VOL. XIX. [JUNE.] No. 6.

PUBLISHED MONTHLY. AUGUST & WILLIAMS, PROPRIETORS.

J. E. WILLIAMS, EDITOR.

THE SOUTHERN PLANTER.

DEVOTED TO

AGRICULTURE, HORTICULTURE,

AND THE

HOUSEHOLD ARTS.

PRINTED AT RICHMOND, VA.,
BY MACFARLANE & FERGUSSON.
1859.

CONTENTS.

THE SOUTHERN PLANTER

Devoted to Agriculture, Horticulture, and the Household Arts.

Agriculture is the nursing mother of the Arts. [XENOPHON.

Tillage and Pasturage are the two breasts of the State.—SULLY.

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

VOL. XIX. RICHMOND, VA., JUNE, 1859. No. 6.

A Statistical View of American Agriculture.

ITS HOME RESOURCES AND FOREIGN MARKETS, &C.

An Address delivered at New York, before the American Geographical and Statistical Society, on the organization of the Agricultural Section.

BY JOHN JAY, ESQ.,

Chairman of the Section, and Foreign Corresponding Secretary of the Society.

MR. PRESIDENT AND GENTLEMEN:

In accepting the honor you have conferred upon me in the Chairmanship of "the Agricultural Section of the American Geographical and Statistical Society," it becomes my duty in opening the Section this evening, to say a few introductory words upon this branch of the Society's labors.

With your permission, I propose to glance over the field which the Agricultural Statistics of our country are destined to embrace, and refer cursorily to some of the aspects in which, looking at the past, and the present, and onward to the future, they commend themselves to all classes of our reflecting countrymen. The facts which they develop, concern alike consumers and producers, farmers and planters, manufacturers and all engaged in commerce, whose varying interests are so closely and inseparably allied. They have a common interest for all who watch the march of our Republic, and record its progress; and above all they deserve the careful study of the Legislators and Statesmen, who are constantly being called from private life, to frame its laws, to shape its policy, and to determine its destiny. For these, especially, the tabular results of American Agriculture, furnished each decade by the national census, will serve as a primer of practical knowledge, in which, guided by those principles that underlie all just government, they can learn the alphabet of legislative wisdom, and read easy lessons in political economy.

Most of the Governments of Europe have been greatly in advance of us in their appreciation of the value of statistics. England, France, Belgium, and Austria, have, for some years past, applied themselves earnestly to statistical investigation; and in those countries the truth is becoming generally recognized, that the world at large has an interest in the statistics of every nation, as tending to develop natural laws of universal concern to mankind.

In England, the labors of the Statistical Society, whose elaborate and most valuable publications enrich our Library, through

the courtesy of the British Government, have aroused the attention of the people and of Parliament to the truth, that the science of politics finds in the statistical element its most solid foundation.

"STATISTICS," remarks M. Le Ray,* "are to politics and to the art of governing, what Anatomy is to Physiology in the study of the human body; the observation of the stars to astronomy; the study of the species of animals, plants, and minerals to the natural history of the globe; the analysis of the body to Chemistry; Experimental Physics to Natural Physics. The statesman who pretends to govern, without knowing the important facts which interest society, makes a more fruitless attempt, than the philosopher who should propose to make a general classification of the beings which compose the three kingdoms of nature, without knowing the essential characteristics of them."

The French Minister, in his opening address at the International Statistical Congress at Paris, in 1855, thus touched upon the Philosophy of Statistical Science:

"Whether Statistics prove the development of population, its increase or its decrease, its riches or its misery, or whether it registers the elements of production and of consumption among nations, it tends always—and that is its chief merit—to discover and develop all the general laws which may assist to render men better and happier."

This remark, although predicated of Statistical Science generally, is equally applicable to that part of it which pertains to Agriculture, and which has been hitherto so singularly neglected.

Commerce and Manufactures, by their "consolidation of power and concentration of wealth," have commanded to a far greater extent the attention of government. But the Census shows beyond the possibility of error, that even now, and without reference to its future developments, Agriculture is the largest national interest of this Republic; involving more than any other branch of industry, the wealth and the welfare of the country, and the labor and the happiness of the greatest number.

* The author of a recent valuable work on the occupation of domestic life and moral character of the working classes of Europe.

It is natural that such an interest should in every enlightened community establish among its members a common ground of thought and action, however otherwise they may be divided.

Thus we see in England and in the United States, amid scenes of party excitement, the warmest political opponents meeting cordially on the same platform at Agricultural Exhibitions, and in France at the grand *Exposition* of 1855, the same pleasing spectacle was exhibited.

The French Minister of Agriculture, in distributing the prizes, remarked that the catalogue, in addition to its Agricultural value, had a great political significance; and he then added, "Have you not remarked, that names the most separated by civil dissensions, have come together at this peaceful tournament! The reason is that Agriculture has its rewards for every legitimate ambition; that all parties have an equally powerful interest in it; and that the beauty of the productions of Agriculture, gives the measure, *and in certain respects the degree of civilization.*"

Looking at the employment of the free male population of the United States over fifteen years of age, we find that in 1850 the population engaged in Agricultural pursuits, was twenty-four hundred thousand, or forty-four (44.69) per cent; while the total number engaged in commerce, trade, manufactures, mechanics, arts, and mining, was only sixteen hundred thousand (1,596,265) or about thirty per cent (29.72).*

These proportions, it may be remarked in passing, differ materially from those of Great Britain, where the census in 1841, returned the persons engaged in commerce, trade, and manufactures, at twenty-four hundred thousand (2,415,127) or twenty-six per cent (26.24) and those engaged in

* The other occupations and their proportions were as follows:

Labor, not Agricultural,	18.50
Army,	10
Sea and River Navigation,	2.17
Law, Medicine, and Divinity,	1.76
Other pursuits requiring education,	1.78
Government Civil Service,	46
Domestic Servants,	41
Other occupations,	41

De Bow's *Compendium of Census*, 1850, p. 128. *Table CXXX.*

agriculture as only fourteen hundred thousand (1,410,509) or fifteen per cent, (15.33).

Looking beyond the number of individuals employed in American Agriculture, to the amount of capital invested in it, you have been already told that the Superintendent of the census estimated the value of the capital represented by Agriculture in 1850 at five billions of dollars, and that represented by all other branches of industry at less than one billion, giving to Agriculture more than five-sixths of the whole; and although these figures may be but an approximation to the truth, the proportions are probably correct.*

Agriculture, by its products, adds to the wealth of the country some sixteen hundred millions per annum,† and in the State of New York, where the assessed value of the real estate is eleven hundred millions, (1,107,272,715,) notwithstanding the enormous wealth of the metropolis, the Agricultural interest pays *four-fifths* of the taxes.

Prof. J. F. W. Johnston in his Lectures on Agricultural Chemistry, says, that *nine-tenths* of the fixed capital of all civilized nations is embarked in Agriculture.‡

With these figures before us of the comparative population and wealth devoted to Agriculture, we can appreciate without effort the truth of the remark made by Mr. Webster, in his well-known agricultural address at Boston, on his return from England.

