of a very long retractile ovipositor, and is seen abundantly in warm evenings. The Cecidomyia destructor, or Hessian fly, also causes injury, and is said to be very destructive to wheat in America. These insects are destroyed in numbers by the Inchneumons, which deposits their ova in their bodies. The Apple-tree mussel, or dry-scale Aspidotus conchiformis, attacks the bark of Apples, Pears, Plums, Apricots, and Peaches. Many of the Coccus tribe are highly injurious to plants. One of this tribe, in 1843, destroyed the whole orange trees in the island of Fayal, one of the Azores. Many insects cause the rolling up of leaves. Tortricida viridana acts thus on the leaves of the Oak, and various species of Losotænia do so with other trees. Sacchiphantes abietis is the aphis which causes the leaves of the Spruce-fir to be united together, so as to have the appearance of a cone.

Many insects, called miners, make their way into the interior of leaves, and hollow out tortuous galleries, sometimes causing an alteration in the colour of the leaves. Galls are caused by the attacks of species of Cynips, which are provided with ovipositors, by means of which they pierce the bark or leaves with the view of having a nidus for their ova. These galls are very common on the Oak, and are called *oak-apples*. Sometimes they have one cavity, at other times they are divided into numerous chambers, each containing a grub, pupo, or perfect fly, according to the season. Galls are produced on the twigs, catkins and leaves of the Oak. The artichoke gall of the Oak depends on an irregular development of a bud, caused by the attack of insects, and consistsof a number of leafy imbricated scales resembling a young cone. On examining the galls of commerce, the produce of the Quercus infectoria, some are of a blue colour, containing the larva of the insect; others are pale, and are marked with a perforation by which the insect has escaped. Extensive ravages are committed in Elms and other trees by the attacks of Scolyti. The presence of much moisture, such as the rapid flow of sap, destroys them. Mr. Robert found that the flow of sap might be promoted by taking off the suberous layer of the bark, and he proposes this as a method of getting rid of the insects. Some galls are formed in the substance of leaves, and burst through the cuticle in the form of ovate bodies, with crenate borders and opercula, which are perforated in the centre. These galls resemble parasitic fungi. *Oak-spangles* are galls of this nature. They are attached by a central point to the under surface of the leaf, the inner side being smooth—the outer red, hairy, and fringed. Each contains a single insect, which retains its habitation till March, long after the leaves have fallen to the ground.

It is impossible in this place to enumerate all the insects which attack plants. Almost every species has certain insects peculiar to it, which feed on its leaves, juices, &c., and often cause great injury. Those which are common to hothouses and greenhouses, have called for the special attention of horticulturists, and various means have been suggested for their removal or prevention. Among them may be enumerated, vapour of tobacco, and ammoniacal liquor of gas-works, to kill aphides; vapour of sulphur, for the red spider; vapour of turpentine, for the wasp; vapour of crushed laurel leaves, for the white-bug; coal-tar, for the wire-worm, &c.—*Balfour's Botany*.

Every one that asketh, receiveth; and he that seeketh findeth; and to him that knocketh, it shall be opened.

The eyes of the Lord are in every place, beholding the evil and the good.

From the British Farmer's Magazine.

Feeding Statistics.

SIR,—Agriculturists have been called upon to believe that great discoveries have recently been made in the science and practice of the feeding of animals. To use the words of one of the most notorious of the new lights on this subject:—"The manufacture of an alimentary and condimental compound for the seasoning of the food of live stock, is one of the most important advances in applied science which the pen of the agriculturist has to record."

Being largely interested in the feeding of stock for profit, and having devoted a great deal of time and money in inquiries to obtain fixed data relating to the feeding of animals, the conclusion to which I have arrived is, that no proof has yet been given that these new foods have any practical value whatever in an economical point of view. Nor does a knowledge of the composition of these foods add anything to what was previously known on the subject of feeding.

To enable those who are practically engaged in feeding stock to judge for themselves what profit they are likely to derive from the use of food costing from £40 to £50 per ton, I propose to call attention to a few facts connected with the subject of feeding, which have been established by the results of my own experiments.

The first question to consider is, what is the probable amount of saleable increase, or meat, that may be calculated upon as the produce of a given amount of ordinary good fattening food? The second is, what is the probable value of the manure? In offering a very few brief observations on these two points, I shall not attempt here to give any exact estimates of the comparative feeding properties of different foods, but merely state the average quantity of ordinary mixed foods of recognised good quality, required to produce a given amount of gross increase or of carcass weight. I shall, however, give estimates of the comparative value of the residue remaining for manure, from a given weight of a number of the most important of our stock-foods.

If feeding experiments are conducted over a sufficiently long period of time—if they include a sufficiently large number of animals to neutralize the influence of individual peculiarities, and if they are in all other respects performed with sufficient care, results will be obtained from which there would be but little deviation whenever the experiment was repeated. Results so obtained may be expressed in a few figures, which, for all the practical purposes of general estimates, may be safely taken to represent the average result of well managed stock-feeding.

My own experiments show that oxen and sheep, fed liberally upon good fattening food composed of a moderate proportion of cake or corn, a little hay or straw chaff, together with roots or other succulent food, will yield over a considerable period of time, one part of increase in live weight, for from eight to ten parts of dry substance supplied in such mixed food. The quantity of dry substance of food required will vary between these limits according to the exact character of the food and other circumstances; but nine parts of dry substance of food, for one of increase in live weight, may be taken as a very fair average result for oxen and sheep with good food and good management. The dry substance of the fattening food of pigs contains much less indigestible woody fibre, and a larger proportion of assimilable constituents than that of oxen and sheep, and in their case one part of increase in live weight should be obtained from the consumption of four to five parts of dry substance in their fattening food. By the "*dry substance*" of food is meant that portion which would remain after driving off, by a suitable heat, all the water which in their natural state they contain. For practical purposes it may be assumed that oil cakes and foreign corn will, on the average, contain rather less than one-seventh, and home-grown corn, hay, &c., rather more than one-seventh of their weight of water, the remainder being the so-called "*dry substance*" of the food. In the same sense the commoner sorts of turnips will, on the average, contain more than nine-tenths, and swedes, mangolds, &c., less than nine-tenths of their weight of water, the remainder being dry substance. Potatoes consist of about one-fourth dry substance and three-fourths water. From these data the farmer will be able to judge for himself whether or not he gets a proper increase in weight or live stock for the food consumed; and from comparative experiments he can decide whether or not he gets an adequately greater rate of increase by mixing with his other food some

of the mixtures offered to him at £40 or £50 per ton. To aid him still further in his calculations on this point, it may be stated, that owing to the fact that during the fattening process the saleable carcass increases very much more rapidly than the internal and other offal parts, it may be reckoned that nearly 70 per cent. of the gross *increase* of oxen and sheep fattening over a considerable period of time will be saleable carcass. Calculations of a similar kind, in regard to pigs, show, that of their *increase* in weight whilst fattening, little pigs less than 90 per cent. may be reckoned as saleable carcass.

So much for the means of estimating the value of the increase in live weight of fattening food stock. I now turn to the question of the probable average value of the manure obtained from the consumption of descriptions of food.

The valuation of the manure resulting from the consumption of different foods is founded upon estimates of their composition, and upon a knowledge, experimentally acquired, of the probable average amount of those constituents of the food valuable for manure, which will be obtained in the solid and liquid excrements of the animals. In the estimates of the value of the manure from different foods, given in the following table, I have based my calculations upon what I consider the average composition of several articles, when of good quality.

TABLE,

Showing the estimated value of the Manure obtained from the consumption of 1 ton of different articles of Food; each supposed to be of good quality of its kind.

Description of Food.	Estimated money value of the Manure from 1 ton of each Food,
1. Decorticated Cotton-seed Cake,	£6 10 0
2. Rape Cake,	4 18 0
3. Linseed Cake,	1 12 0
4. Malt-dust,	4 5 0
5. Lentils,	3 17 0
6. Linseed,	3 13 0
7. Tares,	3 13 6
8. Beans,	3 13 6
9. Peas,	3 2 6
10. Locust Beans,	1 2 6(?)
11. Oats,	1 14 6
12. Wheat,	1 13 0
13. Indian Corn,	1 11 6
14. Malt,	1 11 6
15. Barley,	1 9 6
16. Clover Hay,	2 5 0
17. Meadow Hay,	1 10 0
18. Oat Straw,	£0 13 6
19. Wheat Straw,	0 12 6
20. Barley Straw,	0 10 6
21. Potatoes,	0 7 0
22. Mangolds,	0 5 0
23. Swedish Turnips,	0 4 3
24. Common Turnips,	0 4 0
25. Carrots,	0 4 0

It will be seen how enormously the value of the manure from one ton of different foods varies according to the composition of the food itself. Now, from the actual analyses that have been made of several of the expensive "condimental" compound foods, as well as from a knowledge of the chief articles used in their manufacture, it may be safely asserted that a ton of few, if any of them, would yield a manure of anything like the value of either of the first nine articles in the above list. In the case of the majority of these new foods, the value of the manure from a ton of the food would certainly be much less than that from a ton of any one of those nine articles.

To conclude: No experimental evidence upon indubitably trustworthy authority has yet been brought forward to prove that the use of the foods, costing from £40 to £50 per ton, will so improve the rate of increase of fattening stock upon a given weight of dry substance of food, as to compensate for the heavy cost of these condimental additions. Any intelligent farmer can, however, by the aid of the information which has been given above, satisfy himself on the point, if he will rigidly rely upon scales and weights, instead of upon merely casual observation. And with regard to the value of the manure, the figures in the above table, and the observations we have made upon them, will show him how much of his £40 or £50 he may expect to recover in the form of manure.

J. B. LAWES.

Rothamsted, Jan. 18th.

A GENTLEMAN once introduced his son to Rowland Hill, by letter, as a youth of great promise, and likely to do honor to the University of which he was a member; "but he is shy," added the father, "and I fear buries his talents in a napkin." A short time afterwards the parent, anxious for his opinion, inquired what he thought of his son? "I have shaken the napkin," said Rowland, "at all the corners, and there is nothing in it."

Did'nt Think.

Walking in the country one morning, in early spring-time near an orchard gate, very soon we observed a large man hanging to the top-most limbs of a small apple tree with one hand, while with the other he was cutting off twigs and branches. We bade him good morning. He answered cheerfully; and we ventured to hint that the tree he had climbed, bore a heavy burden. "Yes," he said, the trees all need pruning, but I can only attend to a few of them. The others would'nt bear my weight."

"Why don't you fasten your saw to a pole, stand on the ground, and prune such limbs as most require it?" we asked.

"Well, I declare," he answered, that would do—I did'nt think of it."

There was a valuable lesson in that confession—"did'nt think of it." It explained why in many respects, the farmer was not prosperous. He was a hard worker. He endeavored to be economical; but he was always behind. His orchard did'nt yield abundantly—his cattle had diseases—his grain was often poor—and he could only sell at a low price, *because he didn't think*. He had never learned fore-thought—he did not understand how judicious head-work assists hand work.

Did'nt think—that is the sorry explanation of much error—of many a crime—of many a failure—of many a hardship, and many an abuse.

Little boys and girls, bear in mind that whatever advantages you may have at home, in school, in business, or in society, unless you think, your lives will be sad and your efforts unsuccessful. Learn, then, while you are young, the art of thinking. To be great and good, you must understand the art of reflection, as well as appreciate the pleasure of memory.—*Rural Register.*

New Agricultural Product.—Mr. Louis Baker, of this city, has succeeded in raising the "Japan pea," a desideratum which has not before been obtained. The seed which he planted were brought to the United States by Commodore Porter, but have heretofore always failed to germinate. The pea which has just been raised has a pod of all varieties of length up to *thirty-one inches*, the whole of which is palatable and rich. It is very prolific, and when introduced will form a valuable agricultural product.—*Wash. States.*

Parasite Plants.

Parasite plants, as the name imports (*Para*, beside, and *sitos*, food—Gr.) are those which derive their food from other plants—sending prolongations of their tissue into other plants, and preying upon them. Many fungi, for instance, develop their spores (seeds), and spawn (mycelium) in the interior of living or dead plants, and thus cause rapid decay. The disease of corn (edible grains in general, and wheat in particular), called smut and rust, and the dry rot in wood, are due to the attacks of these parasitic fungi. The minute dust, or powder produced by these plants, consists of millions of germs, which are easily carried about in the atmosphere, ready to fix themselves on any plants where they can find a nidus. There are also flowering plants which grow parasitically, and they may be divided into two classes:—1. Those which are of a pale or brownish color, and have scales in place of leaves; and 2. Those which are of a green color, and have leaves. The former, including Orobanche, or broom-rapes, Lathræa, or tooth-wort, Cuscuta, or dodder, derive their nourishment entirely from the plant to which they are united, and seem to have little power of elaborating a peculiar sap; while the latter, as Loranthus, Viscum or Mistletoe, Myzodendron, Thesium, Euphrasia, Milampyrum, and Buchnera, expose the sap to the action of air and light in their leaves, and thus allow certain changes to take place in it. The Mistletoe, from its power of elaboration, is able to grow on different species of plants, as on the apple, beech, oak, &c. Some of these parasites are attached to the roots of plants by means of suckers, as in the case of Broom-rapes, Tooth-wort and Thesium; while others, as Dodder, Mistletoe, &c., feed upon the stems. The plants to which the parasites are attached give origin frequently to their specific names. The species of Cuscuta, or Dodder, inhabit all the temperate and warm parts of the globe, and are peculiarly destructive to clover and lint (flax). They are produced from seed which at first germinates in the soil like other plants; but after the stem has coiled closely round another plant, and becomes attached to it by means of suckers, then all connection with the soil ceases, and the Dodder continues its life as a parasite. A remarkable tribe of parasites, called Rafflesias, has been found in Sumatra and Java. They are leafless, and produce brown-colored

flowers, which are sometimes three feet in diameter. On account of their only producing a flower and root, they are denominated Ritzanths, (*ritza*, a root, and *anthos*, a flower—Gr.)—*Balfour's Botany.*

On the Essential Manuring Constituents of Certain Crops.

At the Aberdeen Meeting of the British Association, Professor Vöelcker detailed the results of certain field experiments, having special reference to the turnip crop, which had extended over a period of four years. These are the most important points cited: 1. That fertilizers destitute of phosphoric acid, do not increase the yield of this crop. 2. That phosphate of lime applied to the soil, in the shape of soluble phosphate (super-phophate), increases this crop in an especial manner, and that the practical value of artificial manures for root crops chiefly depends on the relative amount of available phosphates which they contain. Thus it was shown that three cwt. of super-phosphate per acre produced as large an increase of turnips as fifteen tons of farm-yard manure. 3. That ammoniacal salts and nitrogenized constituents, yielding ammonia on decomposition, have no beneficial effect upon turnips, but rather the reverse. 4. That ammoniacal salts, applied alone, do not promote, as maintained erroneously, the luxuriant development of leaves; but that they produce this effect to a certain extent when salts of ammonia are applied to the land in conjunction with the mineral constituents found in the ashes of turnips.

The report likewise states that numerous analyses of turnips have been made, from which it appears that the more nutritious and best ripened roots invariably contain less nitrogen than half-ripened roots, or turnips of low feeding qualities. In the latter the proportion of nitrogen was found, in several instances, two to two and a half times as high as roots distinguished for their good feeding qualities. Similar experiments upon wheat showed that nitrogenized ammoniacal matters, which proved inefficacious in relation to turnips, increase the yield in corn (grain) and straw very materially, and that the increase of wheat was largest when the ammoniacal constituents were associated with mineral matters.—*Annual af Scientific Discovery*, 1860.

Open rebuke is better than secret love.

Farmers—Take a Hint.

It is very surprising to see how slow men are to take a hint. The frost destroys about half the bloom of the fruit trees; everbody prognosticates the loss of fruit; instead of that, the *half* that remains is larger, fairer, and higher flavored than usual, and the trees, instead of being exhausted, are ready for another crop the next year. Why don't the owner *take the hint* and thin out his fruit every bearing year? But no: the next season sees his orchard overloaded, fruit small, and not well formed; yet he always *boasts* of that first-mentioned crop without profiting by the lesson it teaches.

We heard a man saying, "the best crop of celery I ever saw, was raised by old John ——, on a spot of ground where the wash from the barn-yard ran into it after a hard shower." Did he take the hint, and convey such liquid manure into trenches to his garden? Not all; he bragged about that wonderful crop of celery, but would not take the hint.