"No man in England is so high as to be independent of this great interest, no man so low as not to be affected by its prosperity or its decline. The same is true, eminently, emphatically, true with us. Agriculture feeds, to a great extent it clothes us; without it, we should not have manufactures; we should not have commerce. They all stand together like pillars in a cluster, the largest in the centre; and that largest is AGRICULTURE."

Apart from the general rule, that the Agricultural wealth of a country is undoubtedly the first test of its internal resources, and the condition of its people, extra-territorial causes seem to be combining to give an unusual and increasing importance to the Agricultural products of America.

The increase of population on the Eastern Continent, beyond the capacity of production, is investing the question of food in this age with a significance that never belonged to it before, and the growing demands for bread that come to us from Western Europe, give a world-wide interest to the Statistics of American Agriculture, far beyond that which they could derive simply from the wants of our own countrymen.

Consumption has there overtaken production, and henceforth, in England, France, Belgium, Holland, and a great part of Germany, the *food question* will be *the question* that must take precedence of all others, as the regulator of commerce, and entitled to the first attention and the wisest treatment on the part of Government.

In England, the turning point at which consumption overtook production, is said to have been in 1824,* and from that time, two causes are held to have been constantly increasing the disproportion. The first of these, the increase of the population enlarging the consumption of breadstuffs, and the second growing out of the first—the demands of that population in part, for animal food, calling for a larger supply of cattle for the butcher, and consequently for a larger breadth of grazing and arable land for the production of green crops to rear and feed them, thereby diminishing by so much the breadth of land devoted to bread crops.†

Upon the political importance of the Bread question in Europe, it is not necessary to enlarge. It is a matter within the

* Mr. Waring's paper on the Agricultural features of the Census, Vol. 2, Bulletin of American Ceographical and Statistical Society, p. 191.

† Compendium of the Census, p. 176.

‡ 2d Ed., New York, 1857, p. 11.

* England imported corn from abroad long before this date, but in great part for re-exportation. Malthus, in 1803, speaks of England as having been an importing nation for twenty or thirty years; and remarked, "In spite even of the peculiar advantages of England, it seems to me clear that if she continue yearly to increase her importations of corn, she cannot ultimately escape the decline which seems to be the natural and necessary consequence of excessive commercial wealth. I am not now speaking of the next twenty or thirty years, but of the next two or three hundred."—*Essay on Population, American Ed.*, 1809. *Vol. II.*, 273, note.

† This subject is clearly treated by an anonymous correspondent, "S. C.," of the London Farmers' Magazine for 1857, in a paper headed "The Consumption and Production of England."

personal knowledge of the present generation. The famine of 1847, which in Ireland alone was attended by the loss of half a million of lives, and the succeeding revolution and rebellion throughout Europe in 1848, are fresh in our memories.*

To the existence and power of the French Government, as one of their own writers has remarked, the mildew on an ear of corn, or the *oidium* on a bunch of grapes, are of more vital consequence than the splendor of the Imperial jewels, or the marvels of a thousand handicrafts. Whatever in our day cuts off the small profits of the industrial classes in Europe, or threatens multitudes with starvation, strikes at the stability of the political institutions of the land, and wields a mighty influence whether for evil or for good.

The very existence of thrones may be affected—indeed some think their existence has been determined, by causes apparently insignificant as the rot in the potato, or the weevil in a grain of wheat.

This overplus of population and deficiency of food in Europe, is of such recent origin, and as yet so slightly felt, that as a nation we have hardly begun to realize that it is to be of permanent continuance. But European Economists recognize and appreciate the fact, that an inevitable and increasing demand for food, with an insufficient and diminishing home-supply, will give henceforth to the Bread question, an immense political, as well as moneyed significance; and the sufficiency of each successive crop at home and abroad, to satisfy the wants of the people, within the limits of their capacity to purchase, is become a question of constantly recurring and earnest speculation.†

France and England are competitors in the corn and cattle markets of the world. The price of food is becoming enhanced by the simultaneous demands of their merchants at all the sources of foreign supply; and this accounts for the singular fact that our agricultural returns are sought for abroad, with more eagerness than among ourselves; and that in the absence of official returns, the most accurate statements and approximations are to be found in "The Mark Lane Express," and "London

* Mr. Coleman, in his work on Continental Agriculture, thus speaks of the Irish famine of 1847:

"In a single country, by the loss of a single crop, at least five hundred thousand persons have perished, amidst the horrors of starvation, or by the diseases engendered and aggravated by famine."

† The following interesting remarks on this subject, are made by the eminent political economist, Mr. JOHN STUART MILL, in the second volume of his well-known work. (London, 2nd Edition, 1848. pages 297, 8.) "Suppose, then, that the population of Great Britain goes on increasing at its present rate, and demands every year a supply of imported food, considerably beyond that of the year preceding. This annual increase in the food demanded from the exporting countries, can only be obtained either by great improvements in their agriculture, or by the application of a great capital to the growth of food. The former is like to be a very slow process from the rudeness and ignorance of the agricultural classes, in the food exporting countries of Europe, while the British colonies and the United States are already in possession of most of the improvements yet made so far as suitable to their circumstances. There remains as a resource the extension of cultivation, and on this it is to be remarked that the capital by which any such extension can take is mostly still to be created. In Poland, Russia, Hungary, Spain, the increase of capital is extremely slow. In America it is rapid, but not more rapid than the population. *The principal fund at present, available for supplying the country with a yearly importation of food, is that portion of the annual savings of America which has hitherto been applied to increasing the manufacturing establishments of the United States, and which may now possibly be diverted from that purpose to growing food for our market.* This limited source of supply, unless great improvements take place in agriculture, cannot be expected to keep pace with the growing demands of so rapidly increasing a population as that of Great Britain—*and if our population and capital continue to increase with their present rapidity, the only mode in which food can continue to be supplied cheaply to the one is by sending the other abroad to produce it.*"

Mr. Mill seems not to have been aware—indeed, few of our own people are aware, of the large amount of foreign capital which is yearly introduced into the country by foreign emigrants, especially by the Germans.. Recent investigations on this subject by some of the Commissioners of Emigration, at New York, indicate an annual addition to our national wealth from this source, vastly greater than was generally supposed; and this fact helps to explain the marvelous rapidity in the improvement and products of our Western territories as exhibited in the tables of the Federal Census. The suggestion in favor of a transfer of the capital now employed in the United States in the manufacturing of products for American consumption, to the production of food for British consumption, is not without significance, in view of the ability of the writer, and his clear-sighted advocacy of British interests.

Farmers' Magazine," and are thence transferred to the columns of the American newspapers for the information of American farmers. Thus does individual enterprize seek and partially obtain those results, which governments alone can accurately furnish. The contemplative statesmen of those countries, especially of England, foresee that with a limited area, and an increasing population, the time is at hand when, despite every effort to postpone it, by improved cultivation, in which England now leads the world, their own productions will be more and more inadequate to supply the needs of their people, and the failure of a single harvest, according to an English writer, might be naturally followed by war, famine and disease.

A brief century ago a very different state of things existed. In 1756, M. D'Anqueille, a French political economist and statesman, remarked, that "England could grow corn enough in one year to supply herself for four."

Now, England is said to import food annually to the amount of some forty-five millions sterling, in corn, wheat, barley, oats, beans, meal, and flour; besides live animals, meat, cheese, and butter; and her population is increasing at the rate of a thousand a day.

The contrast between now, and then, is the more remarkable, when we remember that England is estimated to have three times as much land under cultivation as when D'Anqueille wrote, and that the ratio of her crops to the acre is doubled, if not trebled.

In France, despite the efforts of government to secure for the people sufficiency of food, the scientific researches of M. Payan, of the French Institute, on the public alimentation of France, confirm the inferences drawn by M. de Lavergne from the condition of the French peasantry. The nation, it is said, *have not enough to eat*, even to supply the natural wants of the human frame.

The official report of the products of the recent universal Exposition of France, in dwelling upon the agricultural ability of the empire to support its population—referring to the fact that France has raised in good years 97,000,000 hectolitres of wheat, which represents the sustenance of 32,000,000 of individuals, added, "and there are unfortunately more than 4,000,000 of our compatriots who are not in the habit of eating bread." Indeed it has been broached as an interesting question how far the physical deterioration of the standard of growth in parts of the French Empire is the result of an inadequate supply of nutritious food. Some plausibility is given to this suggestion, by the statement that the number of conscripts who are rejected on account of deficient health, strength, and stature, is constantly on the increase. Forty per cent are said to be turned back for that cause, and although since 1789, the standard has been three times reduced, as large a proportion of the conscripts is below the required height (five feet two inches,) as before the changes, showing, as the late Professor Johnston remarks, how closely the discussion of agriculture is connected with that of the most profound social evils.* The importance and dignity of the entire subject become yet more striking in view of the great truth so forcibly alluded to by Lord Stanley in his Address on Public Health, "That whatever exception may be found in individual instances, when you come to deal with man in the mass, physical and social decay necessarily go together."†

In Spain, whose central table-lands are reckoned among the finest wheat growing districts in the world, the culture is most rude and imperfect, and some tracts are partly overgrown with broom and daphne.

The governments of Europe are awake to the importance of the question. In France the Imperial Interdict is continued to September, 1858, against the exportation of grain, and for the encouraging its importation.‡

In Spain, similar measures are said to have been adopted. In England and Ireland science is making every effort to dis-

* On the authority of Rubickon as quoted by Prof. F. J. Johnston, in one of his addresses before the New York State Agricultural Society.

† Address, delivered before the National Association for the Promotion of Social Science.

‡ A writer on European Agriculture, in the London Farmers' Magazine, says: "France has made a greater advance in two short years than we have done in twenty. The present Emperor is doing much by his personal exertions and example to introduce good live stock and to improve the general system of cultivation. See M. de Trehounais' paper on the "Past and Present of French Agriculture," recently read before the Society of Arts.

cover and arrest the potato-rot, which is reported to be spreading also in France.

Throughout Prussia, Austria, Belgium, Holland, Bavaria, and most of the minor German States, the increase of population is attended not with an increase, but rather with a decrease of the breadth of land devoted to cereal produce. In France, that decrease has been made greater by the absorption of land in the cultivation of the Silesian sugar-beet, and a similar decrease is found in Western Europe, with the exception of Belgium and Holland, which are grazing rather than agricultural countries, and are themselves purchasers of foreign grain. And excepting also Russia, which is making extraordinary efforts, involving no slight revolutions, social and political, to maintain its markets, and so secure its agricultural supremacy. That mighty Empire, with a population of sixty millions of souls, and embracing in Europe, Asia, and America, one sixteenth of the whole world, presents many prominent points of similarity as well as contrast to the United States, which, without anticipating the rivalry that may hereafter arise between the two countries, invest with a peculiar interest for our own countrymen, the newly developed features of its imperial policy, and especially those which relate to the social elevation of its laborers, and the improvement of its modes of culture.

Agriculture, in the Continental States, is at a low ebb, and by no means keeps pace with the increasing requirements of the population.

For the supply of their wants, annually becoming greater, they begin to look in great part to the American Continent.—"One fact," says the Mark Lane Gazette, "is clear, that it is to Western America that we must in future look for the largest amount of cereal produce."

I have permitted myself, gentlemen, to dwell for a few moments upon the subject of the foreign demand for breadstuffs, for the reason that although that demand is of recent origin, and is still limited both in extent and degree, it would seem that in the natural order of things that demand must not only increase throughout the whole of Western and in parts of Eastern Europe, but extend to other quarters of the globe, and form a necessary feature of increasing prominence, in every intelligent view of the agricultural aims and resources of the United States.

While recognizing the truth that lies at the basis of Statistical Science, and that should never be lost sight of in an association like this, that fancy and theory are inadmissible, and that Newton's motto, "*Hypotheses non fingo*,"* should be our guiding rule, we cannot forget, that while England and France count their ages by centuries, our Republic is yet in its infancy, and that, in a general glance such as we are about giving to the agriculture of our young land, the view would be meagre and incomplete, were we not to notice the surrounding circumstances, that are beginning to shape its character and influence its growth.

With the facts before us to which I have referred, in regard to the existing demand for bread in Europe, let us now look at the general capacity of our country for affording a supply.

The number of square miles contained in the area of the United States of America, in the present year, (1858,) is within a fraction of three millions, (2,936,165,)† somewhat more than one third the area of North America, exclusive of the West Indies, and nearly double the area of all Europe,‡ excepting Russia.‖

---

* Quoted by Lord Stanley, in his very able address before the Statistical Society.

† Square Miles.

The area of the United States at the peace of 1783, was,	820,680
The purchase of Louisiana, 1819, added about,	899.579
Acquisition of Florida, 1819,	66.900
Annexation of Texas,	318.000
Oregon Treaty,	308.052
Treaty with Mexico,	522.955
	2.936.166

—De Bow's *Compendium*, p. 32.

‡ The area of North America is as follows:

	S. Miles.	S. Miles
United States,		2.936.166
British America:		
New Britain,	2.598.837	
Upper and Lower Canada,	346.850	
N. Scotia & N. Brunswick,	1.104.701	
		3.050.398
Mexico,		1.038.834
Central America,		203.551
Russian "		394.000
Danish " (Greenland)		380.000
Total square miles,		8.002.349

—De Bow's *Compendium*, p. 31.

‖ See note to this reference on next page.

Two countries in either hemisphere approach the United States in area; the one Russia, containing twenty-one hundred thousand square miles; the other Brazil, having twenty-seven hundred thousand square miles.

The aggregate population of the United States has increased from about four millions, (3.929.827,) in 1790, to twenty-three millions, (23.191.876,) in 1850. The estimated population for the present year, 1858, is a little over twenty-nine millions, now for the first exceeding the population of Great Britain, which in 1851 was about twenty-seven and a half millions. According to the ratio of increase from 1840 to 1850, the population in 1890 would be one hundred and seven millions. The annual increase from 1790 has been four times as great as Russia, six times as much as Great Britain, nine times as much as Austria, ten times as much as France.*

In 1850, the density of population for the existing territory of the United States, was about eight (7.90) persons to the square mile. In the New England States, the density was forty-two (41.94) to the square mile. In the middle States fifty-eight (57.79), while California and Texas together had less than one person to the square mile. When the increase of our native and foreign population shall invest with the density of New England the whole territory of the United States, its population will amount to one hundred and twenty-three millions. With the density of the Middle States, of fifty-eight (57.79) to the square mile, it would amount to one hundred and seventy millions.