We knew a case where a farmer subsoiled a field, and raised crops in consequence, which were the admiration of the neighborhood; and for years the field showed the advantage of deep handling. But we could not learn that a single farmer in the neighborhood took the hint. The man, who acted thus wisely, sold his farm, and his successor pursued the old system of surface scratching.

A staunch farmer complained to us of his soil as too loose and light; we mentioned ashes as worth trying. "Well, now, you mention it," said he, "I believe it will do good. I bought a part of my farm from a man who was a wonderful fellow to save up ashes, and around his cabin it lay in heaps. I took away the house and ordered the ashes to be scattered, and to this day I notice that when the plow runs along through that spot, the ground turns up moist and close-grained."

It is strange that he never took the hint! There are thousands of bushels of ashes lying not far from his farm, about an old soap and candle factory, with which he might have dressed his whole farm.

A farmer gets a splendid crop of corn or grain from off a grass or clover lay.

Does he take the hint? Does he adopt the system which shall allow him every year just such a sward to put his grain on? No; he hates book farming and scientific farm-

ing, and this "notion of rotation," and jogs on the old way.

A few years ago our farmers got roundly in debt, and they have worried and sweated under it, till some of them have grown grayer, and added not a few wrinkles to their faces. Do they take the hint? Are they not pitching into debt again?—*Fruit, Flowers, and Farming.*

A Good Way to Grow Potatoes.

I plant medium-sized sets in good dry loam, about the first of April, and do not cover them more than two inches. As soon as the tops come through the ground, I commence moulding, and never allow the tops their free liberty to the light of night till the month of May is about to say farewell, by which time my crops are nearly or entirely moulded up, and no more labor is required from me on their account, till I find it necessary to pick off the blossom. So now the green tops are generally appearing over the face of the ground, let me recommend to hand-scarify or fork the ground lightly between the rows; and as this is proceeded with, cover those young tops which show themselves completely, though slightly, over head with mould, and by constantly attending to this earthing over head and ears, the mere chance of frost pinching them is done away with; and another consideration, by frequently attending to this, is also of immense advantage to the future of the plants in regard to the openness of the soil and the circulation of air to their roots; the earthing over process thus becomes by degrees completed when in the generality of cases we see it about to be begun.

Besides, the early earthing-over plan, as I will call it, offers another great advantage, by securing a vigorous growth in the tubers. It is easily to be supposed that roots should necessarily be formed before their leaves, as should those of a hyacinth, in order to insure a first-rate flower, but when the tops are allowed to take an undue precocity they are drawing too hard upon the supplies, and nearly ruining the prospects of a crop in order to satisfy an extravagant ambition.—Now, by repeatedly earthing them over head in their infancy, this growing parade is checked and smothered, and the formation of young tubers consequently accelerated, and by the latter end of May, when the tops are allowed their full freedom, the tubers also begin to insist on their share of nourishment from the roots and stems combined, which check all undue extravagance in the branch, and the result becomes a reciprocal action for both? Is it not so? At any rate, I have never had grander tops since I adopted this method.

In finishing off the earthing over, make them to present broad shoulders, slightly inclining towards the stems; thus insuring moisture, and the largest body of soil possible for the tubers to form and grow in within reach of atmospherical warmth and its influence, for by the delectable pointed right angular mouldings generally seen, this is rendered impossible. And so we will now suppose ourselves well on in June, with young potatoes every day for dinner, which, between ourselves, is by no means an unpleasant idea.—*Correspondent American Agriculturist.*

Underdrainage.

WHY IT MAKES SOIL MOISTER IN DRY WEATHER.

Every one can understand why the drainage of land should leave it dryer after rains. It is because the excess of water is carried off through the tiles. Farmers experienced in the cultivation of drained lands, who have drained extensively and tried the effects, agree, *nem. con.*, that it makes the soil moister in times of drouth. But why this is so, they cannot exactly see. If we can make the following understood, they will see that, by the laws of nature, an increase of moisture in dry times, is just as much a natural consequence of drainage, as a diminution of water in wet times.

All soils have, in different degrees, a retentive power over water; that is, they hold a certain portion of water, after all has drained out that will. Sands hold the least. A moderately compact loam holds twice as much as sand; a stiff clay three times as much, and some peaty soils four times as much.—When you supply a soil with water beyond its capacity to hold it, the excess flows off, if unobstructed, and leaves the soil with only so much water as it has a capacity for—in other words, leaves it saturated, and no more. Thus, if you pack your pails, each with a hole in its bottom, one with a common loam, one with clay, and one with peat, each of these soils having been tho-

roughly dried, and then by slow degrees pour a pailfull of water on each, you will find that nearly all the water will pass through the sand; less through the loam, still less through the clay, and very little or none through the peat.

In a heavy rain any soil is more than saturated—has in it for a time more water than it can hold—but the water soon drains off, in case no obstruction is presented, and leaves the soil with its appropriate quantity of water; that is, so much as it can hold and yet be in a sound condition, such as to feel solid under your feet, and not to poach when the cattle walk over it.

But while the soil remains full of water, as while a heavy rain is falling, the air is pressed out, and then, as fast as the excess of water settles away into the earth, the air follows, and occupies its place. The soil examined in this state would appear to be made up of particles, each particle moistened with water, and air circulating through the intervening spaces. The difference between this and a soil that is water soaked, is that the spaces in one case are completely filled with air, in the other with water.

It is a well established fact, that air always contains more or less watery vapor, varying from half to one and a half per cent, and averaging about one per cent. The more air is heated, the more water it can hold in solution; and if it is suddenly cooled, it gives up a portion of its water to any object it comes in contact with. For illustration, you set a tumbler of cold water upon your dinner table, on a dry summer's day. You may wipe the outside as dry as you please, but soon it will be wet. The children say the tumbler sweats. But the truth is, the heated air coming in at the door and windows, as it passes by the tumbler is cooled; its capacity for water is lessened; and it deposits a portion of its water on the cool surface of the tumbler.

Just so, when a soil is open and porous, with a free circulation of air among its particles, the air coming into the soil in a heated state, is cooled by contact with the particles, and deposits on their surface a portion of its watery vapor, precisely as on the tumbler, in the other case. It will not do to say that these particles of water, thus deposited, are too small to amount to anything. On the millions of particles in a single spadeful of soil, they amount to a great deal, equal, throughout the body of the soil; in the course of a day, to a pretty good shower; and this is the reason why farmers who underdrain, and plow deep, and stir the soil often, seldom or never suffer from drouth.—*Ind. Farmer.*

From the Charlottesville Review.

Tobacco Fertilizers.

HOLKHAM, April 19, 1860.—You were so polite as to solicit me to say something occasionally through your paper on the subject of agriculture, and I embrace this opportunity of urging upon the growers of tobacco the propriety, I might say the absolute necessity, of selecting good soil only, and cultivating at least one-third less; concentrating their manures, home-made and bought, on a smaller surface, and making larger, heavier and richer tobacco, which invariably commands a remunerative price, because so few planters have the sagacity to adopt the only sure mode of raising this description of tobacco.

At this time the price of ordinary tobacco is so low, that no one can afford to grow it, while large, rich, heavy tobacco pays well. Some planters will doubtless say their soil is too poor to produce tobacco of this description, not so, however, except in but few instances. The writer of this has generally as good tobacco as his neighbors, whose lands are held from fifteen to twenty-five dollars per acre higher—overcoming the great inferiority of soil which this fact will indicate, by a greater concentration of manures and giving to its cultivation and general management, that attention, which could not be given to a large and full crop.

It may be said that if every one adopts this plan, the best tobacco will likewise come down to a ruinously low price. I grant it; but this can never be the case, as the farmers (generally with but few exceptions) seem to prefer groping in Egyptian darkness, and rarely abandon the error of their ways. Having received a great number of inquiries by letter and otherwise, as to the fertilizers I shall use on my soil for tobacco, to save much trouble I will here state, that I shall apply one half-barrel to the acre, of plaster, containing 10 per cent. potash, which I procure of Samuel Sands, Esq,, of Baltimore, editor of the Rural Register; and in addition to this, from one hundred and fifty or two hundred and fifty pounds of a preparation made by R. H. Sta-

bler, Esq., for Messrs. Fowle & Co., Alexandria, containing two-thirds Peruvian Guano, and one-third Soluble Phosphate, made by treating Sombrero Guano, with sulphric acid. I used this last, on my wheat last Fall, as did several of my neighbors, and from present appearances, I consider it an exceedingly valuable fertilizer. All of the simple phosphates, unless treated with sulphuric acid, are too insoluble, I fear, to produce any perceptible effect on the immediate crop, and especially those grown entirely during the Summer and Fall.

Experiments have been repeatedly made in England, (where there is so much more humidity than here,) establishing the fact that one bushel of soluble phosphate will produce as great an effect on the crop as five in the crude insoluble state.

Many short-sighted farmers will doubtless be deterred from using the above fertilizer to the extent which I have recommended; but who should hesitate one moment, when an expenditure of from eight to ten dollars per acre, will ensure a crop, in ordinary seasons, worth from $125 to $150 per acre, and afterwards a good crop of wheat and stand of grass.

I shall experiment, also, with some Elide or California Guano, applying at the same time the preparation of Plaster and Potash, which I consider highly important, whatever else may be preferred.

In writing the above, no one, I trust, will be induced to suspect even, that I wish to disparage other preparations, of which there are now such a number, nearly all of which seem to have produced good effects on some soils, and with some persons. As an humble famer, in my plain way I have endeavored to respond to those who have been so kind as to deem my opinion and practice of some value.

Such as they are, very hurriedly written, I send them for publication, trusting that those, at least, who have induced me to prepare them, will properly appreciate my motives.

If acceptable to your readers, I may perhaps say more to them, occasionally, on subjects interesting to Agriculturists.

In haste most truly yours,

JOHN R. WOODS.

Let your light so shine before men, that they may see your good works, and glorify your Father which is in Heaven.

Cooking by the Sun's Rays.

BY PROFESSOR JOSEPH HENRY.

Were it not for the ærial envelope which surrounds our earth, all parts of its surface would probably become as cold at night, by radiation into space, as the polar regions are during six months' absence of the sun. The mode in which the atmosphere retains the heat and increases the temperature of the earth's surface may be illustrated by an experiment originally made by Suassure. This physicist lined a cubical wooden box with blackened cork, and, after placing within it a thermometer, closely covered it with a top of two panes of glass, separated from each other by a thin stratum of air. When this box was exposed to the perpendicular rays of the sun, the thermometer indicated a temperature within the box above that of boiling water. The same experiment was repeated at the Cape of Good Hope, by Sir John Herschel, with a similar result, which was rendered, however, more impressive by employing the heat thus accumulated in cooking the viands of a festive dinner. The explanation of the result thus produced is not difficult, when we understand that a body heated to different degrees of intensity gives off rays of different quality. Thus, if an iron ball be suspended in free space, and heated to the temperature of boiling water, it emits rays of dark heat, of little penetrating power, which are entirely intercepted by glass. As the body is heated to a higher degree, the penetrating power of the rays increase, and finally, when the temperature of the ball reaches that of a glowing white heat, it emits rays which readily penetrate glass and other transparent substances. The heat which comes from the sun, consists principally of rays of high intensity and great penetrating power. They readily pass through glass, are absorbed by the blackened surface of the cork, and as this substance is a bad conductor of heat its teperature is soon elevated, and it in turn radiates heat, but the rays which it gives off are of a different character from those which it receives. They are voluminous, and have little penetrating power; they cannot pass through the glass, and are retained within the box, and thus give rise to the accumulation of the heat. The limit of the increase of temperature will be attained when the radiation from the cork is of such an intensity that it can pass through the glass, and

the cooling from this source becomes just equal to the heating from the sun. The atmosphere which surrounds the earth produces a similar effect. It transmits the rays from the sun and heats the earth beneath, which in its turn emits rays that do not readily penetrate the air, but give rise to an accumulation of heat at the surface. The resistance of the transmission of heat of low intensity depends upon the quantity of vapor contained in the atmosphere, and perhaps also on the density of the air. The radiation of the earth, therefore, differs very much on different nights and in different localities. In very dry places, as for example, in the African deserts and our own western plains, the heat of the day is excessive, and the night commensurably cool. Colonel Emory states, in his Report of the Mexican Boundary Survey, that, in some cases, on the arid plains, there was a difference of 60° between the temperature of the day and that of the night. Indeed, the air is so permeable to heat, even of low intensities, in this region, that a very remarkable difference was observed on some occasions when the camp ground was chosen in a gorge between two steep hills. The interradiation between the hills prevented in a measure the usual diminution of temperature, and the thermometer in such a situation stood several degrees higher than on the open plain.—*Scientific American.*

The Tendency of Inventions to Mitigate Human Toil.

The application of machinery is the extension of man's mechanical powers. With the levers and pullies of his own mechanical frame, he can raise a given weight, or transport a burden through a given space. But how limited the extent of his unaided efforts? How soon must all his native energies be exhausted? But seizing nature's elements, and applying nature's mechanical laws, he extends his powers to inanimate objects, so that instead of his mind directing the machinery of his own hands, or his own mechanical system only, it becomes the directing agency of a vast and complicated machinery, effecting results beyond the capability of thousands of his species. Without artificial machinery, the efforts of the human mind must be limited by the efforts of the human hands; but with the full development of mechanical inventions, the mind will be enabled to establish a most comprehensive supremacy over the world of matter. How feeble the power of the human hand, compared with the stroke of the steam-engine, and yet these hands can direct all its movements. How diminutive is the helmsman when contrasted with the mighty ship, which he directs in her course through the waste of waters; and yet it is but the extension of his moral and physical power over the varied parts and movements of this vast machine. How apparently insignificant are the operations in a spinning mill, compared with the magnitude of the machinery by which they are surrounded; and yet all these wheels, and shafts, and spindles, are but an extension of their own mechanical system, presided over, and directed by mental being. The desired results are increased ten thousand-fold, and yet, the amount of manual and mental exhaustion is proportionally diminished. It is thus, that by mechanical inventions, man establishes his supremacy over elements of nature, in order to employ them in his service, and render them subservient to his interests.

How different is the amount of physical force required in a modern quarry, with powder for rending the hardest rocks, with levers and cranes for lifting the huge masses —with railway tracks to remove them to a distance, and machinery to prepare and place on the building—compared with ancient times, when hundreds of slaves were yoked to a block of stone, to remove it from the quarry to the destined building! Similar changes have occurred in every other department of operative production. The plow rapidly effects what a whole community could not accomplish with the spade. The sickle, the scythe, and the modern reaper cut down the yellow grain with a velocity which the hands of the whole population, unfurnished with an implement, could never have attained. Thus labor is set free from the agricultural world, to meet the demands of the commercial, without a diminution of the food raised, or the capability of preserving it. Nay, so divinely regulated have been the agricultural and manufacturing implements, that modern draining, sub-soil plowing, reaping, threshing, grinding and baking machinery, stand contemporary with the steamship, the spinning mill, the power loom and the railway. And thus, there is division of labor upon an extensive scale, each department is found keeping pace with

every other. Consequently, the increase of the human family, or their advancement in one or other department of civilized comfort never outstrips the amount of requisite provision yielded by the soil. Nor even where that provision is increased a thousand-fold, does the burden of toil press heavier upon the peasant or the agriculturist. Progressive discovery and invention are constantly balancing between the amount of produce required, and the amount of toil; so that the latter is gradually diminishing in each department, while the former is steadily increasing throughout the whole.

Thus, it is manifest, that in every department of labor, machinery is taking the place and performing the office of human hands. The products of the mineral, vegetable, and animal kingdoms are assuming the place, in the region of toil and accomplishing the purpose of men under a former system. In the spinning mill, the power-loom, and the railway, the steam-engine is the substitute for animal strength. A pint of water and a pound of coal originate a power and sustain a motion which would soon wear out the human system of the strongest operative. The metal fingers moved with exhaustless energy and devouring speed, set at defiance all attempts at manual competition. A steam engine of one hundred horse power has been computed at the strength of eight hundred and eighty men.* This is sufficient to produce and sustain the motion of fifty thousand spindles each producing a separate thread of a mile and a quarter in length in twelve hours. Thus every twelve hours of fifty thousand spindles will produce sixty-two thousand five hundred miles of thread, a length sufficient to go two-and-a-half times round the globe. In ordinary practice these fifty thousand spindles require seven hundred and fifty persons to superintend their operations; but, by the aid of this machinery, propelled by the power of steam, they can convert as much raw cotton into yarn as would have required two hundred thousand persons by the former method of spinning. Thus, by the aid of inventions, which is simply the employment of so much water, and coal, and iron, the labor of one individual is made equal to the combined efforts of two hundred and twenty-six. This holds true in a greater or less degree of every other department of machinery where steam is employed; the rapidity of production is accomplished by the decrease of human toil. How remarkably is this illustrated by the railway, which is, indeed, the great conservator of human strength! Where the same distance is traversed by walking, or even by the best modes of locomotion previously introduced, how soon would the human system wear down under the operation? But the entire sum of physical strength would be utterly inadequate to meet modern demands; hence, all that has been obtained beyond the powers of walking, must be put to the account of human inventions. Nor is the amount alone affected; this entire increase of locomotive power has been obtained while there has been a corresponding decrease of bodily fatigue.