The density of Spain (78.03,) would make it two hundred millions. That of France (172.74,) five hundred millions.—That of Great Britain (332.00,) six hundred and sixty millions, while the density of Belgium (388.60,) were it possible to support such a population on this continent, would give us eleven hundred and fifty millions. Such a population, however, or anything approaching to it, is a thing impossible in the United States, for the reason that a large portion of its territory is a barren waste, incapable of tillage. Such is the character of the space between the 98th meridian and the Rocky Mountains, denominated "The Great American Plain," and the space from the Rocky Mountains to the Pacific, with the exception of the rich but narrow belt along the ocean, may also be regarded, in comparison with other portions of the United States, as a wilderness unfitted for the use of the husbandman.*

I, therefore, do not mention these figures with any intent of digressing from the subject before us, into idle speculations on the future destiny of the Republic, based upon the extent of its area, but to direct your attention to the fact so intimately connected with a just view of American Agriculture, that making ample allowance for the unproductive parts of our territory, looking only to those parts whose fertility is known, the

---

‖ The area of Europe embraces 3.811.594 square miles. The area of some of the larger States is as follows, in square miles:

Russia in Europe,	2.120.397
Austria,	257.368
France,	207.145
Great Britain,	121.912
Prussia,	107.921
Spain,	182.270
Bavaria,	29.637
Hanover,	14.734
Swiss Confederation,	14.950
Greece,	17.900
Turkey,	210.585
Sweden and Norway,	293.313
Belgium,	11.390
Portugal,	36.510
Holland,	12.601
Denmark,	22.533
Naples and Sicily,	44.401
Sardinia and Piedmont,	29.276
Papal States,	15.892
Tuscany,	8.511

* The population of England in 1851, was 27.475.271; of Austria, 36.514.397; of France. 35.783.170; of Russia, in 1850, 62.088.000; of Prussia, (1849,) 16.331.187; of Turkey in Europe, (1844,) 15.500; of Spain, (1834,) 12.-232.194.

It is stated that Herr Dietrick, of the University of Berlin, estimates the population of the world as follows:

Europe,	271.000.000
Asia,	730.000.000
America,	200.000.000
Africa,	80.000.000
Australia, &c.,	2.000.000

Making a total of 1283 millions; of which the population of the United States, estimating it at thirty millions, is about one forty-second part.

* See a learned paper by Prof. Henry, on Meteorology in its connection with Agriculture. Patent Office Reports for 1856, p. 481.

country is capable of producing a vast excess of food over the quantity required for home consumption by its present and immediately prospective population, even with all the emigration that a wisely directed governmental policy may induce; and that it must be in part the industrial mission of the United States for long years, it may, perhaps, be for long centuries to come, to produce food for the consumption of foreign nations.

It may be said of America as it has been said of Great Britain, that she has a relative as well as an absolute existence, and this truth becomes very striking in this connection, when we look at her, not alone as the bountiful supplier of her own fast-increasing population, but as destined to become, in all human probability, above and beyond their wants, the greatest grain market in the world; ready to assist Europe on the one hand and Asia on the other. It grows more apparent when we consider not simply the large extent of her area, and the small density of her population, but the diversity of her climate, the fertility of her western prairies, her Mississippi Valley, her Atlantic and Pacific slopes, and regard at the same time the intelligence and energy of her farmers, her public schools, her agricultural associations, and her free press; the expanding influences of her institutions, and her commanding central position.

I need not, gentlemen, enlarge further upon the preeminent importance of American Agriculture as a national interest that is destined to furnish the bulk of our exports, nor of the statistics that pertain to its various branches.

The facts to which I have directed your attention, showing the wants of Europe and the capacity of America, are sufficiently conclusive on that point. But I may be allowed for an instant before leaving this branch of our subject to remind you that its increase of our exports is but one of the phases in which the subject is connected with the welfare of the nation.

Our national strength consists far less in the extent of our area than in the number, the youthfulness, the industrial and moral qualities of our people.

These indicate our productive power, which is to be guided into the most profitable channels. Whatever assists us in the development and direction of these characteristics, under the most advantageous moral conditions, contributes to our national strength, prosperity, and happiness.

How far American Agriculture, with its millions of acres yet unbroken, a population of thirty millions to feed, and a growing demand for breadstuffs in foreign markets, is calculated to aid that development, is a question to which I propose simply to allude, as one that will receive new light from each successive census, and from the increasing number of intelligent minds that will be engaged in scrutinizing and collating its returns, and in educing from them natural laws, marked by mathematical accuracy, and possessing almost the certainty of moral truth.

It may well be that those statistics shall assist us to solve the problem, at this time so momentous to the citizens of this metropolis, how we can most readily transplant the imported pauperism of our cities, to the prairies and valleys of the west: and enable us to convert a festering and dangerous mass of municipal corruption, into a healthful element of national prosperity.

It may well be, that by the successive returns of the census, great natural laws may be practically developed, that are as yet but partially and theoretically discerned: and that moral and economic questions which have long puzzled the philosophers and philanthropists of both hemispheres, and that now perplex and confound our politicians, shall be resolved into the simplest elements of political economy, governed by rules, which, although based upon selfish motives, will be found wide-spread as human intelligence, and permanent as the principle of self-interest.

Statistics to be thus available must be complete, and in England they are quite conscious of the comparatively slight value attaching to desultory, fragmentary, isolated returns, educed for special purposes and deficient in unity.

It is now regarded as an axiom, that comparative statistics cannot content themselves with partial and uncertain observations, but must always repose on reality, and always submit to the law of numbers.

Our learned foreign associate, Mr. QUETELET, who has introduced into the Science of Statistics, a new spirit of philosophic analysis, observes, that "All observation tends to confirm the truth of the proposition, that whatever concerns the human race, consid-

ered collectively, is of the order of physical facts. The greater the number of the individuals, the more completely does the will of individuals disappear, and allow the series of general facts which depend upon the causes by which society exists, and is preserved, to predominate. "We must admit," he remarks, "that on submitting to careful experiment unorganized bodies and the social system, we are unable to say on which side causes act in their effects with the greatest regularity."

Another of our foreign associates, Lord Stanley, early prominent among British Statesmen, and who, I may say in passing, has vindicated his ancestral claim to greatness, not simply by his wisdom and industry in Parliament, but by the earnest and philosophic spirit he has exhibited in scientific and philanthropic efforts, gave, not long since, an admirable exposition before the London Statistical Society, of the nature and objects of Statistical Science. Regarding it as dealing with man in the aggregate, and developing results that can be calculated with mathematical precision, and thus leading us, step by step, to the knowledge of the laws that govern the social system, Lord Stanley remarked, "When, therefore, in discussing social questions, we apply the statistical test, we are really doing nothing more than appealing from imagination to fact, from conjecture to certainty, from an imperfect to a perfect method of observation."

Bearing in mind the necessity of universality and completeness in all statistical returns, to insure accuracy, and certainty in our deductions from them, it is clear that the statistics of Agriculture should comprise as far as possible all the conditions, proceeds, and results of the agricultural industry of the country at a given time, and all the facts which may assist towards their proper appreciation in all their different aspects. For the performance of such a work throughout the length and breadth of a vast empire, it is obvious that the efforts of private associations or even of local governments, are utterly unequal.

This is singularly exemplified by a glance at the disjointed and unequal action of the State Governments on this subject.

In most of the States, there is a census taken at varying intervals of two, four, six, seven, eight, and ten years. In Connecticut, Kentucky, Maryland, North Carolina, and Rhode Island, there is no regular State Census.

In 1850, it was ascertained that in New Hampshire the last Census was in 1783. In New Jersey, there had been none in the present century, and in Vermont the last was in 1771. Massachusetts has taken the lead in the extent, accuracy, and minuteness of her statistical investigations. The recent New York Census of 1845, and that of 1855, prepared under the direction of the Hon. Joel T. Headly, Secretary of State, are probably the most complete of any. The Legislative appropriations of this State, for geological and agricultural purposes, have been liberal. In Ohio, the State Census is taken every four years, with yearly returns of the acres in wheat and corn, and their yield.*

Statistics are now recognized as the peculiar function of the State, in a sense in which no other science is so, and in the United States the Federal Government alone, has the power and the opportunity to give it the abundance, universality and accuracy that are essential to enable the American Statistician to avid the errors that are constantly occurring in the calculation of mean results from an insufficient number of data, and without sufficient opportunity to eliminate and allow for disturbing causes.

In Europe, there have been recommended by the recent Statistical Congresses as important accompaniments of an Agricultural Census, minute features, which however desirable, will be for us from the inevitable circumstances of our position, for a long time to come impracticable. They include a plan of surveys, by which the entire territory is to be surveyed and mapped in a uniform manner, on a scale of about three inches to a mile, the scale commonly adopted in England: with the boundaries of countries and townships, the triangulation, the details of roads, and where the lines are permanent, of farm and fields; fixing by districts the average value and character of the land, the higher types and values of the cultivation, the whole arranged with reference to case of revision at stated periods. The scale of maps for villages and crowded districts, it has been suggested, might be fifty inches to the mile, with index maps, showing a considerable surface of the coun-

* M. De Bow's Introductory Remarks.----*Compendium of the Census, pp.* 23, *et seq.*

try, when minute detail is not required. I note the suggestion, to show the thoroughness proposed in Europe, and as one which may, perhaps, be advantageously adopted for special purposes, in some parts of our own country; and I will now call your attention to what has actually been accomplished towards the Statistics of American Agriculture, by the Federal Government.

A general Census has been taken in the United States every tenth year, beginning with 1790, in compliance with the provisions of the Federal Constitution, for the apportionment of representation and taxation among the States, according to their representative numbers; but until very recently, the Census has furnished few national data, upon the prominent branch of American industry.

Our governmental statistics have had reference to population, to revenue, trade, commerce, and navigation. They have of late touched upon the moral, the social, the physical condition, of the people; including religion, education, crime, and pauperism; while *Agriculture* received little attention, until, in 1840, it was partially included in the Federal schedules.

In the Census of 1850, one schedule out of six,* more full in its details, was devoted to agriculture. These schedules were prepared by a special committee in the Senate, and they were assisted by valuable suggestions from our co-laborer, Mr. Archibald Russell, whose services in this regard were publicly acknowledged by the able superintendent of the Census, Mr. De Bow, and who thus in advance aided in preparing the way for the labors of this association, whose infancy he so faithfully nursed, and whose maturer course by Sections, he has within a few months so auspiciously inaugurated.

The materials gathered in these Census, especially the last, despite the errors and imperfections incident to the inception of so vast an undertaking, afford a most excellent basis for future comparison; and indicate the respectful attention which Agricultural Statistics must henceforth claim at the hands of the Government, stimulated as they will be by popular pressure from without, by the demands of their farmers of the United States, recognizing at last in Agriculture a branch of industry not inferior to commerce or to manufactures, but one far surpassing them both in extent and importance; the great overshadowing interest of the nation, by which all others thrive, and which has the right to demand the constant, chiefest, and most enlightened regard, at the hands of their Senators and Representatives in Congress.

The Compendium of the Census of 1850, prepared by Mr. De Bow, of which an immense edition has been issued, embraced a summary of the returns of the former Census, and some comparative statistics of other countries, and forms an invaluable text-book for the student of statistics.

The ability with which the work was performed, and the appreciation it has met, afford good reason for believing that the Agriculture of our broad land, in its more prominent features, will be henceforth decennially photographed with such minuteness and accuracy, as to allow of the most thorough investigation and accurate deductions.

The area of our territory, which as I have already remarked, is about three millions of square miles, will soon be treated of by Mr. Poor, the Chairman of the section on Topography.* Without proposing to trench upon the duties of that section, or to do more than refer to the prominent features of our physical geography, I may remark that the calculations of the Topographical Bureau at Washington, show the existence of an interior valley drained by the waters of the Mississippi and its tributaries, nearly as large as the Atlantic and Pacific slopes together, and one-third larger than the whole domain of the Republic on the adoption of the Constitution.

The following table shows the area of each slope and its ratio to the total area of the United States.

* The schedules were as follows: 1. Free inhabitants; 2. Slaves; 3. Mortality; 4. *Agriculture;* 5. Manufacturing industry; 6. Social statistics. The superintendent suggests that there be but two schedules hereafter; one of Population, the other of Production, with proper instructions for compressing all required information in a compact and inexpensive form.

* Since the delivery of this address, Mr. Poor has given an admirable exposition of the larger features of the topography of the country, illustrating the subject by Mr. Shroeter's Mammoth Map of the United States and adjacent countries, which he subsequently exhibited to the Royal Geographical Society at London.

Territory.	*Area in Square Miles.*	*Ratio of Slope of total Aeea of the U. S.*
Pacific Slope	786.002	26.09
Atlantic Slope, proper	514.416	17.52
Northern Lake Region	112.649	3.83
Gulf Region	325.537	11.09
Mississippi Valley, drained by the Mlssissippi and its tributaries.	1.217.562	41.47
Total	2.956.166	100.00

Thus, over two-fifths of the National territory is drained by the Mississippi and its tributaries, and more than one-half is embraeed in what may be called its middle region. One-fourth of its total area belongs to the Paeifie, one-sixth to the Atlantic proper, one twenty-sixth to the Lakes, one-ninth to the Gulf, or one-third to the Atlantie, including the Lakes and Gulf.

As eonnected with the faeility of water transportation, it may be interesting to add, that a calculation made at the Office of the Coast Survey, for 1853, gives for the total main shore line of the United States, exelusive of sounds, islands, &e., twelve thousand (12.609) statute miles, of whieh 54 per eent. belongs to the Atlantie eoast, 18 to the Pacific, and 28 to the Gulf coast; and that if all these be followed, and the rivers entered to the head of tide-water, the total line will be swelled to thirty-three thousand (33.069) miles.