The reduction of human labor might be illustrated by the history of each individual mechanic, as well as by the productive power of all combined. The human mind is gradually planning and constructing some implement of industry which may release the human hands. Thus the mind is gaining supremacy over matter—the mental is directing and controlling the material. The higher and nobler faculties of man are expanding, while the physical powers are relieved and his toil diminished. But this process will not be completed by merely transferring the burden of toil from the physical to the mental. The ultimate tendency is to relieve the whole man from toil as a burden, and to make necessary labor a pleasant exercise. In the rapid progress of the present age may be seen signs of approaching deliverance from the evils incident to manual labor. Already are the heavier kinds of work transferred to untiring machinery, so that by mere direction, one man can accompilsh what previously hundreds could not have effected.

OBJECTION.

"Why has not the introduction of modern inventions already produced the results specified?" Is it not a fact that the population of our cities is as busily occupied as before the introduction of spinning mills and railways?" It is fully admitted that the fruits of modern inventions are but partially developed, and the community as a whole, is more busily occupied than even under the former system. But there are both moral and social reasons sufficient to account for the fact. The moral state of the masses is

* Instincts of Industry.

not yet such as to admit of that full measure of relaxation which machinery is calculated to afford, while there are social revolutions sufficient to account for the seeming paradox, that while machinery is doing the work of man, humanity itself should be more occupied. It must be observed that in connection with this rapidly increasing power of production at home, new nations have been springing up abroad, at once absorbing the operative classes and increasing the demand, in accordance with the powers of production; while national wealth and comfort have been increased to all. Besides, the covetous spirit of man may and will pervert the choicest blessings. The race for riches has kept pace with the newly developed means of acquisition, and consequently, that release from grinding toil, which ought legitimately to be awarded to the operative, has been either wasted in fruitless competition or turned into channels of personal aggrandisement. But though, in the present progressive state of transition, in the social history of the world, and in the earlier efforts of mechanical invention, the demand may seem to keep ahead of the increasing speed of production; and though this at first sight would seem to indicate that no release from toil can be expected by the introduction of mechanical inventions, yet, viewing the subject as a whole, it is evident, that when machinery has attained its climax, and when the various departments have been balanced and adjusted, and when the entire system of manufacture and commerce shall be directed and regulated by sound moral principles, the necessary tendency of machinery must be to emancipate the operative classes, and thus to equalize the privileges of those who employ, and those who labor. Even under all the disadvantages resulting from a transition state, and in spite of the covetousness of the age, the hours of toil are already abridged, and the physical system so far relieved as to encourage mental culture. The ultimate result of this must be the revival of social and domestic affections, which are ready to expire under the exhaustion of physical slavery. Enlightened legislation has judiciously fixed the age as well as the time, beneath and beyond which grasping employers shall not be permitted to protract the hours of toil in public factories. This legal movement has been succeeded by another, still more praiseworthy, as it presents a nobler aspect of mutual interest between employers and employed, in which merchants and shopmen have voluntarily agreed to abridge the hours of daily attendance, besides, in many notable cases, adding the Saturday half-holiday as preparatory to the Sabbath. Let the covetous learn that "a man's life consisteth not in the things that he possesseth;" and let the avaricious be taught the benevolence of the gospel; then shall the Saviour's definition of a day be taken as a standard, and all classes shall enjoy the domestic bliss of the evening. "Are there not twelve hours in the day?" was the interrogation of Him who set the sun in the firmament. Will any man be prepared to say, that this is not a sufficient time to devote to the pursuits and objects of this present world? The aid of machinery renders the abridgment of the period of labor practicable. It is avarice alone that gives rise to a spurious competition, and encroaches upon the privileges of domestic life. It is evident that even now the long-hour system, opposed as it is to the claims of nature and grace, is doomed. That God who made the sun to rule the day, also framed the human constitution in accordance with this physical arrangement, and that which the introduction of sin has deranged in the past history of man, the grace of the gospel will rectify in the coming Millennium. * * *

THE TENDENCY OF INVENTIONS TO ALLEVIATE HUMAN MISERY.

It has been previously established that the whole tendency of machinery, legitimately applied, is to reduce the quantity, and improve the character of manual labor. The transference of the heavier portions of human toil to mechanical inventions, is the direct method of cutting off a vast amount of physical suffering. Indeed, under proper regulation of machinery it is possible to remove all that constitutes actual suffering in legitimate labor. But it is very evident that the mitigation of mental and physical exhaustion must be accompanied by a reduction of disease. The substitution of activity in superintending machinery for the patient endurance of grinding toil, must necessarily tend to the health of the mental and physical system.

Mechanical inventions also tend to promote health, and to alleviate human misery, by removing these physical causes which produce disease, especially in towns and cities. The improvements of modern times

in architecture, in the formation of streets, in the introduction of water, the subterranean sewerage, the burning of smoke, the disinfection of putrid substances, the lighting, ventilation and construction of public buildings and private habitations, must all tend to improve health, prevent disease, and mitigate suffering. The progress of medical science, aided by chemical investigations, gives even increasing success to the pharmacopœia of Nature, while, already, the improvement of surgical instruments, in conjunction with the use of chloroform, and other narcotic agents, has mitigated the excruciating pain formerly endured under surgical operations. Besides, the discovery of this agent, has marked a new epoch in the healing arts, by giving a wider range to human ingenuity, by sparing the feelings of the operator, as well as the pangs of the subject. Is it not a remarkable fact that this secret should be disclosed in Britain at the very time when it may be most extensively employed in dressing the wounds, and amputating the shattered limbs of her soldiers, upon a distant field of battle? Are these not signs of coming deliverance from a vast amount of physical evil? What the achievments of the future may be, none can predict, but enough has already been realized to warrant the hope that agents such as these may be rendered available in mitigating all those forms of suffering which are incident to the nature of man in a fallen state. The mind must be skeptical indeed, that recognizes not the hand of God in the discoveries and improvements of medical science, as readily as that hand is seen in the forms of disease. Do we not, even now, behold in the triumphs of the present age the harbingers of that blessed future, which the poet anticipated under the sanction of inspiration, and of which he says :—

"Disease was none; the voice of war forgot;
The sword, a share, a pruning hook, the spear.
Men grew and multiplied upon the earth.
And filled the city and the waste, and Death
Stood waiting for the lapse of tardy age
That mocked him long."—*Pollock.*

Blakeley's Theology of Inventions.

Blessed are they which are persecuted for righteousness' sake, for theirs is the Kingdom of Heaven.

Blessed are the pure in heart, for they shall see God.

Agricultural Letter.

We lay before our readers the following Reports to "The Nottoway Club," which have been kindly furnished us for publication in the *Planter*, by the permission of its members.

We are under obligations to them for many similar favors, hitherto bestowed: and we hope that we shall be their debtor for a great many more, in future.

Would that Virginia could justly boast of many such "Clubs" in her borders; they would afford strong protection to her agricultural interests, and prove a mighty weapon with which to combat, and beat down ignorance, prejudice and sloth.

For Sou. Planter, from the Nottoway Club.

Brickland, Va., May 9th, 1860.

To Richard Irby, Esq.

Dear Sir,—I am in receipt of yours inviting me to a meeting of the Nottoway Agricultural Club, on to-morrow, at the Nottoway Foundry, to celebrate its tenth anniversary.

It would be very agreeable to me to accept your kind invitation, if it did not interfere with prior engagements.

Agricultural reunions have gotten to be an institution at the South, and their beneficial influence is obvious throughout the whole planting regions. They extend social relations, engender rivalry and imitation—diffuse information more impressive and practical when aided by our valuable periodicals, and the Nottoway Club is doing its work like men and patriots.

With a diversified soil of "Chinquepin" ridges, where every ounce of manure gives you the American weed, with valleys of Chocolate loam and numerous streams bordered with flat, rich bottoms, it may well be questioned whether it would be prudent to exchange for the blue limestone lands of our mountain valleys, or the deep, wide alluvial soils of the "great Father of Waters." Your lots with wide hanging tobacco, and gracefully waiving wheat fields, and lawns well sodded with grass and clover, attract the attention and favorable mention of the traveller, and attest the benign influence of your society. Your county is entitled to the banner in the competition for the greatest quantity of tobacco to the hand, and by the "accumulation and application of manures." The cultivators of your chinquepin ridges, have long been buying out the river bottoms and mountain valleys.

My earliest lessons in planting were given to me by the Fitzgeralds and Irbys—The first said, "to make good crops, or succeed in planting, give your fields a daily gaze"—accompanying the injunction, by applying a finger to the under lid of each eye, exposing a pair of as large, intelligent black eyes as any man ever had. Who could forget such natural teaching?

The second, to my question, "Do tell me the secret of your success in the management of Overseers?" Replied, "do not excite their prejudices; teach them their character is their capital, and that your interest and theirs is identical. Why sir, my overseer has been living with me five years and has never owned a saddle; he thinks the grass would get an advantage of him if he went to the Courthouse." In those days, Overseers boasted of their right to visit monthly courts, and that practice sometimes gained them a blood shotten eye, and always grassy crops for their employer.

This gentleman was justly regarded as a worthy model of the Virginia planter, and by the zealous exercise of his sound, good sense, in every department, and by the "accumulation and application of manures," he produced a high degree of improvement, and demonstrated that the system may be carried too far and imperil health. Superabundance of vegetable matter, breeds animalcules, fungi and malarious fevers. His experiment proved there should be limits to the vegetable application to soils; and, doubtless, he was a martyr to the successful and profitable application of his farming theories.

The mission of your society is based on just and benevolent principles, to improve the condition of a copartnership of labor; the stock contributed on the part of the white man is *mind*, and that of the black man, *muscle*.

The fulness of the corn-crib and smokehouse, is common property, and should crevasse or drought come, the black man knows he will be amply fed, clothed and cared for, unless "Masser" has lost his credit. Then he is ready and willing to form a new copartnership.

The white partner is sovereign to the extent of his domain, and is responsible for his administration to good neighbourship and the laws of society; his interest, feelings and humanity alike, inducing him to give ample protection to his negroes, abundant, wholesome food, good clothing, with the best nursing and medical skill when sick. The black man is best off, when restricted to his own log cabin literature;—the moral teachings of example; his religious exercises;—the excitement of the dance. He is naturally religious, and his implicit faith makes him the better Christian and slave. The white man has more individuality and care; the black man more faith and contentment.

It is a system that is progressive; it must and will last forever. Tobacco and cotton have become to be necessaries, and the world will have them. Tobacco has lived and gotten into general use, in despite of governmental prohibitions and taxations, and all the fulminations of fanatical clergymen and doctors of medicine. The wants of man require cotton and will have it. The white man never has made cotton, nor will he ever do it. As the tropics are as a wall of fire to the whale, so is the climate of the cotton growing belt to the laboring white man.

African labor must and will continue to furnish tobacco, cotton, sugar and coffee,—utilitarian progress will crush out abolitionism. It is the foundation of a new sociology, and will preserve the individuality of man, our federative system and self-government.

Agriculture is the great desideratum of Americans, Professors, Lawyers, Doctors, Merchants and the Sailor regard their vocations as the pedestal, Pisgah's Top, the attainment of which is to enable them to retire to the comforts and mellow influence of a good plantation—Washington, Jefferson and a host of great men, hastened from the highest pinnacle of fame, to wear away their three score years and ten on their own farms. If the "old man eloquent" had have owned a plantation in Nottoway, well stocked with African laborers, as Nottoway plantations generally are, he would not have died "in harness."

With thanks to yourself and the committee, and the hope that your society may continue to achieve good results,

I am, very truly,

STERLING NEBLETT.

For So. Planter, from the Nottoway Club.

Experiments with Peruvian and Sombrero Guanos.

In the spring of 1859, I determined to make a comparison of the results of the application of Peruvian and Sombrero Guano,

and of the two in combination; to that end my tobacco lot was as nearly equally manured, with home made manures broadcast, as I could accomplish it, nearly the whole of the lot was then dressed with a mixture of equal quantities of Peruvian and Sombrero Guano, at the rate of 260 pounds to the acre in the drill; through the middle of the lot, I then drilled ten rows with 260 pound per acre of Peruvian Guano unmixed, and immediately along side, ten rows with 260 pounds per acre of Sombrero Guano. In the fall, say 1st of October, I cut one hundred plants of tobacco from each experiment, taking the plants as they stood without selection, they were placed on marked sticks, and lay in the same room; in the month of January, 1860, they were stripped and weighed the same day; the one hundred plants manured with the mixed Peruvian and Sombrero weighed 34 pounds, or at the rate of 1360 pounds per acre; those manured with Peruvian Guano, weighed 42 pounds, or at the rate of 1680 pounds per acre; the one hundred plants manured with Sombrero Guano, weighed 40 pounds, or at the rate of 1600 pounds per acre. To the eye, the tobacco manured with the mixed Guano seemed to be largest, but, to my surprise, weighed least; that manured with the Peruvian Guano, when stripped, was manifestly the richest and heaviest.

Respectfully submitted,

WM. R. BLAND.

April 12th, 1860.

For the Southern Planter, from Nottoway Club.

Reciprocal Relations of Farmers and Millers.

MR. PRESIDENT:

In discharge of my annual obligation, I propose to discuss a subject of much more importance than is usually attached to it. I refer to the reciprocal relations of farmers and millers. Owning three mills myself, I can take the liberty of expressing the opinion that there is not a more fruitful source of imposition and injustice to each party, as such operations are usually conducted. I claim no exemption for my own, but if any imposition be practised, I desire to furnish the means of detection. Injustice is frequently visited on the miller by the usual practice of selecting a mill-boy without any regard to his honesty or carefulness. I have known turns to leave the mill with the boast of the miller, for favorable turn out, but so depleted by depredation before reaching the owner, as to excite complaint. Such occurrences indicate the necessity and propriety of some uniform standard of management, precluding such results. The plan I recommend is, for the farmer first to secure what is termed a sealed half bushel measure, with iron strips across the top, to prevent abrasions from the friction of measurement, or variation from the convexity or concavity of the striker; that the owner should for one time at least, attend to the measurement of the corn, (even measure) that he accompany it to the mill, and see in person to the tolling and grinding—that he shall measure the product at the hopper, and again at home, the quantity being slightly lessened by the agitation and compression of the removal; that he shall then measure out for each person on his farm, the requisite quantity for a day or week, and ascertain thus exactly how much corn will make the requisite quantity. This being once done, will answer for life, and tend to preserve the satisfactory, mutual intercourse of the parties, as well as check any proclivity to dishonesty on the part of the miller or mill-boy. For the benefit of those who may not find it suitable or convenient to superintend the process, I will present some results in a measure superceding such necessity. A bushel measure is generally considered to contain but 8 gallons, but it will be found generally to contain near 10 gallons, and properly ground will yield 13 gallons of meal at the hopper. I regard it as not an unreasonable calculation on the part of the farmer, that after paying ⅛ for toll, he should receive back in bulk ⅛ accession in meal. If properly ground the bulk is not reduced by the process of sifting, as it lies lighter after that operation. The calculation should always be made by an even measure, as the heaping may be irregular. Perhaps the safer plan would be to weigh all, though there is a necessary reduction in weight from evaporation, wastage, &c. Where there is regularity in the quantity sent and ground, and at regular intervals, the miller can tell when it is received, whether there is any material diminution, and can refuse to receive it, reporting the fact, and the person sent to mill can do the same, and when it is understood that such particularity is mutually observed, no difficulty is likely to arise.