The general character of the soil between the Mississippi river and the Atlantie is that of great fertility, as also that on the western side of the Mississippi, as far as the 98th meridian, including the States of Texas, Louisiana, Arkansas, Missouri, Iowa, and Minnesota, and portions of Kansas and Nebraska; but from that meridian westward to the Roeky Mountains, and thenee nearly to the Paeifie, excepting the rich and narrow belt already alluded to along the oeean, is found in some parts a waste utterly barren, and generally the land is unfit for the support of an ordinary civilized eommunity.* Of the entire area of the United States only about one-thirteenth part is improved; about one-eighth more is oeeupied but not improved. The entire number of aeres occupied is some three hundred millions (293.560.614) or nearly one-sixth part of the national domain.†

The olden theory in regard to the soil first oeeupied by settlers, broached by Ricardo and Malthus, and for a long time adopted without queslion, was that the best lands were first occupied by the pioneers of eivilization; but this has been refuted by Mr. Carey, whose careful array of facts gathered from the history of various nations, ineluding our own, seems to show eonclusively that the riehest lands are the last to be cultivated, and hence we may conclude that among the unoeeupied portions of our country, there remains soil of greater fertility and ultimate value, than is to be found in the thirteenth portion now under aetual cultivation.‡

The States and Territories among which these lands are divided, are forty in number, besides the Distriet of Columbia, including within their organization, sixteen hundred (1620) county divisions.

The total number of farms and planta-

* Prof. Henry's learned paper on Meteorology, in its connectien with Agriculture.

†In Great Britain, including England, Wales, Scotland, Ireland, and the British islands, according to a table prepared for the House of Commons, in 1827, in statute, there were of cultivated lands 36,522,970 acres; of uncultivated, 15,000.000; of unprofitable, 15,871,363; making a total of 77,394,333: of this total, 19,135,990 were in arable lands and gardens; 27,386,980 in meadows, pastures, and marshes; 15,000,000 wastes, incapable of improvement; 15,871,463 wastes, capable of improvement.

In France, there are 82,790,702 acres improved; 38,238,616 unimproved. In Austria, 138,808.366—25,812,517 unimproved. In Prussia, 39,478,704, improved—28,141.156 unimproved.

‡ "The richest lands of North Carolina, to the extent of many millions of acres remain to this time uncleared and undrained, while men are everywhere wasting their labor on poor ones, yielding three, four, or five bushels to the acre. South Carolina has millions of acres of the finest meadow and other lands, capable of yielding immense returns to labor, and waiting only the growth of wealth and population; and so it is in Georgia, Florida, and Alabama. So entirely valueless are the richest lands of the west, south, and south-west, that Congress has recently granted them to the extent of nearly forty millions of acres to the States in which they lie, and the latter have accepted them."—*Principles of the Social System, by H. C. Carey. Philad.* 1858. *Vol.* 1, *pp.* 116-47.

tions is about a million and a half (1.449.-075,) the number of improved acres is one hundred and thirteen millions (113.032.614,) of unimproved one hundred and eighty millions (180.528.000 ;) the farms average two hundred and three acres to each farm, and average in value twenty-two hundred and fifty (2.258) dollars. The implements and machinery on each farm average in value one hundred (105) dollars. The proportion of improved land in the different sections of the country is as follows:

In New England 26 acres in one hundred.
In the South, 16 " " "
In the North-West 12 " "
In the South-West 5 " "

In the South, the number of acres to the farm is the largest, but the value is most in the Middle States, and the average value of the Union is eleven dollars (11.04) per acre, ranging from one dollar and a half ($1.41) in Texas, a fraction more in California, and five and a half (5.34) in the Southern States, to eleven dollars and a half (11.39) in the North-Western States; twenty dollars (20.27) in New England, and twenty-eight dollars (28.07) in the Middle States.

The published Census* exhibits very partial returns of the number of acres held by individuals in the several States; returns limited, in fact, to certain counties in particular States. Among them Louisiana and South Carolina are indicated as having more farms of large size than the others, Louisiana having among fifteen hundred (1,558) farms two hundred (206) of from one to ten thousand acres, and one of over ten thousand acres; while South Carolina, among nine thousand (9,400) farms, has fourteen hundred (1,472) of over five hundred acres, twelve hundred (1,230) of over one thousand acres, and sixteen of over ten thousand acres each. Among all, the smallest average number of acres to a farm is 97 acres in Maine, ranging upwards to about one hundred (120), in New York (113), New Jersey (115), New Hampshire (116), Pennsylvania (117), and Ohio (125), to upwards of two hundred in Maryland (212), Kentucky (227), Tennessee (261), three hundred in Virginia (340), North Carolina (369), Mississippi (309), and Louisiana (372), to four hundred (441) in Georgia, five hundred (541) in South Carolina, nine hundred (942) in Texas, and forty-four hundred (4,466) in California; but these two last averages clearly indicate that the division of the number of farms into the occupied area of the State territory, a great part of which is still very sparsely occupied, cannot give the true and actual average of the number of acres to each proper farm, and the mean average obtained in this way, of two hundred acres to each farm in the United States, would seem to be consequently only an approximation, and larger than it is in fact.

These farms, with occasional exceptions, as among the ancient manors of New York, of late conspicuous for anti-rentism, are owned in fee by the cultivators themselves, and this rule constitutes an essential element of difference in comparing American Agriculture with that of England, where the cultivators of the soil are nearly uniformly tenants, generally under terms of longer or shorter continuance, and sometimes at will, causing a separation and occasional clashing of those interests of the landlord and the farmer which are with us united in the same person.*

* Table CLXXXIX.

* Mr John Stuart Mill, in his well known work on "The Principles of Political Economy, with some of their applications to social Philosophy," in the chapter on the "Influence of Progress on Profits. Rents, &c., contends that the assertion of Ricardo, paradoxical as it may at first appear, is nevertheless sound, that the interest of the landlord is decidedly hostile to the sudden and general introduction of Agricultural improvements.

Mr. Mill argues that if the improvement were confined to one estate, it would clearly benefit the proprietors; but if it extends equally to all it is injurious, for the reason that whatever permanently reduces the price of produce, diminishes rent; and that, if by the increased productiveness of land, less land were required for cultivation, its value, like that of any other article for which the demand had diminished, would fall.

Correct as this reasoning may be in the abstract, and upon the premises assumed, that but a limited demand for arable land exists in England, I think, with great deference to so distinguished an authority, that it ceases to apply to the existing and prospective state of things in that country; since the demand for food in England, if we rightly read her statistics, exceeds the utmost limits of the supply that her arable lands, with all the assistance te be derived from modern improvements, are capable of yielding. For in this case it would seem, that the demand for food being incapable of supply at home, and all possibility of a failure in the demand for arable land being done away, the interest of the

What influence this difference may exert upon the character and progress of agricultural improvements, and how far the superior wealth, and to some extent, more liberal education of the English landlords is counterbalanced by the individual energy and enterprize fostered in America, by an undivided interest, are interesting questions that will be probably elucidated by a careful comparison of the future returns of the two countries.