This regularity also ensures a constant

supply, otherwise some suffering will result from sudden exhaustion. I am persuaded that a regard for these regulations is essential to a proper and friendly understanding and intercourse with all concerned, and that no person can properly and safely complain without them I am farther persuaded that no person in the usual negligent arrangements of the country, loses less than the amount of his annual taxes, or will save less by a proper observance of these necessary precautions. This discussion might be advantageously extended as to the proper system of management in providing and distributing supplies for servants either by the day or week, and on which I would be gratified by the views of others, preparatory to a decision, and most judicious selection.

May 10*th*, 1860. E. G. BOOTH.

Report on Guanos.

Last year I tried several different kinds of guano. I laid off rows of corn, and applied on alternate rows Peruvian and American in equal quantities, as nearly as practicable, at about the rate of 200 lbs. to the acre. The early part of the season being wet and favorable to the growth of corn, the crop took a rapid growth, the Peruvian bringing it forward much the most rapidly, and the American showing quite plainly. The latter part of the season proving dry, the Peruvian gave back, and at the maturing of the corn, there was no perceptible difference between that and the American —neither of them, owing to the peculiar season, proving of any material benefit. There have been seasons in my experience, where Peruvian will do more harm than good, and this was one of that sort.

I also tried Mexican and Nevassa guanos, and Superphosphates of Lime, Rhodes', and one made in Philadelphia, Twell's. I could observe no material difference between them, all of these being used in combination with Peruvian guano on Tobacco. The season being very wet, I am disposed to think none of them had a fair chance to show their merits, and I am doubtful whether I was repaid for their cost.

Respectfully submitted, by

May, 10*th*. RICHARD IRBY.

If ye forgive men their trespasses, your heavenly Father will also forgive you.

Manufacture of Wafers.

The mode of making the best quality of wafers, as practiced by the English manufacturers, is as follows:—Fine wheat flour is taken, and mixed with white of eggs and isinglass into a very smooth paste; this is spread over tin plates evenly, and dried in an oven, several of the plates being placed one over the other to communicate a glossy surface to the wafers. When dry, the sheets of paste thus formed, are laid up in a pile, about an inch or more in depth, and cut into circular pieces by a hollow punch, which, allows the wafers to pass up its tubular cavity and discharge themselves sideways as the cutting proceeds, which is effected with great rapidity. The variety of colors that are ordinarily communicated to wafers, is given to them in the paste, by the usual pigments in the dry powder state, or previously dissolved in the water employed. The French isinglass wafers, made in France, are formed of isinglass dissolved in water to the proper consistence, which is poured out upon plates of glass provided with borders, and laid upon a level table; to prevent the blue from sticking to the plates, a little ox-gall, or other, suitable material, is robbed over them. Previous to the isinglass becoming quite dry, they are cut through along the borders. The leaves are then removed and cut with hollow punches, as in the case of other wafers. The various colors are also communicated to them by pigments while in the fluid state.—*Scientific Artisan.*

Cutting Glass without a Diamond.

A subscriber to the *Agriculturist*, A Mead, N. Y., writes that glass may be readily cut with a file, by keeping it wet with spirits of turpentine, which gives it a "bite." We have seen the following process recommended for dividing circular vessels as bottles, jars, etc. Fill the vessel with any kind of oil up to the point where the division is to be made. Heat an iron rod to redness, and slowly introduce it into the top of the oil; the glass will crack in an exact circle around the surface of the liquid. The heat imparted to the oil, causes the inner side of the jar to expand rapidly, and thus makes a break.

[REMARKS.—The last recommendation is of doubtful utility. We have often cut off glass bottles readily by first filing a small

notch for a starting point, and then applying a hot iron rod, or poker, moving it slowly back and forth along the line where we wished the crack. By keeping the iron ahead of the break, you can *lead* it in any direction desired, so as to cut off the bottle square or at any angle. When at work in the laboratory, we often made extempore tumblers for holding various substances, by thus cutting off the upper part of bottles, of which the necks had been broken. We have also made gas transferrers, etc., by cutting off the bottom of cracked bottles, leaving the neck and main body whole, with the bottom open. After a little practice any one can, with a hot iron, *lead* a crack in a bottle, tumbler, or along flat glass, in any desired direction. The sharp edges can be smoothed or rounded with a fine file, or by grinding. We have often cut a pane of glass nearly true across, by filing a slight notch in the edge, laying on cold iron, or even a strip of wood for a rule, and then passing a hot iron back and forward, along the place where the fracture is desired.—Ed.]—*American Agriculturalist.*

Can't Afford It.

Those who are counting the cost of dissolving the Union, may close their calculations somewhat after the fashion of the old woman in the subjoined anecdote:—"A person having occasion to visit an old couple in Durham, of extremely penurious habits, found them holding counsel together upon a matter which apparently weighed heavily upon the minds of both, and thinking it was respecting the probable dissolution of the wife, who was laying dangerously ill, proceeded to offer them all the consolation in his power; but was cut short by being informed that this was not exactly the subject they were discussing, but one which afflicted them still more deeply; viz: the cost of the funeral; and, to his astonishment, they continued their ghastly calculations until every item in the catalogue, from coffin to night cap, had been gone through, with much grumbling at the rapacity of 'the undertakers,' when the bright thought suddenly struck the husband, and he exclaimed—'Well, Janet, lass, you may not die after all, ye ken.' 'Deed, and I hope not, Robert,' replied his helpmate, in a low, feeble voice, 'for I am quite sure that we canna afford it.'"—*New York Observer.*

Make the Best of Everything.

An important lesson to learn, and the earlier it is learned in life the better, is to *make the best of everything.* As the old adage says, "It is no use to cry over spilt milk." Misfortunes that have already happened cannot be prevented; therefore, the wise man, instead of wasting the time in regrets, will set himself to work to recover his losses. The mistakes and follies of the past may teach us to be more cautious for the future; but they should never be allowed to paralyze our energies, or surrender us to weak repinings. A retired merchant relates that, at one period early in his career, he had got almost to the verge of bankruptcy; "but," says he, "I ploughed a deep keel, and kept my own counsel;" and by these means he soon recovered. Had this man given way to despair, had he sat down to bewail his apparently impending ruin, he might now have been old and poor, instead of having retired in a splendid position. He adds, that a characteristic was, that through life, in all circumstances, he did the best that he could, whatever that was, consuming no time in useless regrets over misspent time or bad speculations.

The rule holds good, not only in mercantile affairs, but in the whole conduct of life. The man who is born to indifferent circumstances will never rise, if, abandoning himself to envy of those more blessed by fortune, he goes about sullenly and complaining, instead of endeavouring to use to the best of his ability what few advantages he has. The patriot deploring the decline of public and private morals, will never succeed in reforming the commonwealth, if he stickles for visionary or impracticable measures, rejecting those more moderate ones that are really attainable. The friend will soon have no intimates at all, if, making no allowances for the infirmities of human nature, he judges too harshly of the conduct of his acquaintances. Many a matrimonial quarrel might be avoided, if husband and wife, instead of taking offense at each other on slight provocations, would dwell rather on the good traits the other displays. There are not a few statesmen now living in retirement, who might have still gratified their ambition by serving the public, if they had understood, amid the fatigues and disappointments of public life, *how to make the best of everything.*

Report of P. T. Tyson, Esq., Maryland State Agricultural Chemist, on Bones.

Bones were first used as a manure in Germany, and afterwards, in the year 1771, were introduced into England. Little use however, was made of them prior to the beginning of the present century, since which period their use has rapidly extended throughout Great Britain.

The high prices of bones in England have drawn, and continue to draw, them from almost every part of the world; even the bones of the soldiers who fell at Waterloo, and at the siege of Sevastopol, have contributed to enrich the soil of Great Britain.

The first bones used for manure in this country, it is believed, were crushed at the establishment of Mr. Wm. Trego, and sold to farmers in Harford and Montgomery counties in the year 1836.

They were sold for some time at 33 to 35 cents per bushel, or about half their present value. The prices in England are about 40 pr. ct. higher than they have yet reached in this country.

When I first applied bones in Harford county, in 1839, the operation was watched with interest by my neighbors, some of whom thought they would prove an extravagant and useless application; and there were those who appeared to have formed theories in reference to manures which ruled bones out of the list, because, as they believed, they were of "too dry a nature."

Their good effect, however, soon became manifest, and the result was to produce heavy crops upon soils which had been long lying idle, after having been rendered sterile by improvident planting and farming of former times.

The use of bones soon extended, and my old neighbors are now perfectly willing to pay double the prices which were then thought extravagant.

Whilst in Harford during May last, I had an opportunity to notice the durable effect of bones which I applied to land from seventeen to twenty years since. All the fields to which they were applied continue to produce heavy crops under the judicious management of the present owner, Mr. Hanway.

There was one field of 10 acres upon which I applied 300 bushels of crushed bones. He enlarged it, and applied 15 bushels to the acre over the whole, but finding the 10 acres which I had manured as above so much more productive than the rest, he applied to the latter (which I had not taken in) 18 or 20 bushels more per acre. He expected, by this means, to equalize the fertility of the whole enlarged field. He informs me, however, that his expectation in this regard was not realized, and he was satisfied would not be until he shall apply another manuring of bones, as he intends to do, to the part upon which I had applied none.

Loudon, Johnston and other writers, inform us that the effect of heavy dressings with bones are clearly shown in England to endure for forty or fifty years.

We shall be prepared to discuss the cause of all this after having described the chemical and physical constitution of bones.

A bone may be described in general terms as a spongy structure, made up in part of a frame-work of phosphate and carbonate of lime, whose interstices are filled with animal matter analagous to gelatine, and a small portion of fat or oil. A piece of bone long exposed to dilute muriatic acid will be deprived of its phosphoric acid and other mineral matters, and leave the cartilage or gelatine in nearly original form. If we expose a bone in an open fire until it shall burn white, its form will not be changed, but the animal matter will have been burnt away. If, however, the bone be exposed to heat in a close vessel, all its animal matter, except a portion of the carbon, will be driven off. The remaining carbon, with the earthy matters, constitute what is called animal charcoal, ivory black, or bone black.

We have on record numerous results of analysis of bones of different animals, but the following, which gives the composition of the bones of the ox, will answer our present purpose:-

Animal matters analogous to gelatin and albumen, called azotic compounds, ...	33.30
Phosphate of lime, . . .	55.85
" " magnesia . .	2.05
Carbonate of lime, . .	3.85
Fluate of lime, . . .	2.50
Soda, common salt, &c., . .	2.45

The above are the results obtained from a fresh clean peace of bone. Those collected by the bone crushers, cannot but have more or less of dirt adhering to them, and after being crushed, they will absorb a portion of water. This adds to

their weight probably about 5 per ct., and, of course, lessens the proportion of the other constituents; but it will be safe to assume that 100 lbs. of ground or crushed bones of commerce contain an average amount of gelatine and other azotic compounds, ... 32 lbs.

And phosphate of lime, . 53 "

Of this last there is phosphoric acid . . . 24½ "

And lime, . . . 28½ "

The proportion of ammonia produced by the decomposition of the animal matters may be estimated to average about 7 parts of the above 32.

We may, therefore, assume the value of 100 lbs. of crushed bones to consist in:

Ammonia, ...	7	lbs.
Phosphoric acid, 24.5 / Lime, . . 28.5	53	"
Carbonate of lime, . .	3	"
Fluate of lime, . . .	2¼	"
Phosphate of magnesia . .	2	"
Soda, muriate of soda, &c., .	2¼	"

In addition to the above, there are carbonic acid and sulphuretted hydrogen, produced by the decomposition of the animal matters.

It has been stated to me that crushed bones had, in some instances, been adulterated with useless foreign matters, but I have met with no certain evidence of the fact; on the contrary, an examination of a number of samples which farmers had received from several different sources, showed them to be as pure as is practicable with an article of that kind.

There are difficulties in the way of adulterating ground bones, occasioned by the fact that a small addition of foreign matters can be readily detected with a good pocket lens, which every farmer ought to possess.

They are not injured if boiled merely long enough to abstract the grease they contain, but if the boiling be continued until more or less of the gelatine be removed, their value is lessened, because it is from the gelatine that the ammonia is produced. Pure fresh bones should lose from 33 to 37 per cent. of their weight, when burned in an open vessel until they become white.—But if they have been robbed of part of their gelatine they will lose less weight by burning.

Prof. Johnston, in his Agricultural Chemistry, refers to a discussion which sprang up some years since, in reference to which of the constituents of bones we are to attribute their value. Sprengel asserted that it was to their phosphates only, and this opinion was favored by Liebig. Others again gave all the credit to the ammonia formed from their animal matter. It would, in my opinion, be a waste of time to give the views of the contestants.

Both sides certainly knew that all soils which are deficient in phosphoric acid, are rendered more fertile when it is supplied; and it would be certainly difficult to find a field long in cultivation whose productiveness would not be increased by the use of ammonia, provided one or more of the essential elements be not deficient or altogether absent.

It seems strange that such a question could have been raised by distinguished men in the present day, when there is certainly no room to doubt for one moment the efficacy of both phosphoric acid and ammonia as constituents of manure.

Much difference of opinion has prevailed from the first use of bones, as to the best mode of applying them. In Germany it was for a long time the practice to burn them. Whether this was owing to ignorance or the want of bone-crushing mills, we do not know. I believe, however, that this practice has ceased, and that crushed bones are now used in both Germany and in France.

Stoeckhardt, in his Agricultural Chemistry, laments that, owing to the want of appreciation of bones in Germany, they are largely exported to England for manure.

In England they are crushed or ground fine, when they are to be drilled in with turnip seed; but a rather coarser kind is used when sown broadcast.

In this country they are also crushed, but the kind suited for drilling in is not often used, owing to its additional cost.

There are three modes of applying crushed bones to the soil:

1. In the dry state, as purchased.
2. Dissolved in sulphuric acid.
3. Causing an incipient decay, or, more correctly, putrefaction of their animal matter.

If the object is the permanent improvement of the soil, without caring so much about a maximum growth of the first crop, the crushed bones may be applied in the

dry state, without any previous preparation. This was the least expensive mode. (1.)

When they are applied for the benefit of only one or two crops, without looking to the permanent improvement of the soil, the phosphate of lime may be made soluble by means of sulphuric acid or oil of vitrol. (2.)

When the object is to have the bones in such a state as to produce an immediate effect upon the first crop, and which will be continued during many years, it is better to treat them as will be hereafter shown, so as to bring their animal matter into an incipient state of putrefaction, improperly called by some fermentation. (3.)

I have had some experience in the application of dry bones to land, and have also been able to collect the opinions of many who have extensively applied them in this manner. It has the advantage of saving time and labor, but requires a larger dose to produce a given effect upon the *first* crop. Its effects, however, are more lasting, and will continue during a long series of years. This method may answer when the ground is intended to be kept permanently in grass. Gypsum should always be mixed with them in the proportion of 1 bushel to 10 of bones.

The system of dissolving in acid, I have been always satisfied, is less advantageous than the putrefactive process, and therefore I have never used the dissolved bones.

In a paper read before the meeting of the British Association, at Dublin, in 1857, Sir J. Murray claims that he was the originator of the practice of using dissolved bones more than forty years ago. Long experience, however, in the use of them has induced him to change his opinion upon that subject, and he now objects to the use of dissolved bones. He states that he finds "the soluble phosphates too soluble; that they melt too fast, and are carried into the subsoil or pass off into streams during rains."

He adds that "his present views result from many years experience," and "that they have been confirmed by a long series of experiments, carried on for him by the governor as well as the gardener of the Richmond (England) Lunatic Asylum."

The prompt action of dissolved bones upon crops brought them prominently into notice, and induced many farmers to prepare and use them, and, besides, induced a host of parties to prepare them on a large scale to save the farmers the trouble of so disagreeable a process, and not without danger. I am fully convinced that if any one will take the trouble to make proper comparative experiments with dissolved and putrified bones, and notice the results, during five or ten years, they will come to the same conclusion as Sir J. Murray did, who has the candor to acknowledge the errors into which he has led his brother farmers.

The books and periodicals for years past contain numerous directions for dissolving bones, and it is remarkable that they should differ so greatly in the proportions of acid required.

In the Patent Office Report of 1856, Mr. Brown recommended the use of five pounds of sulphuric acid to 100 lbs. of bones, and to compost them with muck.

An article in the Country Gentleman of the 28th October, 1858, by Prof. Gilham, of the Va. Military Institute, refers to an article of Prof. Norton, which recommends 50 or 60 lbs. for whole bones and 25 and 45 lbs. for ground bones, and adds that he (Prof. Gilham) found even 100 lbs. of acid were not sufficient to dissolve 100 lbs. of bones.