Between the United States and France—although the lands in both are generally held in fee simple, or nearly so, a difference of similar importance is found in the average size of the farms.

Here the average is from 150 to 200 acres; there the average, although not so small as has been frequently represented, is probably but six or eight acres among four millions of the smaller proprietors, or about twelve acres to each farm throughout the empire, and these are frequently encumbered by ancestral mortgages.

To be continued.

From the British Farmers' Magazine.

Influence of Nitrogen on Crops.

MILBORNE ST. ANDREW FARMERS' CLUB.

A meeting of this club was held at Milborne St. Andrew on Wednesday evening, the 20th of October last, to discuss the subject of "The influence of Nitrogen and its compounds on Vegetation," introduced by Mr. W. C. Spooner, the eminent Agricultural Chemist, of Eling, near Southampton. There was a goodly attendance of members.

Mr W. C. SPOONER said: Mr. Chairman, and gentlemen, the subject on which I have to address you is, I believe, as your Chairman has said, "The influence of Nitrogen on Vegetation." Now, it is very desirable, speaking of the subject of manures, to have some little separation of topics; because the importance and influence of the phosphates, and a few others, are now felt to be so great, that the moment you begin speaking of manures, you are sure to talk about phosphates and superphosphates; and the chances are, that being considered still more important in a district like this, the subject naturally branches off in that direction, leaving little opportunity for discussing on that occasion the proper subject of the evening. With regard to nitrogen, when I had the pleasure of introducing the subject to you before, you will no doubt recollect that I then showed you what were the various gases that composed animal and vegetable bodies, or, in other words, of which they were built up; it will, therefore, be unnecessary to do so on the present occasion, from your being aware of these components, and not having forgotten the observations which were then made on the subject. In short, I shall speak chiefly of nitrogen, and shall say but little of the three other organic bodies that enter into the structure of the earth, and the animals and vegetation existing on the earth. Nitrogen exists in the atmosphere to the extent of four-fifths of its entire bulk. It is a body of but little activity, and serves principally the purpose of diluting the oxygen of the air to some considerable extent. You all know that when a candle is burned under a close glass the light soon goes out. Water ascends and condenses on a portion of the glass, as part of the confined air is burned, and the remaining part consists almost entirely of the nitrogen which was in combination with the oxygen consumed. It serves in the air, then, to dilute the oxygen, whose powerful influence would otherwise burn up all animal and vegetable bodies, and, in fact, cause our planet to disappear from space after a brief conflagration. Therefore it is that the nitrogen of the atmosphere is of such immense importance. Yet it is a singular fact, and, indeed, I know of none which startled chemists so much when first discovered, that this apparently innoxious, weak, and harmless gas is the peculiar element composing animal bodies, flesh, and bodies capable of supporting and nourishing flesh. They were surprised when it was discovered that nitrogen was the gas peculiar to flesh as distinguished from fat. Gluten, as distinguished from starch, was that part of the food which is capable of

---

landlords would be decidedly in favor of the general introduction of Agricultural improvements as tending to increase, not only the productiveness of their estates, but the annual pecuniary returns from every acre, since they would increase the average number of bushels to the acre, without diminishing the value of each separate bushel in market.

sustaining flesh and building up fabrics distinct from that which is merely deposited as fat, which serves the purpose of keeping the body warm, or of acting as fuel in the consumption by it of the oxygen of the atmosphere in the lungs, and thereby supporting animal heat. The question is "Nitrogen, what is it?" "Ammonia, what is that?" We are much more familiar with the word ammonia, by which we understand at once that pungent gas which largely escapes from our dunghills. Its strong pungent smell is chiefly due to the carbonate of ammonia constantly escaping from it. Ammonia is composed of hydrogen and nitrogen. Hydrogen is the gas which forms water—nitrogen, as already noticed, the gas which composes four-fifths of the atmosphere. By weight, three parts hydrogen and fourteen parts nitrogen from ammonia. Thus, when an analysis is given, fourteen parts of the constituent proportions of ammonia consist of nitrogen: the other constituents matter not; and it is the more correct when speaking of that which relates to food or manure as nitrogen, because, although the greater part of that which escapes is in the form of ammonia, other parts exist in it as a compound capable only of being converted into ammonia. You are all familiar with ammonia. Here is a liquid form (*pouring it out;*) any gentleman who may heartily sniff it (*passing it round*) will feel it to be strong. (*Laughter from the successive experimenters.*) Here also is some chloride of ammonia; that is, ammonia fixed by hydrochloric acid, commonly called muriatic acid; in passing it round, it will be found to possess none of the smell of ammonia. If, however, we mix a little lime with it (*mixes*) we shall presently see that this renders free the ammonia; and in passing this round, you will have an opportunity of testing the difference betwixt ammonia in combination and apart. We possess no evidence to show that nitrogen, although the ultimate and important element so essential in manures and in animal bodies, can be directly assimilated by plants. Otherwise it would soon perform a revolution in agriculture. Peruvian guano would no longer possess a monopoly, and the price of ammoniacal manures would cease to be what they are at present. They would be no longer of value, because the atmosphere, which contains no less than eighty per cent. of it would give abundance of this valuable ingredient. But it seems to be the design of Providence that man should only earn his bread by the sweat of his brow; and that only through the means of his labour and intelligence shall the fruits of the earth be raised. Providence, therefore, steps in and forbids the use of this important element, existing so largely in the atmosphere. It is necessary that nitrogen, to be of use, should assume another form and we have no evidence to induce us to suppose that the nitrogen of the atmosphere can be directly assimilated by plants. You are aware that carbon forms the great bulk of vegetable bodies, such as the root crops; it is derived principally from the atmosphere, partly from the soils, and very little from manure. It is principally obtained, I say, from the atmosphere; for, although it exists only in the atmosphere as carbonic acid to the extent of one thousandth, it is yet sufficient to build up the mighty forests that cover the face of the globe. Plants, by a very simple plan, imbibe the carbonic acid of the atmosphere, giving off the oxygen again, and converting the carbon into their own structures, which are not derived from nitrogen. When nitrogen becomes the food of vegetable bodies, it is more common for it to unite with hydrogen and take the form of ammonia. The effect of mixing two bodies without smell may then be perceived. Reverting to the experiment previously shown, you will perceive that the chemical effect of the alkali (lime) is to unite with the hydrochloric acid, and the ammonia flies off. This chloride of ammonia is more familiar to us as sal ammoniac. We have seen that ammonia is one of the forms in which nitrogen feeds plants; but there is another form—that of nitric acid—not the strongest acid we possess, but next to sulphuric acid in that respect, and better known as acquafortis. It is a powerful caustic, and yet composed exactly of the same elements as atmospheric air—nitrogen and oxygen. What is more extraordinary still, instead of the largest percentage of nitrogen, it has the smallest, and the largest of oxygen; but the proportions in which they unite produce one of the strongest acids in nature. I bring this before you because it is almost the only other form in which nitrogen becomes the food of plants. Nitrate of soda employed as a top-dressing, is composed of nitric acid and an alkali, the base