The real state of the case is, that if it be desired to dissolve all the phosphates in 100 lbs. of bones, or about two bushels we must apply 59 lbs. of sulphuric acid, whose specific gravity is 1.85, diluted with three times its weight of water. And to effect a complete solution they must be frequently stirred during three or four weeks. If the bones be whole it will require many months to dissolve all their phosphates.

If it be desired to dissolve a part only, a less proportion of acid may be used. My own opinion is, the less, the more economical to the farmer in the long run.

We must not omit to count the cost of applying sulphuric acid to bones, which, of course, will be modified by the proportions used.

Let us first ascertain the cost of effecting a complete solution of the phosphate of lime in bones:

1st. 100 lbs. of ground bones, costing	$1.46
59 " sulphuric acid (3 cts.),	1.77
We should add for labor and the cost of a vat or tub, which is soon destroyed, freight on acid, &c.	.08
	$3.31

2nd. If we use acid sufficient to dissolve half the bones, the cost will be as follows:

100 lbs. bones, . . .	$1.46
30 " sulphuric acid (3 cts.),	.90
Labor, &c., as before, . .	.08
	$2.44

As a bushel of bones will average in weigbt 45 lbs., we have to deduct 55 per cent. to get at the cost of one bushel; therefore,

One bushel fully dissolved will cost $1.49
One bushel half dissolved will cost 1.10

It will be seen, therefore, that by dissolving we much more than double their cost, and if but half dissolved, their cost is increased more than two-thirds in amount.

It is true that a smaller quantity will suffice for an immediate effect, which may suit a temporary tenant, but let the land-owner bear in mind that the *whole ultimate benefit* is in proportion to the *weight of bones* applied. It is true the action of the acid upon the carbonate of lime produces a portion of gypsum, but so far as that article is concerned, we can purchase it at less than one-fifth the cost of making it.

When bones or phosphatic guanoes are dissolved in acid it is usual to add absorbent materials, so that it may be made sufficiently dry to admit of being spread. Neither lime nor ashes should be used for this purpose, because it would precipitate the phosphate and neutralize the effect of the sulphuric acid.

Great care should be taken when the acid is poured into the water, which must be done before the bones are added. It must be done very gradually, because it generates heat above the boiling point, and is apt to be thrown into the faces and on the clothes of the workmen.

Sir J. Murray thinks there is much loss by the soluble phosphates being carried off by water; but there is good reason to believe that the cause of their effects being so slight after one or two crops, is more owing to certain known chemical reactions in the soil. Soluble salts of alumina and iron, especially the latter, are never absent from soils, and when a soluble phosphate of lime comes in contact with either of these, the phosphoric acid is precipitated as phosphate of iron or alumina. Both of these, according to Bischoff, are among the most insoluble substances known in water and carbonic acid But some experiments of Dr. Piggot prove that they are soluble in alkaline silicates.

Whilst it does not seem proper to apply sulphuric acid to bones, yet I think it probable that we may advantageously use either that or muriatic acid in *small* proportion to some of the phosphatic guanoes, especially to those containing phosphates of iron and alumina.

It remains now to notice the third mode of preparing bones, which consists in causing putrefaction and decay.

This mode has been evidently coming more into use within a few years past, and we often find directions in the agricultural journals for effecting it, most generally by making them into composts with stable manure or other matter. I have, however, met with nothing in that way that appears likely to answer a better purpose than that practiced by me 19 years ago, after experimenting to some extent. And as inquiries have been made in answer to which I had found it necessary frequently to describe the process, it will now be repeated in full.

Having smoothed over the surface of the ground (under a shed, if convenient), place thereon evenly, a layer of 3 in. of ground bones, and then an even layer of good fine soil or earth, free from stones or sticks. Give a good sprinkling of gypsum over each layer of earth. Another layer of bones is applied upon the layer of earth, and the same alternations are to be repeated with the gypsum until we have four of each bones and earth, and the height of the pile will be 24 inches. As the bones are usually dry, each layer should be well moistened with water or *better with urine*, in order to hasten the process. It is proper to place two or more sticks in the pile reaching to its base, which should be frequently examined by feeling them, in order to judge of the degree of heat produced. If the weather be warm they will begin to heat in a few days, and in a week or two they will become hot. When upon taking out the

sticks they feel unpleasantly hot, the process should be checked by chopping or spading down the mass from top to bottom, which, if carefully done, mixes the materials well together, and they are ready for spreading.

If the process be commenced during cold weather it may be hastened by placing at the bottom a layer of fresh horse dung about six inches thick, and covering the pile with straw or fodder to retain the heat.

There is much testimony in favor of using salt as a manure, and it cannot be applied more advantageously than with the bones, because it promotes their solubility. It would be better to place the proper dose of salt with the gypsum upon each layer of the earth.

In reference to the quantity of bones to the acre, I may say, that after trying them in quantities from 30 bushels down to 10, I came to the conclusion that 10 bushels to the acre was the most advantageous quantity. I became satisfied, also, that this quantity, prepared as I have just indicated, and uniformly sown, will be as effective for a year or two as double the quantity applied in the dry state.

Should the soil be dry when wheat ground is dressed with dry bones, and continue so for some time after, but little effect will be produced by them upon the autumn growth.

The effect of the putrefied bones will be obvious within a few days after the young wheat appears above the surface. The putrefaction in the first case goes on very slowly; but when the bones have been once heated it will proceed more readily, and of course furnish an earlier supply of the much needed ammonia, as well as phosphoric acid.

One great advantage of bones over ammoniated guano arises from the fact that putrefaction and decay have progressed in the latter until nearly all the ammonia which they are capable of yielding has been already formed. And as it is very soluble in water, much of it is rapidly washed off during heavy rains, leaving a portion, which is absorbed and retained in the soil. This is going on whenever the ground is wet, so that when the soil is not frozen in winter, the ammonia is passing off and there is no crop growing to appropriate it.

When bones are applied, either dry or in the manner I have suggested, (3,) they are giving out their ammonia as the crops require it, but in cold weather the putrefaction is nearly or quite suspended, according to the temperature, and again resumed in the Spring; at first slowly and then rapidly in hot weather, when it is most wanted by the crop.

I have very rarely met with those who have used bones for manure without being satisfied with their effects. Experience has shown, however, that their effects are not so promptly evinced in stiff clay soils as in those of a more porous character. The compactness of very stiff soil prevents sufficient access of air to assist in the decay of the bones. When applied to *very* wet soils the animal matters decompose so slowly as to produce little benefit to crops.

BONE BLACK OR ANIMAL CHARCOAL.

In former days bullock's blood was largely used in refining sugar, but in the improved modern process very little blood is used. The principal reliance is upon animal charcoal, through which the hot syrup is filtered for the purpose of being decolored. It is coarsely crushed or ground and the finer portions and dust sifted out, which would otherwise clog the filtering cloth or pass through with the syrup. After each operation the charcoal is again exposed to heat in closed iron vessels, and the dust, etc., sifted out as before. It is this material that is sold for manure under the name of bone black.

All the animal matter, except a portion of carbon, has been expelled by heat, leaving the carbon with the phosphates and other earthy matters of bones, and is, of course, valuable as a manure.

I have been informed that the refineries in Baltimore dispose of their bone black to manufacturers of fertilizers in Philadelphia; the whole amount being annually about half a million of pounds.

A sample which I obtained from Dougherty & Woods, of Baltimore, was analysed by Dr. Piggot, with the following results, viz.:

Phosphate of lime, . .	70.10
Phosphate of magnesia, .	.15
Carbonate of lime, . .	11.85
Charcoal (animal), . . .	10.98
Oxide of iron and alumina,	3.01
Sand, ...	2.83
Soluble salts, . . .	.41
Soluble organic matter, .	.13

It is to be regretted that this large amount of phosphate of lime should be carried out of our State instead of being used at home. There is no doubt of it being valuable for manure, as its constituents clearly indicate, because of the phosphate and carbonate of lime it contains. Its carbon also will prove a source of carbonic acid in the soil.

CRACKNELS OR GREAVES.

This material consists of the tissues and other matters remaining after the melting and straining off the fat of animals.

At one establishment in Baltimore (the Butchers' Hide and Tallow Association) there are 100,000 lbs. of this material produced per annum, all of which is sold at one cent per lb. to parties in Philadelphia, to be used in the manufacture of Prussian blue. I have no means of knowing the whole amount produced in Baltimore, but it must be considerable.

Boussingault determined the proportion of nitrogen to be 11.88 per ct., which will produce during the decay of the material more than 14 per ct. of ammonia, or nearly equal to the amount in the best Peruvian guano. It seems, therefore, that it would be worth more than one cent a pound for manure, if it were powdered or otherwise reduced to such a fine state of division as would admit of its being properly mixed with the soil. As it comes from the press its cakes are about three feet square and about six inches thick, which are easily transported without being packed. It is in fact almost as solid as wood itself, and will require suitable machinery to bring it into a proper state for manure.

It is but very recently I learned that it was produced in quantities worthy the attention of farmers, but it is my intention to examine further into it as early as practicable.

A mixture of cracknels and the bone black of the sugar refiners would constitute a very valuable manure.

"Shall I buy 'American Guano?'"

During the past few months, this question has been addressed to us by subscribers, personally and by letter, a great number of times. In fact we expect that every few minutes during the day, some one will knock at our door and almost invariably ask on entering, "What do you think of this American guano?" We therefore offer a general reply here. But first let us correct a false impression that we have any "preconceived prejudice" against the article. On the contrary, we would gladly commend it in the highest terms, could we do so consistently with our own views. We dislike as much as any one, the monopoly of Peruvian guano, and would be right glad if American farmers could dispense with its use altogether. We could heartily wish that all that is claimed for the "American guano" might prove to be below its real merits. It would be a national blessing, of more value than all the gold of California. Several enterprising men have devoted their time and money to its introduction, and, so far as we know, they have done this in the belief that they are doing the country, as well as themselves, good service, in hunting up and bringing these fertilizers here.

But, as we have said to some of them personally, we think they are guided by an incorrect theory in regard to the wants of our soils and crops; and our present opinion is, that, after a year or two, these purely phosphatic guanos will have had their day, and cease to be in demand by farmers, at least where they have been tried. That some portions of the material brought from the Pacific Islands may prove moderately useful, is probable, for we have seen specimens which contained sufficient ammonia and other organic constituents to warrant the belief that they would be beneficial to crops. And this will, in part, account for the fact that some persons have been pleased with their first trial of American guano. We have examined a dozen different specimens of the material, in its unground, unmixed state, and found them of various composition, running all the way from a nearly pure phosphate, up to one containing a valuable admixture of organic matter including a considerable percentage of ammonia. Now any person chancing to obtain a sample of the last named quality would doubtless see sufficiently good results to lead him to try it further, and to commend it to others. We have seen certificates from such persons. But how many are there in the country who have reaped no benefit? We have heard of many such, yet no one is interested in collecting and setting forth the cases of failure, and farmers, as a class, seldom write out their experiences, unless it is drawn from them, and so we seldom get the dark side.*

*An illustration may be given of the fact referred to above. A few years since, one of the special

We have hesitated to discourage the introduction of the American guano, because we have hoped, that in the progress of the enterprise, there would be found deposits containing *organic* material enough to verify at least a portion of the expectations indulged on the part of the importers, and the public. This may yet turn out to be the case, and we advise those enlisted in the enterprise to turn their attention specifically to the discovery and introduction of organic deposits; for we are firm in the conviction that the purely mineral or phosphatic guanos, such as are now mainly brought here, will not prove profitable or satisfactory. We are aware that the sellers take a different view, and have on their side many scientific men; but we are quite willing to put our opinions on record to be tested by time and experience. In the meanwhile, we must caution not only farmers but the importers themselves, not to invest too largely in a material which is at best of doubtful utility. In our last article on manures (No. 4) we stated, perhaps fully enough, our reasons for calling in question the supposed value of mineral manures generally, including the phosphates.

But whatever may be the character of some of the American guanos already introduced, or of those yet to be found and brought here, we will now only consider the general character of those offered, remarking that the chief excellence claimed for them by those interested, is that they abound in phosphates. We have been furnished with the following recent analyses of several cargoes, and the remarks thereon by Prof. S. W. Johnson, who conducted the experiments.

YALE ANALYTICAL LABORATORY,
NEW-HAVEN, Conn., March 16, 1860.

JOHN B. SARDY, Esq.—Dear Sir: This may certify that I have inspected the discharged guano cargoes of the ships Gosport, Rambler, and Polynesia, late from Jarvis Island, have had average samples taken in my presence, and have submitted the same to chemical analyses, with the following results. The table also includes analyses of a sample of the Victory's cargo, Jarvis Island, and of a specimen from Baker's Island.

Ships.....	Moisture.....	Organic matter and combined water.....	Lime.....	Phosphoric Acid.....	Sulphuric acid (once estimated).....	Undetermined matter and loss.....	Bone Phosphate of Lime equivalent—average, per cent.....
Gosport.....	9.33	13 37	33.88	21.81	20.33	1.28	47.47
do.	9 24	13 22	33.59	22.01	20.33	1.61	
Rambler.....	13.22	8.39	34 17	19 10	25.07	.05	41.47
do.	12.69	8.97	33.68	19.18	25 07	.41	
Victory	7.08	7.75	36.31	25.67	21.75	1 54	55 01
do.	8 85	6.65	36 33	25.12	21.75	1.60	
Polynesia.....	12.00	7.70	34 83	26.47	15.85	3.15	59.17
do.	12.41	7 34	34.67	28 15	15 85	1 58	
Baker's Island	3.57	8.25	41.54	39.24	2.16	5.24	83.93
do. do	3.58	9.02	41.09	38.24	2.16	5.91	

These cargoes together show an average of Phosphoric Acid equal to 50 per cent. of Bone Phosphate of Lime, which is sufficient to constitute a valuable fertilizer, especially since the material is, on the one hand, very finely divided, and on the other, contains considerable organic matter, and Sulphate of Lime, which, being themselves easily decomposable or soluble, must leave the Phosphate of Lime exposing a great surface to the solvent action of the soil water. Simple calculation shows also that in the Jarvis Island Guano, by far the largest share of the Phosphoric Acid exists in the form of what is commonly called *neutral Phosphate of Lime*, which is characterized by a much greater solubility than is possessed by the Bone Phosphate. For these reasons this guano must manifest greater activity than other guanos which are more compact, and consist mainly of Bone Phosphate of Lime.

SAM'L W. JOHNSON, Prof. of
Analytical and Agricultural
Chemistry, Yale College.

Probably Prof. Johnson designed the above simply as a professional private business letter; he should have stated the results differently, if for the general reader. The second column, "Organic matter and

pleaders for super-phosphate visited a New-England town, and lectured so strongly in favor of the use of this material, that the cultivators at once made up orders for some 80 tons, at a cost to them of nearly $4,000. It proved a failure, and we believe not a pound of it has since been sold there. But the buyers quietly pocketed the loss, acknowledged themselves sold, and discarded all scientific teachings in regard to agriculture. But no one of them ever took the trouble to collect and publish the facts. On the other hand, in another town, one man obtained, or thought he obtained, good results, (perhaps he had an extra good sample,) and on application he gave his certificate in its favor. That certificate, and a few others of similar character, were published all over the land by interested parties, and very many persons bought super-phosphate or the strength of them. We only mention this as an illustration of how one-sided statements may sometimes go forth, and further to invite those who try any new fertilizers to report their *failures* in all cases. Let us have both sides.

combined water," gives no valuable information. We are left entirely in doubt as to *how much* of it is "combined water," and *how much* is "organic matter." So also, we have no indication whether the organic matter is simply useless or nearly useless carbonaceous material, or whether it contains an appreciable amount of useful nitrogenous compounds.

We have confidence in Prof. Johnson's skill and integrity as an analytical chemist, but we must differ with him in regard to the value he attaches to these guanos, and to phosphoric acid generally. He estimates *soluble* phosphoric acid as worth 12½ cents per lb., and the *insoluble*, at 4½ cents per lb. Upon this basis the "Sombrero guano" imported into southeastern Connecticut quite largely, was estimated to be worth over $30 per ton. Many of the farmers who bought it upon this estimate, and have tried it, would not now buy it at any price,

Prof. Johnson, very guardedly says above: "*Simple calculation shows, etc.*" But we think these calculated values of phosphoric acid are not to be depended upon in estimating its real value as a fertilizer. If the phosphoric acid in Peruvian guano really constitutes the *estimated* part of the value of that material, then we admit the calculated value of phosphoric acid in other fertilizers; but *we* attribute the beneficial effects of Peruvian guano, bones, etc.*, mainly to the organic matters, and especially to the ammonia they contain.

The above analyses show the elements of a notable amount of sulphate of lime (plaster of Paris) in the first four specimens. This is highly valuable upon some soils and crops, while on others it is nearly or quite useless. We have seen surprising results from the use of only 200 lbs. of plaster to the acre. And here is another mode of accounting for the occasional good results obtained last season from the American guano. The use of 300 to 600 lbs. of this to the acre would furnish plaster enough to alone give good results in some cases. But farmers cannot afford to buy plaster in the form of American guano at $30 to $40 per ton, when the simple, unmixed plaster is abundant at $6 to $10 per ton.

To sum up: the American guano is recommended and sold mainly as a fertilizer abounding in phosphoric acid, and this in our opinion is of only moderate value at best*—not enough so, to at all warrant its importation from the Pacific Ocean. Good results have sometimes been obtained by the use of the American guano, especially where it has chanced to contain abundant organic matter, and also where it has been used freely enough to supply plaster to the soil. But the results have not been uniformly good by any means, and the present importations do not contain organic matter enough to be taken largely into account in estimating their value. Therefore, basing our opinions in part upon the considerations stated above, and in part upon the reports of the results of its use thus far, we are reluctantly forced to answer those asking our opinion, that we cannot advise farmers to purchase the American guano in quantity, until something is offered of different general character and composition from that now sold. Limited quantities of it may be tried by the side of other fertilizers.

"What Manures Shall I Buy?"

"If you do not advise to use the manufactured super-phosphates, or the manipulated guanos, or the Sombrero, in short, any of these mineral fertilizers, pray tell us what manure we shall buy?"

Perhaps you need not buy any. If on the better class of prairie, or on other lands where there is plenty of vegetable mold upon the surface, then a good plow and a good harrow, to break up and pulverize the surface well, so that the air may have free access to decompose the organic matter, may be the best "manuring" you can give this year. An application of Alkali, in the form of ashes or lime, mingled with the soil, is frequently good to remove sourness and hasten the decomposition of the organic materials, and prepare them to feed the plants. Alkalies are good on all cold, wet, or sour lands, wherever located.

On the poorer lands, especially in the older sections of the country, get the best *organic* manures that are accessible. Good stable manure is always the best, and usually

* There is one view of the value of soluble phosphoric acid which we have not seen stated, viz.: that like other acids it may act as an absorber or retainer of ammonia, and so far it may be valuable to soils; and this may account for the good results obtained from the use of the soluble phosphates. But in any form in which phosphoric acid is accessible, it costs vastly more than sulphuric acid, which is a notable "fixer" or retainer of ammonia.

the cheapest, where it is to be had. Next to this we esteem finely ground *unburned* bones —not so much for the phosphoric acid they contain, as for their organic matter. We have this Spring bought of Messrs. A. Lister & Co., of Tarrytown, N. Y., 1½ tons of dry bone saw-dust, for 1½ acres of ground which we wish to cultivate very highly.—(We mention this to show that we "practice what we preach."

Next to unburned bones we esteem pure Peruvian guano, the kind that costs $60 per ton—not the "manipulated," nor the "No. 2," which is sold at a less price, after going through some process of reduction. This sown in the drill at the rate of 100 to 500 pounds per acre, and well harrowed into the surface, or scattered as a top-dressing, is usually a paying application. The amount per acre depends upon the poorness of soil. For high culture, as in gardens, 600 lbs. or more per acre will not be amiss.

Next to Peruvian guano, try—well, we hardly know what to recommend, for there is little else in market always worth buying at the price asked, and the transportation There are several varieties of animal compounds, made in limited quantities, which are sometimes cheap at the prices asked for them, and sometimes not. We hardly dare recommend them for general use. Among them are: the blood and wool manure, when purely blood and wool, and not mixed up with sand; the poudrettes, when not too liberally compounded with muck, and when the excrements, from which they are made, have not been taken from cess-pools where a constant flow of water has washed out the most valuable portions. A fuller description of the fertilizers above alluded to, and others, will be given in the regular chapters upon manure.

A List of Wonders.

Among the thousands of marvelous inventions which American genius has produced, within the last few years, are the following, compiled in an abstract from the Patent Office Report. Read them over, and then say, if you can, that there is nothing new under the sun:

The report explains the principle of the celebrated Hobb lock. Its "unpickability" depends upon a secondary or false set of tumblers, which prevent instruments used in picking from reaching the real ones. Moreover, the lock is powder proof, and may be loaded through the key hole and fired off till the burglar is tired of his fruitless work, or fear that the explosions will bring to view his experiments more witnesses than he desires.

Doors and shutters have been patented that cannot be broken through with either pick or sledge-hammer. The burglar's "occupation's gone."

A harpoon is described which makes the whale kill himself. The more he pulls the line, the deeper goes the harpoon.

An ice making machine has been patented which is worked by a steam engine. In an experimental trial, it froze several bottles of sherry, and produced blocks of ice the size of a cubic foot when the thermometer was up to eighty degrees. It is calculated that for every ton of coal put into the furnace, it will make a ton of ice.

From Dr. Dale's examiner's report we gather some idea of the value of patents. A man who had made a slight improvement in straw cutters, took a model of his machine through the Western States, and after a tour of eight months, returned with forty thousand dollars. Another man had a machine to thrash and clean grain, which in fifteen months he sold for sixty thousand dollars. These are ordinary cases—while such inventions as the telegraph, the planing machine, the India rubber patents, are worth millions each.

Examiner Lane's report decribes new electrical inventions. Among these is an electrical whaling apparatus, by which the whale is literally "shocked to death." Another is an electro-magnetic alarm, which rings bells and displays signals in case of fire and burglars. Another is an electric clock, which wakes you up, tells you what time it is, and lights a lamp for you at any hour you please.

There is a "sound gatherer," a sort of huge ear-trumpet, to be placed in front of a locomotive, bringing to the engineer's ears all the noise ahead; perfectly distinct, notwithstanding the noise of the train.

There is an invention that picks up pins from a confused heap, turns them around with their heads up, and sticks them in papers in regular rows.

Another goes through the whole process

of cigar making, taking in leaves and turning out finished cigars.

One machine cuts cheese; another scours knives and forks; another rocks the cradle; and seven or eight take in washing and ironing.

There is a parlor chair patented that cannot be tipped back upon two legs, and a railway chair that can be tipped back in any position, without any legs at all.

Another patent is for a machine that counts passengers in an omnibus and takes their fares. When a very fat gentleman gets in, it counts two and charges double.

There are a variety of guns patented that load themselves; a fishing line that adjusts its own bait, and a rat trap that throws away the rat, and then baits itself and stands in the corner for another.

There is a machine, also, by which a man prints, instead of writes, his thoughts. It is played like a piano forte. And speaking of pianos, it is estimated that nine thousand are made every year in the United States, giving constant employment to one thousand nine hundred persons, and costing over two millions of dollars.—*Baltimore Exchange.*

From the Country Gentleman and Cultivator.

Value of Corn Cobs.

MESSRS. EDITORS—In the COUNTRY GENTLEMAN for Feb. 16. p. 113, I find an inquiry by A. W. Parsons, on the subject of corn-cobs for feed. As my mind has been somewhat exercised on that subject, I propose to give you briefly my conclusion, and the process by which I arrived at it. I had been in the habit of getting my corn and cobs ground together, as was the case with the most of my neighbors; but I was not exactly satisfied that it was a paying business, for, to look at a basket of cobs, it seemed to me that there could be but little nutriment contained therein—not much more than in a nice basket of chips. I concluded that the analysis of the cob must settle the question, and on consulting authorities, I found that according to the analysis of Chas. T. Jackson of Boston, Mass., the cob contained three and one-fourth per cent. of nutritive matter. According to the analysis of Sir Humphrey Davy, the corn contained seventy-seven per cent. of nutritive matter. Here then was a basis for calculation. If one hundred pounds of corn gives seventy-seven per cent., and one hundred pounds of cobs gains three and one-fourth per cent., then one hundred pounds of corn is worth as much as *twenty-three hundred and sixty-nine pounds of cobs.* Well, now, thinks I to myself, that would make a pretty good sized pile of cobs. Now suppose a cow, or an ox, or a horse, to be a thinking reasoning being, and then place the two piles before them—the one hundred pounds of corn, and the twenty-three hundred and sixty-nine pounds of cobs, and tell them there is just as much nutriment in one as the other, which do you suppose they would choose? Would they not revolt, and justly too, at the idea of eating all of that monstrous pile for what little it contained. And then the wear and tear, for it seems to me it would take a cast iron stomach, or something as strong, to digest the cob.

I believe the millers generally charge more for grinding when they grind the cob, so that in reality, we pay them all, or more than all the cob is worth for their work.

I shell my corn, and use the cobs for fuel, and I think they will nearly pay for the shelling of the corn if used in that way, for they not only make a good fire, but they make a large quantity of first rate ashes, and and then the convenience of handling the corn after it is shelled is no inconsiderable item.

JOHN F. OVENSHIRE.

Bradford Co., Pa.

Following the Copy.

The Printers' rule is to follow the copy if it goes out of the window. It seems that the manufacturers of England are equally rigid in their regulations and in both cases the responsibility of mistakes which sometimes occur rests with those who furnish "the pattern."

Axes without Handles—The Railway Review reports that the managers of the Grand Trunk Railway sent a pattern to England of the axes needed to cut wood for their road in Canada, and ordered 2500 of the articles made. The house receiving the order went immediately to work to fill it, and a few months ago shiped to the managers of the road at Montreal the axes as ordered. Upon receiving their property, however, the scientfic men found that not one axe out of the 2500 had a hole in it to receive the handle. They were made according to the order—"exactly like the pattern," They have these axes for sale now in Montreal.—*New York Observer.*

The Southern Planter.

RICHMOND, VIRGINIA.

Editors.

It is a very general impression among "the public"—who of course are uninitiated in the mysteries of the "Sanctum"—that the post occupied by the class whose name heads our page, is one of great pleasure, profit and idleness. *The place* of all others, where a man may secure for himself position, influence and wealth—together with a perfect exemption from the *little* vexations, labors and cares which beset other people, by a sacrifice of—nothing: Honors and profits are yours without the trouble of asking for them! Oh, ye Knights of the Pen, the Scissors and the Press! *the public* must know your condition, your character, and the minutæ of your "daily walk;" the "secret springs of action" which vibrate in so many bosoms, and which are only *unknown* to yourselves: your gross receipts, and your net profits; that being, editors, you are of course rich, idle and "sassy," for the "public" has had many dealings with you, and can bring up "many witnesses," out of whose mouths must be established "a proper conclusion."

But we know that you "are not like other men," and have concluded "to bring you up to condign." In short, to give you a trial, and to "show you up" fairly.

Accordingly we abandon the Chair, and count ourselves out, to avoid personality and to secure impartiality. We claim the privilege of an outsider, and as such, proceed to help you "see ourselves as others see us."

Stand up like men, and answer to the "public's" charge—if you can.

You are, in feeling, hard and callous, for "like the old woman's eels," you are used to being "touched upon the raw."

You utter so much "copy" every day, or month, as the case may be, with no higher ambitional motive than to gain for yourself "rest for a troubled mind," and to appease the restless inquietude of "the devil," who can subsist on no other food.

In consequence of these, your professional idiosyncrasies, you are not sufficiently alive to the censure, the praise, the utter indifference, the sympathy and kindly regards of your fellow men—*subscribers especially.*

Speak now, ye gentlemen of the craft, for we will question you, and tell us if there be a man among you who has not felt his bosom swell, his breathing grow short, and a strong desire pervade his right arm to grasp the hand of some honest, manly fellow—one of Nature's noblemen, who has given you evidence of his capacity "to feel another's woes," by making you the recipient of an unsolicited and unselfish kindness? Wipe the ink from your faces, that when you answer we may see whether truth is patent as your mouth opens. We have an *interest* in you—no matter what your condition is, and will give you the suggestions appropriate to your case, kindly volunteered by Mr. "Worldly-Wise," for the present occasion.

As you do not conceal the fact that you are often "seeking rest, and finding none," we cannot help wondering whether such men be "sinners above all these," whose "lines are cast in pleasant places."

What right have you to lead a life of self-denial or industry; to work for the "common good," and the benefit of every class in the community? Can't you attend to your own concerns, and let other people's business alone? 'Twould better suit the spirit of this progressive age not to be so "old fogyish," and to "take it easy."

You do feel *anxious*, do you, about your "Table of Contents," and the "opinion of the world?" How can you be *so nervous?* You should preserve a "stiff upper lip" and a more independent equanimity.

You feel *irritated* and *mortified*, too, whenever you catch a gratuitous "fling," or get an undeserved kick. Why don't you *always* cherish a more *Christian spirit?* Your flesh is weak; then in these times of *muscle* try to be more *manly.*

You do not fill your columns up with a sufficiency of *original* matter *now*, and *sometimes* you talk too much.

Because you are inclined to the opinion that "there's nothing new under the sun," is that any reason why any one man, in this "free country," shouldn't think the other way, or both ways, if he chooses?

Again, who wants a paper filled with your thoughts and egotism, when you can present a sheet filled with the very best thoughts of "others," which you can arrange by labor and good sense, artistically, to suit every body? You have only to *select* the matter, that is all.

Why should you, (who are only an Editor—one of that class who should *feel* nothing, *know every thing*, and *want little*,) feel concerned about your list of *non-paying subscribers* to whom you have sent your paper regularly for years perhaps? Don't you know that they have only "*taken it*" to "*encourage you?*" Why be concerned at all about the state of your *family?* Are they not participants of your fortunate lot; can't you blot out from your remembrance the fact, that your exchequer is empty, that printers will want pay for sending your papers to those who "*encourage*" you, that "bills payable" must be "*met*," if they can't be conquered; and that you must "renew" when you can't "take up;" that "the devil" will creep close to your elbow again, crying "copy," while an echo from a "*delinquent subscriber*" replies, "*copy if you dare!*" Can't you, I say, very easily dispose of all these little troubles by—going to sleep. Go on, then, and we will give you a *murmuring* lullaby.

We suppose we know something of you now, since we have questioned and examined you closely; and we think you are a "hard set," entitled to a "hard lot" by "force of position"—but time fails and we must draw our labors to a close. We have given you "a patient and impartial hearing;" and having mingled with that great world outside of the "sanctum," while we were not overburdened by the weight of our "working clothes," we have taken upon us that broad mantle of Charity, which she ever keeps to lend—the folds of which we spread over you. Having thus covered up your multitude of sins, our heart softens and goes out toward you, and from its inmost depth arises a warm aspiration for your happiness here and hereafter: since we are inclined to believe it is possible that you may be "more sinned against than sinning," and that sometimes you may offer excuses for, and explanations of imperfections which are human: that your lot will be much improved when "the wicked cease from troubling," and your "form" is "set up" in a better "case" on high.

We leave the *end* to turn to the *first cause of all complaint against you.* As a skilful physician could not expect to cure the disease while the cause remains, so we have little hope of beneficial results from the kindly suggestions herein offered, unless we remove that "stumbling block" which causes our "brother to offend." Therefore, we say to all *unreasonable, non-paying subscribers,*

> "*Delinquents on the Printer's books*
> *Can never enter heaven.*"

Attention Farmers.

You would confer a great favor on the editor of this paper, and we verily believe would do much good to one another, if you would write regularly your experience in your farming operations.

Men who have never written a line for us, or any body else, so far as we know, complain that we do not have "communications enough from Virginia farmers." Whose fault is it, we would ask, if we do not? We have begged you to write—we have printed what is written, and like "Oliver Twist," we have always politely asked "for more."

Gentlemen, it lays with you to provide the proper remedy, and to take away a reproach that criminates every one of you who can gain access to paper, pen and ink. Again we say unto you, *write!* WRITE! WRITE.

The Virginia Farm Journal.

Mr. Crockett has announced already the discontinuance of this paper, and the arrangement made with us to supply those, whose subscriptions to it are unexpired, with a copy of the Southern Planter in its stead.

It remains for us to express our sincere regret, that the *Journal* should be discontinued for the want of sufficient support; it was well edited, published weekly, and offered at the low price of $2 per annum.

It is mortifying to know, that while *Virginia furnishes subscribers enough to papers published out of the State to support half a dozen good ones at home*, she has ever dealt with a close hand with those of her own sons. We do not find fault with the support extended by our own State to several papers we could name, which are published beyond her borders—they are worthy of it, and so highly do we esteem them, that we would to-day subscribe for them, did we not enjoy the pleasure of reading them regularly, through the courtesy of their editors, offered through the customary *exchange.* But, in all candor, we are sorry that there is so much truth

in the proverb, "A prophet is not without honor *save in his own country.*"

We shall mail the present number of the "Southern Planter" to the address of each subscriber furnished us by Mr. Crockett—except *those who are already subscribers to our paper. If these gentlemen should wish to have two copies of the Planter sent them*, they will give us notice, and we will cheerfully furnish them.

We request the favor of those who *do not like the arrangement*, to notify us *at once* to discontinue it.

Super-phosphate of Lime.

As it has been a matter of controversy lately, among some of our agricultural brethren, as to the merits of super-phosphates as manures, and the quantity of water which they may or should contain, without being subjected to a charge of *adulteration*, on account of their per centage of water, we publish the following article from the Charleston (S. C.) *Mercury*.

Messrs. Rhett & Robson are the agents for "Rhodes' Super-phoshate," and have published in the *Mercury* the analysis of an *average* sample of this manure, made by G. A. Liebig, of Baltimore.

For ourselves, we must candidly say, that we have had a *very* limited experience with super-phosphates of any kind; but as we are entirely convinced of the necessity for supplying the soil with this ingredient, so important to most of our crops, in some available form, we expect to become "better posted" by-and-by.

We are glad to say we follow farming for a livelihood, and *because we love it as a profession*—therefore, we say to all farmers, we are proud to be ranked "as one of them;" and we shall advise no man to follow where we would be afraid to lead. Perhaps we spoke too fast in saying "*to all farmers*"—we acknowledged "equality and fraternity"—for we are sorry to say, that in this time-honored profession, may be found specimens of the idle, lazy, and "old fogy" class of men; some who "don't take the papers," and who by neither any force of example, precept, or sympathy, extend aid to the zealous supporters of agricultural improvement. We believe that "farming will pay," and that the judicious expenditure of money upon the lands, for reasons based upon common sense and the experience of prudent, sensible men, and the scientific developments of the present age, will as surely lead to increased profits to the farmer, as any other class can reap from capital employed in other callings.

If we are wrong, we shall have the penalty to pay, as we don't expect to abandon this idea, or a farm, as long as we may continue in possession of "one red cent."

While we strongly urge upon all farmers the propriety of using all manures which may increase their crops or benefit their land, at the same time we commend caution, and prudent experiment on a small scale, with concentrated fertilizers, until they ascertain whether they are adapted to their particular soil, since there can be no doubt that the same article produces different results in different soils.

We are well aware of the fact that there is an incidental benefit to B. M. Rhodes & Co. in copying the article referred to, and we do not wish to be understoood, in any sense, as the partizan of their super-phosphate, or the partizan of any concentrated fertilizer whatever. On this subject every man must form his own opinions; but as Dr. Liebig, from his position as an analytic chemist, must be considered as competent authority, we publish his letter as instructive on the subject of super-phoshphates generally.

—

Mr. Editor,—We hand for publication a report from Professor Liebig, of Baltimore, on Rhodes' Super-phosphate Lime, which will be found of interest to those who have used it—as correcting some erroneous impressions, and also giving some suggestions as to its mode of application.

The extensive use of guano and artificial fertilizers, and the worthlessness of many, render it necessary that the planting interest should be protected against imposition, and secured in getting them of the uniform quality and standard they are represented to be. This can only be done by subjecting samples, taken indiscriminately from parcels, after arrival here, to analyze by chemists of established reputation here and elsewhere. This report fully confirms that of Professor Sheppard, published some time since, from samples taken from the same lot of 1,500 barrels in our warehouse.

Respectfully,

RHETT & ROBSON.

—

Baltimore, 67 South Gay Street,
April 13th, 1860.

REPORT OF ANALYSIS OF RHODES' SUPER-PHOSPHATE, FOR MESSRS. RHETT & ROBSON, CHARLESTON, S. C.

A sample of the above, averaged from a lot of 1,500 barrels, was sent at my office, and found, upon analysis, to be composed as follows:

Sulphuric acid	26.58
Lime	22 12
Phosphoric acid	20.33
Phosphate of iron and alumina	0.61
Chloride of natrium	0.41
Water chemically combined	18.59
Water as moisture	5.76
Sand and carbon	5.60
	100.00

Which constituents are combined as follows:

Biphosphate of Lime		14.70
Containing of Phosphoric Acid	8.92	
Containing of Lime	3.52	
Containing of Water	2.26	
Free Phosphoric Acid		15.79
Containing of Phosphoric Acid	11.41	
Containing of Water	4.38	
Sulphate of Lime hydrated		57.13
Containing of Sulphuric Acid	26.58	
Containing of Lime	18.60	
Containing of Water	11.95	
Phosphate of Iron and Alumina		0.31
Chloride of Natrium		0.41
Sand and Animal carbon		5.60
Moisture		5.76
		100.00

The free Phosphoric Acid in this article, amounting to 11.41 per cent., is equal to 18.80 per cent. of Super-phosphate of Lime, rendering the whole amount to thirty-three and a half per cent. of Super-phosphate of Lime.

These numerals speak for themselves, and show that this article represents the most concentrated Super-phosphate manufactured from Bones, which is the most reliable and uniform source for Phosphoric Acid.

The well-deserved name, "Standard," which this Super-phosphate has attained, since its first introduction to its present position, is owing to its great uniformity.

The results which I have obtained by analyzing many samples, either sent to me from different sources or drawn by myself from the different agencies, and indeed from the factory itself, correspond so nearly, or are within such limits, as only can be maintained by the greatest possible care and attention in the management of so large an establishment.

In a sample which I took warm and smoking from the workmen of the establishment, not waiting for the usual drying process, I found the amount of Super-phosphate to be 26 per cent. (26.) This is the lowest of all samples which I have analyzed.

The large increase in the consumption of this article, and, consequently, the increasing demand, has made necessary the building of a second mammoth series of oil vitriol apparatus, which is indeed the best proof of the value of this fertilizer.

I have observed in a Southern paper that the water determination has given rise to attack and suspicion of adulteration. One who is not acquainted with chemical formulas, might well be surprised by the apparently high per centage of water. We will only remark that they must make a distinction between chemically combined and mechanically mixed water.

The super-phosphate of lime belongs to that class of salts whose very existence is dependant on a certain per centage of water chemically combined. It is impossible to produce this salt with less than 15.38 per cent. of water in chemically pure state.

The driving of the water, which is only possible by calcining at a high heat, would totally alter the nature of the salt by forming a glass, consequently cease to be a soluble super-phosphate of lime, therefore the advantage gained by treating bones with sulphuric acid would be entirely lost. (See Berzelius' Chemistry, p. 407, vol. 3.)

All finely powdered substances are hygroscopic, that is, they draw with avidity moisture from the air; therefore every finely powdered biphosphate of lime, coming dry from the factory, will absorb water from the air, and cannot be found with less than four per cent. of hygroscopic water.

I do not think it inappropriate here to say to you a few words in regard to the application of these manures.

The English and Belgians sow but one-third the quantity of super-phosphate intended for a field, and spread the other two-thirds when the plants are beginning to sprout, or when they have appeared above the surface.

The advantage to be derived from this method is two-fold: 1st. The exposed super-phosphate being in contact with the atmospheric air, will have much greater opportunity of absorbing ammonia from it. 2d. Rain and dew dissolving the super-phosphate, it descends below the surface, and none of this valuable fertilizer will be lost, as the fine fibres are ready to absorb it by this time.

I feel convinced that no farmer desirous of improving his land and increasing his crops, ought to be afraid of the trouble, or to make at least a trial in this method of applying this invaluable manure.

G. A. Liebig, *Ph. Dr.*
Successor to Dr. Charles Bickel.

The Southern Field and Fireside is an able and interesting family paper, filled with matter beneficial, amusing and instructive to both the old and young members of the family circle. Published at Augusta, Georgia, weekly, at *Two Dollars a year in advance.*

Our schoolmate, Jno. R. Thompson, Esq., the talented and well-known editor of the *Southern Literary Messenger* for many years, has gone into the Editorial Corps of "The Field and Fireside," and we do most cordially recommend this paper to all our Southern friends, "and to the rest of mankind."

Z. Drummond, of Amherst.

The venerable agriculturist whose name heads this article is no more. He has been a subscriber to the Southern Planter probably from its commencement, and there is scarcely a volume, until within the last two years, when probably prevented from writing by advanced age and increasing infirmities, which does not contain one or more sound, practical and instructive articles, on some well-chosen subject in agricultural economy, from his facile pen. For many years he was a constant contributor to the agricultural department of the Lynchburg Virginian, and his valuable communications did not fail to invest that always well-conducted paper with additional interest for the country reader, even when in its palmiest days, it could well boast as its editor the gifted and lamented Toler!

Our Farm of Four Acres, and the Money we made by it. New York: C. M. Saxton, Barker & Co. From James Woodhouse, Esq.

The peculiarity of this book is the plain common sense shown in it.

Two ladies leave London for the country, and manage by skill, attention and economy to obtain a larger share of health and comfort from a little farm of four acres than could have been believed possible. Their experience is pleasantly recorded. In well-written English they narrate how they learned with difficulty to make butter, to keep cows, pigs and poultry; they give valuable recipes for making bread, curing bacon and managing a kitchen, garden, and wind up the book by showing how cheaply a pony can be kept in the country, and how much comfort there is in having one.

We commend the book to our readers; if they do not require the instruction, it will at least amuse and interest them. One lesson all may learn from it, for it is the central idea of the book—if you wish business well done, do it yourself.

Flint's Milch Cows and Dairy Farming.

We tender our thanks to Chas. L. Flint, Esq., the Secretary of the State Board of Agriculture, Massachusetts, for a copy of the last edition of this very valuable book. We think every cattle breeder should have it, as it is sold at a moderate price, ($1.25,) and contains a great deal of useful information on every subject connected with the dairy, breeds and management of cattle, making and preserving butter, &c., &c.

For the Southern Planter.

KING & QUEEN CO., VA.

Mr. Editor: I have a nursery of young fruit trees which have looked well and flourishing until recently. They are infected with small bugs or lice, similar to those on cabbage in fall of the year. They must, from appearances at present, kill all, or at least, nearly so, and thus end my crop of trees for one year. I have closely examined and watched them, but failed to discover their origin. I observe very many small redish bugs, called, I think, the "lady bug," also a long, ugly fly. Will you, or some other friend of the farmer, tell us the name and description of bug or insect that propagates these vermin?—we may thus destroy them by a strike at their origin----and oblige,

A FRIEND.

We hope some of our friends engaged in the nursery business will reply to this query, and oblige us----ED.

Erratum.

In Mr. Hill Carter's address, published in our May number, an important typographical error occurs, which the reader will please correct. Page 274, 3rd line from the top, for pure white "lands" read *sands.*

☞ We return our sincere thanks to *H. I. Smith, Esq.*, for a present of asparagus, which was very acceptable, and which we disposed of as he intended, by filling up the gaps in our ribs. *Thirty stalks of this asparagus weighed only half an ounce less than five pounds.*

Substitute for Guano.

The late Professor Johnston of Edinburgh proposed the following recipe as a substitute for Guano:

Seven bushels of bone dust,	315 lbs.
Sulphate of ammonia,	100 "
Pearl ash (or 80 lbs. of wood ashes,)	30 "
Common salt,	80 "
Dry sulphate of soda,	20 "
Nitrate of soda,	25 "
Crude sulphate of magnesia,	50 "
	610 "

The News,

Published at Independence, Va., by Thomas Pugh and Lundy, a weekly journal, neutral in politics. Price, 1.50 in advance.

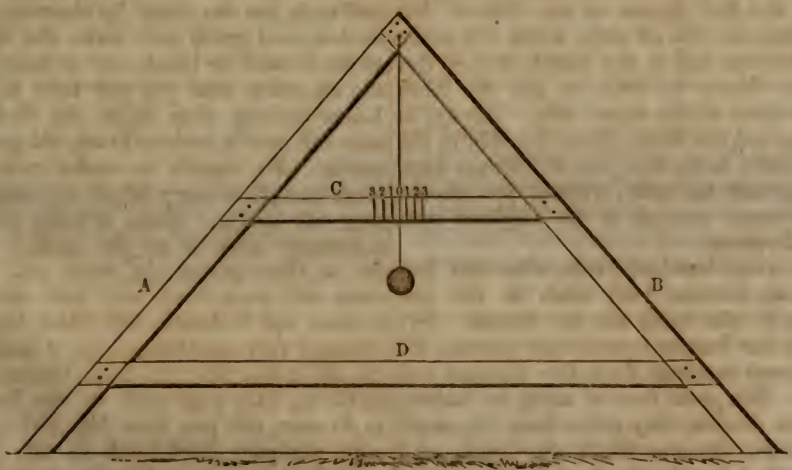
We place on our exchange list and tender our cordial greetings, and best wishes to the publishers.

Horizontal Culture.

Dr. Cloud —*Dear Sir:*—There are many things to be taken into consideration theoretically and practically applied to lands that are waveing, or, in other words, that are hilly, and need bringing to a level, in order to retain the soil.

The first thing to be done is branch-ditches, conductors, to be cut as straight as possible with the spade, and large enough to hold all the water that the hill-side ditches may empty into them, this done, the next thing is the hill-side ditches, these will require some skill, patience and knowledge; but before you can commence, you must have some kind of an instrument to measure the grade for the ditch, for this I have found nothing to surpass the rafter-level.

The first thing then is the construction and description of an instrument absolutely necessary to lay off the work correctly—the opinion of many that they can lay off as good a ditch or run as level a row by the eye, to the contrary notwithstanding. Take two strips of plank 1 inch thick, 3 inches wide, and 8 feet long, put them together at one end by letting into each other at such angle as that the other ends will be just 12 feet apart from outside to outside, and take 2 other strips of the same width and thickness and of sufficient length, and let the end of one into the piece, one-third from the top, or crown, and the other end one-third from the foot of the opposite or other side piece. The other piece must be let in the same way from the opposite side piece which will cause them to cross each other, where they must be let into each other, the whole put together with inch screws firmly. Then draw a line from the outer corner of one foot to the outer corner of the other, mark and saw off, this will make the instrument flat on its feet, when raised upon them. It should have two good coats of paint to protect the wood from the influence of the weather. You can either attach a spirit-level to it, or you may use plumb and line; (I use the plumb,) fasten the line at the



crown of the instrument, and on a strip attached to the underside of the two braces straight across from one to the other, get your level marked by placing the instrument on some level surface; to get the grade marks, place a block one inch thick under one of the feet, then mark the inch under your plumb line, and so on until you get as many inches either way as you desire. Now the instrument is ready for operating with.

The next thing is to lay off the hill-side ditches—examine the hill or slope that you wish to operate on, consider where the ditch ought to commence, where it should run and where it should empty, so as to have the ditch where it ought to be, but at no time give your ditch less or more fall in order to get it empty at a certain place, always commence the ditch some distance above all the washes in the land so as to stop all the water that collects and carries off the soil. But if there are any gullies in the field you wish to hill side ditch, first fill them up so as you can more readily cross them with your ditch.

You can commence your ditch either at the emptying place, or at the top or upper

end of the ditch. With new beginners, they had better begin at the top and carry the grade down. First select your place to begin, all ready on the spot, a good plowman with a good strong mule and good turn-plow. Now commence laying off your ditch and let the plow follow after you. The first three strides of your level give three inches fall to a stride, (without there should be a large quantity of water caught at the start,) then give one and a half inches every strike for the first 200 yards, if your ditch is longer, (though it should not be if it possibly could be avoided,) the first 100 yards give one inch, and the next 100 yards half inch. If your land should be very sandy, give less fall, and make the ditch wide with a high bank. Now your ditch is laid off, it has but one furrow, have another good plowman with a good and large turn-plow and strong mule; have this plow, or as many more as are necessary, plowing out the ditch. Run three furrows close and deep as mule can well pull the plow, above the first furrow or the furrow that the ditch was laid off with, which will make four furrows, and in the fourth furrow run another furrow in order to get the ditch the deepest on the upper side. Always in plowing out the ditch, throw the dirt to the lower side; to do this, you will always have to drag back the plow, without you should be fortunate enough to be supplied with hill-side plows.

For every hundred yards, after the first hundred, increase your ditch in size one furrow in the width for the bottom. Say for the first hundred yards four furrows, for the second hundred yards five furrows, and so on. The great fault of many in making hill-side ditches, they make them too small, they soon become filled up, break and do much harm to the land in the way of making gullies, carrying off the virgin soil, &c.

In laying off hill-side ditches, there are many things to be kept in consideration, the quantity and force of the water, that will fall into the ditch that you are about making, you will have land that has but little descent; then in a few strides it will be steep and full of gullies that you have previously filled up, here give your ditch more fall, especially when you cross the old gulley, in order to run off more readily, for at all such places the water comes quicker and with more force into the ditch. Consider the quantity of water that will flow into your ditch at the heaviest rains that may fall on your fields, and make your ditches accordingly. Now your ditch is laid off and plowed out the first time, and the hoes should follow and drag the plowed up dirt out of the ditch, bringing it all to the lower side of the ditch, this done, cause the plows to follow after the hoes and plow out the ditch again close and deep with one furrow less; but be certain to run the extra furrow in the last furrow on the upper side in the bottom of the ditch—this will cause the ditch to be deeper at the upper side than the lower side, which is a very necessary thing, so as to cause the water not to bear too heavily on the fresh bank below. Now cause the hoes to draw the dirt out of the ditch the second time. At this time you may, and generally can, complete the ditch, have the loose dirt, and all bumps that may be in the bottom of the ditch dragged out clean, roots and grubs cut out smooth, large stumps and trees you can shun by observing them in time, and grade and make the ditch so as not to wash or break over at them, or by the alteration that you will have to make. Leave nothing close about the ditch that may fall into it, such as brush, old grass and weeds. Be certain to make your ditch large enough to carry off all the water that may fall into it. Make it wider and with a stronger bank at all the gullied places, for at these places the water will always come with some force, and here the ditch is more apt to break, and when broken it becomes very troublesome, for it washes out the old gulley that you have laboured hard to fill up, then your work in this line is all to do over, and you have less dirt to do it with, also your ditch bank at this place is to make up again. Always recollect hill-side ditching is worth doing; and "what is worth doing, is worth doing well."

Your ditch is now completed. Now you must consider where the next ditch will be necessary. Here you must exercise some judgment; first consider the quantity of water that falls at the heaviest rains, and the distance below the ditch that you first laid off that the water will commence carrying off the soil, (*i. e.*, the surplus water that your runs will not retain,) here, as near as possible, make your next ditch, and so on until you make all the ditches necessary on this slope or hill-side, and also

wherever a ditch is needed in the field, or in any field that you have, until you have every spot of ground in your plantation that washes the least, or is likely to wash, protected by a hill-side ditch. Here I would remark, the proper time to hill-side ditch your land is when it is just cleared; whenever you have your new ground ready for the plow you should first lay off and make all the hill-side ditches that shall ever be needed—this done, the next thing is to run off your land in rows to a perfect level, and ever afterwards keep them so.

Having your field or fields hill-side ditched, the next thing in consideration is the level or horizontal culture, or the means by which to arrive at it. Take your instrument where you wish to commence laying off your rows, have a bull-tongue plow this time to run off with. It is best to commence near the top of the hill; be certain to commence so as to catch all the rolling water. Start with your level, carry it to a perfect level, cause the bull-tongue plow to to follow after you, run on until you come to a ditch, do not cross it with your rows, for if you do the plows will soon fill it up; but when you get to the ditch your first guide row is done, then go twenty, thirty, or forty yards according to the slope, the steeper the closer the guide rows must be. So, at the proper distance commence your second guide row, run as the first, and so on until the field or the whole of your plantation is levelled. You may start plows to laying off as soon as you get two guide rows run; but it is best to run all your guide rows first, so that when you commence laying off you can be there with your plows to detect any errors, and be ready to run in new guide rows that may be needed in filling up between the first ones.

In laying off the rows, give each hand (plowman) a rod just as long as you wish the width of your rows, so they may have a guide; they will soon learn the proper width by the eye. Cause one plowman to commence laying off rows on the lower side of the guide row, and one on the upper side of the guide row next below—so as between every two guide rows, the laying off will meet in the middle. This they will do first at places where there is more slope in the land, and at more level places there will be corners that must be run off; these will be mostly short rows. If by this time the level is lost, you must run in more level or guide rows, and lay off from them so as to have all your rows from one end to the other on a perfect level; and in this way continue taking up the guide rows until your field is completed, or the whole of your plantation is put in rows to a perfect level. There is an opinion among many that this cannot be done, it is impossible, they think, to get every row from one end to the other to a perfect level. It can be done, and should be done by every farmer that cultivates hilly land; but to do it requires a great deal of patience, and a strong determination that there shall not be the least wash in his plantation. Keep land, in this portion of the country, from washing and it increases in the ingredients that give food to plants, for the soil has a self-sustaining principle, and cannot be *worn out*, if well hill-side ditched and cultivated on a level with a proper rotation of crops, and those crops cultivated in accordance to the laws, that naturally govern each and every plant that we cultivate. For an example take a poor hill side, that is almost murdered, ghost-like staring you in the face, put it under a proper system of horizontal culture—when you plow, plow deep and on a level; how soon it is reclaimed. Nature will do her part, and soon, instead of a gullied and galled hill-side, you have one that will produce good crops. The great object in view is to retain the rain water where it falls, so as to have food in store for the plants during drought.

To keep your level or guide rows, in laying off the rows, the one next to to the row that you run with the level, make a little wider than the usual width of your rows, and when you sow the land in small grain, or break it up, lap two furrows on your guide row. This ridge will remain distinct; so when you wish to run off the land in rows again, you will not have to run off guide rows. Always plow to a level, and never plow across the hill-side ditches. Empty all your hill-side ditches into your conductors; by no means ever let them empty under the fence into the road. This makes a hog hole, and soon ruins the road. If you should have a ditch running the same course of the other ditches that cannot reach the conductors, let it empty into a hill-side ditch that does empty into a conductor.

I have, in a hurried manner, written out the plan (by which I have been operating for the last seven or eight years, on the plantation where I have been doing busi-

ness,) of Horizontal Culture. Land that I could make produce but two to three hundred pounds of cotton per acre, now produces over one thousand pounds per acre without one speck of manure.

DANIEL WOFFARD.

REMARKS BY THE EDITOR.

The foregoing excellent, because practical article, though not written in that *belle-lettre* style, that may please the fancy of some readers, is eminently worthy of the study and adoption of every man in this country who cultivates but ten acres of land. Mr. Woffard understands the philosophy and true principle of properly placing land under the *level culture system.* Every position is distinctly taken and clearly described, so that no practical man need err in its application on the field. All of our old subscribers will distinctly trace through all this article the teachings of the "Cotton Planter." Years ago, (in 1844) when we put the level on our rows at LaPlace, but one writer, (Mr. Hardwick; of Georgia,) that we now recollect, stood firm with our position. Why did we take that (then extreme) position?—The answer is found in this sentence from our correspondent, viz:—"The great object in view is to retain the *rain water, where it falls out*, so as to have food in store for the plants during drought." Mr. Woffard is a manager or overseer, and has, by this system, on the land of his employer, in the short space of seven or eight years, so improved it, that on land which produced but 300 pounds of seed cotton when he commenced operating on it, now produces, under this level culture system, *that retains rain water where it falls*, one thousand pounds of seed cotton. It is not surprising that such an overseer should have remained thus long in the management of the same plantation. Every plantation in the cotton States can be treated in the same manner and to the same advantage. The comparatively level not less than the hilly. So level your culture and deepen your plowing whether on level or hilly land, as to retain the rain water where it falls!—*From American Cotton Planter and Soil of the South.*

Common sense can accomplish much without talents; but all the talents in the world can accomplish very little without common sense.

For the Southern Planter

To the Vine Growers of the United States.

At a late meeting of the "Aiken Horticultural and Vine Growing Association," it was resolved: That a committee of five be appointed to open a correspondence with the various Vine Growing Associations in the United States, and to ascertain the practicability of holding a Vine Growing Convention in Aiken some time next summer; and if found practicable and expedient, that the committee take such measures to secure this object as they may think proper, and that they report the result of their proceedings to this Society at its meeting in May next.

The following gentlemen were appointed the committee: Messrs. A. DeCaradeuc, Chairman; McDonald, Ravenel, Redmond, and Wood.

It is perhaps proper to state the object of the Association in proposing such a Convention, and to point out a few of the advantages to be derived from it. In the first place, it is necessary to come to some understanding about the names of the Grapes now under cultivation, as it is evident that great confusion exists in that respect. Most of the vines being known in different places by different names; the Black July, for instance, having five synonyms. Thus it often happens that a Vine Grower reads or hears great praises of a Grape whose name is unknown to him, and a description of which tallies with none that he has; he procures it at great expense, cultivates it with care for two or three years, and ultimately discovers it is identical with some other he has had a long time. This is discouraging, and has deterred many from procuring new and valuable varieties, which it would have been advantageous to have cultivated more or less extensively. This difficulty can only be obviated by a Convention such as is proposed—the best written description never being so lucid as to convey an exact idea of a fruit.

The meeting will take place at a season when the fruit at the South is ripe; all who attend are invited and requested to bring samples of their Grapes, ripe if possible, and green if otherwise, with a leaf and a piece of the wood, and names and synonyms attached. Those who cannot attend are requested to forward samples as above. Thus if we are assisted by the good will of a majority of Vine Growers, most of the varie-

ties in the States will be represented; their qualities, names, synonyms, sizes, degrees of maturity, etc., will be compared, and a vast amount of invaluable information derived. Names will be agreed upon, accepted or rejected with good authority. Persons will, also, be requested to bring or send samples of the wild grapes from their neighborhood in the same manner, that the different species may be finally determined upon and each grape properly classed under its own head or type—an object of great importance to the Botany of the country and, perhaps, finally to the making of wine from them. We are daily getting additions to our list of natives, and unless a correct nomenclature and classification be at once made, we will be thrown into inextricable confusion, expensive and troublesome to the growers. Another object of the Convention is to determine upon some manner of naming the different Wines. The present way of calling them by the name of the grape is in direct contravention to the established rules of wine growing countries. It has always been customary to classify wines by the name of a State, Province or District, with the different brands attached to them, according to the name of the particular locality. Thus the general name "Wines of the Rhine" comprises many particular brands, such as Hockheimer, Johannesberg, etc., etc. Bordeaux wines include Chateaux Margaux, St Julien, La Rose, etc. The reason for this is very obvious. The same grape will make totally different wines in different places. And, again, in most wine countries, (and we will, no doubt adopt the same course) the grapes are mixed. A wine made from a mixture of Catawba, Isabella and Warren could not be called by either of those names.

At present we have a hundred different Catawba wines, no two of them alike. Hence, the propriety of rejecting the name of the fruit in favor of the time-honored custom of naming after the State, District or River, with brands of private names or localities. Purchasers will then know at once what they they are buying, and will not be prejudiced against Catawba or Warren wine, because they have tasted worthless Catawba or Warren wine.

Independently of the foregoing, the amount of information exchanged by persons meeting in such a Convention as we propose, would truly be worth "Millions to the Nation," and would tend more to develop that rich culture than all that could be written.

We call, then, upon all who cultivate the Grape, whether for the table or for wine, or who take an interest in the success of its culture, to assist the committee in securing their object—a Convention of Delegates from all the Vine Growing Associations in the United States, and of private and seperate Vine Growers. Let all who can come, determine at once to meet in Aiken, S. C., on the *Third Tuesday in August next*, (21st) there to assist in the good work—to compare their fruit and exchange their views.

Aiken has been selected as being easy of access from all quarters—North, South, East and West—being, at all times, unexceptionable as to health, and a delightful summer resort for the neighboring cities, and well provided with ample accommodations.

Secretaries of the different Associations connected with the Vine Culture, would confer a favor by forwarding to this office, or to either of the gentlemen of the Committee, the names and localities of their Societies, and all other information they may think proper.

A. DE CARADEUC, Chairman, Woodward, S. C.
Dr. J. C. W. McDONNALD, Woodward, S. C.
H. W. RAVENEL, Aiken, S. C.
E. J. C. WOOD, Aiken, S. C.
D. REDMOND, Augusta, Ga.
February, 1860.

MUSTARD—The word mustard is said to have originated in the French phrase, "Moult me tarde," (I wish ardently,) which was the motto of the Duke of Burgundy. He obtained 1000 men Dijon, in return for which assistance he permitted that town to bear his armorial ensigns with this motto. The device was affixed over the principal gate; in time the middle word became erased, and the other two were printed on the labels which the merchants pasted on pots with this commodity, and sent all over the world.

Let each man attend to his own calling; so that decision of character may be given to the mind of the public mass.

Do not cherish any feeling of revenge or animosity, in order that you may set a proper value upon human life."

The Rights of Women.

The rights of woman, what are they?
The right to labor, love and pray
The right to weep with those that weep,
The right to wake when others sleep.

The right to dry the falling tear;
The right to quell the rising fear;
The right to smooth the brow of care,
And whisper comfort in despair.

The right to watch the parting breath,
To soothe and cheer the bed of death;
The right, when earthly hopes all fail,
To point to that within the veil.

The right the wanderer to reclaim,
And win the lost from paths of shame;
The right to comfort and to bless
The widow and the fatherless.

The right the little ones to guide
In simple faith to Him who died;
With earnest love and gentle praise
To bless and cheer their youthful days.

The right the intellect to train,
And guide the soul to noble aim;
Teach it to rise above earth's toys,
And wing its flight for heavenly joys.

The right to live for those we love;
The right to die that love to prove;
The right to brighten earthly homes
With pleasant smiles and gentle tones.

Are these thy rights? Then use them well;
Thy silent influence none can tell.
If these are thine, why ask for more?
Thou hast enough to answer for.

Are these thy rights? Then murmur not
That woman's mission is thy lot:
Improve the talents God has given:
Life's duty done, thy rest is heaven.

Life's Harvest.

Twilight had gathered in the sheaves of day,
Which time had scattered thickly here and there;
And night, pale night, had bound them, one by one,
With the long braids of her own raven hair.
Silent and still, an angel floated down,
And bore the sheaves, the gathered sheaves away;
Ah! some were golden with the ripened grain,
And some were black and blasted with decay.

Yes, day by day we sow, and twilight comes
And gathers in the full sheaves, one by one;
And, by-and-bye, will come life's evening hour,
And we shall see the work our hands have done.

LIZZIE G. BEEBE.

Ohio Farmer.]

From the New York "Spirit of the Times."

The Proof Reader.

BY "SPINNING BAIT."

Ye whom the fancy causeth to indite
Or prose, or rhyme, in measure long or short,
Think of *his* labors, also, as you write,
Whose ready eye the long correction sought.
With fev'rish care he grammar scans, and spelling;
The writing cramped and hurried—care compelling—
And words omitted, where the sense obscure
Puzzles his brains to place another sure.
Within his "den," far off from sunny ray,
Full oft he passeth more than half his life,
Or searcheth on by candle's feeble ray,
By changing errors to support his wife.
Think of his brain, how busy—and his eyes
That *read* of what he pines for—gorgeous skies!
Fair flowers and forms. Alas! but now and then
Aught save "a grimy devil's face" may greet his sight,
Who, standing at the doorway of the "den,"
Shouts, "Copy, sir, nor keep us here all night!"
Thinkest thou, writer, whose most piercing eye
An error typographical may sometimes spy,
Of all the toil and trouble, time and care,
That takes to make your article thus "fair?"
Dost never make an error in thy haste?
Or think beyond the word thy pen hath traced?
Leaving to printers, with invention quick,
To find the word to fill's composing stick?
Ponder the cobwebs, traced in pain,
That young apprentices have caused him too
Oppressing more his ever-working brain;
Besides the labor he still has to do.
Think of all this! and if some faults you scan,
Reflect that he is human, poor, frail man!
Nor pour the "vials of your wrath" all o'er,
Nor haunt him till his heart is wounded sore;
But with a laugh----or leastways with a grin----
Say, "here's an error, pshaw! a *venial sin.*"

Grove Hill, S. C.