being soda; and its great effect on vegetation is due to the nitric acid and not to the soda. The experiment has been tried again and again, and if soda were the element that yielded the benefit, we should not give £20 a ton, more or less, for nitrate of soda, whilst we could buy salt which contains as much soda for as many shillings. Mr. Pusey used nitric acid in a diluted form in one of his experiments, and the same effects were produced as if he had applied nitrate of soda. Ammonia and nitric acid both exist in the air. With regard to the nitric acid, a Frenchman greatly startled chemists by the announcement of the fact of a great amount of both ammonia and nitric acid existing in the atmosphere. But this only served to show that no single experiment ought to be relied upon, but ought to be tried by other chemists before being received as an established fact. Boussingault and Professor Way both found that they could obtain from rain-water nothing like the same quantity as the French chemist had succeeded in obtaining. The experiment of the one had been performed in the city of Paris, that of the two others with rain collected in the country; and the larger quantity of ammonia, which in cities arises from smoke, from the large consumption of fuel, from dunghills, and decaying bodies, than in the country, might create, in the atmosphere in the neighbourhood of towns, more than double the quantity in that of the country. This fact, in itself interesting, also accounts for the great amount of vegetation that succeeds frequent thunder showers in some root crops—not that lightning has any direct influence; but a thunder shower generally descends suddenly, and after a drought of some little extent, and consequently brings down with it whatever ammonia and nitric acid exist in the atmosphere. Way found that there was in a year's fall of rain per acre:—

Nitric Acid.	Ammonia.		Total Nitrogen.	
(1855)	(1855)	(1856)	(1855)	(1856)
lbs. 2.98 to 2.80	7.11	9.53	6.63	8.731

There being from 44 to 46 lbs. of nitrogen in an acre of wheat or barley, that quantity it will therefore be seen is considerably more than the rain can bring down, and the French chemist had possibly overrated the effect. It is thought by some that dew and fog are richer in ammonia than rain, but although they are somewhat richer, yet upon careful experiments it has been found that the quantity of dew per acre deposited in the ground is not more than 10 tons, whereas, the quantity of rain is 2,500 tons per acre. Professor Way, in his excellent paper on soils, has noticed that strong soils or clay have a great power of fixing ammonia; so, if we dilute a strong solution of ammonia and throw it over a quantity of soil, very soon all smell of ammonia will disappear. This seems to be a very wise provision of nature that a substance which costs so much money, and is of so much value, should not, like other alkalies, become rapidly soluble and soon washed out, but should thus be retained in the soil for the uses of vegetation. Not so nitric acid, although it also is of so much value applied in a particular manner to particular uses; it is soluble, and, unlike ammonia, soon washes out of the soil, so much so, that I would impress this observation on your minds that you may not be led to throw it away, or to find what you had done rendered useless. You may apply ammonia, as sulphate of ammonia, carbonate of ammonia, or ammonia in the form of guano, and it will be fixed by the soil without being washed away; but if you apply nitric acid in the fall of the year or in the witer, you run great risk of a considerable portion being washed out of the soil again. Thus it is that different results and effects occur. Some may say, "It agrees with my land excellently and answers my purpose, and I can produce six bushels more per acre when nitrate of soda is applied." Others may say, "I get nothing but straw—it has no good effect whatever." Now this greatly depends upon the mode of application. Nitrate of soda should be used only as a top-dressing, and never applied to an exhausted soil, nor unless there be vegetation then and there to take up that which is so valuable, and thus you run no risk of losing money in so valuable an ingredient. It will not do at all times to estimate the value of manure by the quantity of nitrogen; for it was found by a late experiment of Mr. Lawes, that a greater effect was produced by nitrate of soda on barley, than by an equal quantity of nitrogen in the form of sulphate of ammonia. I have myself seen, continually, similar effects produced upon grass and wheat, more particularly on strong land. This also shows that nitrate of soda should be applied late in the season, and never upon poor and ex-

hausted soil, because it would act as a stimulant, supplying one particular element of vegetation only, and stimulating plants to put out their roots and extract from the soil all the other portions of nutriment necessary for their existence. When a manure produces this effect, it is undoubtedly a stimulant, and we should never apply nitrate of soda unless we are sure there is something to respond to the demands of the plant—that there is phosphate of lime and other elements present there to satisfy it. It is then the fact that nitrogen exists in various forms in manures. But if we apply lime or strong alkali, it is at once converted into the form of ammonia, and readily escapes. Guano owes its very powful smell to the quantity of carbonate of ammonia always escaping. Where lime exists in land its ammonia will be developed. Now, all land fit for vegetation, in a greater or smaller degree, possesses some lime—in this neighbourhood abundance of chalk, probably more than is wished: in others it is deficient, and it is necessary to add it before vegetation can take place successfully. Here is some of the ordinary manure for the wheat crop (*exhibits it,*) which, being used as an autumnal application, it is necessary should not be too rapid in its action. As the manure passes round it will be found to have little or no smell, and then it will be shown to smell as soon as a little of the alkali—possessing in itself no smell—is added. (*This was accordingly shown.*) Now, it has been pretty well proved, notwithstanding a vast amount of argument to the contrary, that the essential manure for the turnip crop is phosphate of lime, and that the equally essential manure for grain crops is ammonia, or nitrogen, in some form. You are aware that a great and not very good tempered controversy has arisen betwixt Baron Liebig, and Mr. Lawes and Mr. Gilbert, on this subject. But it was previously known to the agriculturists of this country that the proper manure for the wheat crop was ammonia, and that for the turnip crop phosphate of lime. It is not a new fact. We were well aware of it ten, twelve, or fifteen years ago, and this it would be easy to prove. But Mr. Lawes has instituted some very laborious experiments, which have set the matter still clearer; for he has well shown that whilst he continued to apply phosphate of lime to the root crops, he succeeded in raising a greater amount of roots year after year; whilst, on land which had no manure, they dwindled, in four years, from four tons to three tons, then thirteen cwt., and nothing in the fourth. He found, likewise, that he by no means produced the same effect by adding salts of ammonia to a considerable extent. He applied to a crop of turnips, in considerable doses, sulphate of ammonia, but, without the phosphates, and had no crop. Professor Voelcker, in the last part of the Society's Journal, has given the results of experiments which set this in a yet stronger light. If we adopt these experiments as our guide we should feel almost disposed to say that nitrogen and ammonia are totally useless to the root crops. But there is a drawback to them which I shall mention. It is that in spite of all his endeavours, Dr. Voelcker obtained only a half crop at best, viz., from fifteen tons farmyard manure, 7.16 tons; from nothing, two and a half tons, or rather under three; from six cwt. bone ash dissolved in sulphuric acid, from eight to nine tons; from sulphate of ammonia nothing (but as applied there is no doubt its pungency injured the seed,) and not more when sulphate of ammonia was added to bone ash than when it was not. We must be cautious, however, in building our superstructure on too narrow a basis; we must repeat these experiments. The following experiment, if I may venture to quote myself, is one which I made and published in a little paper ten years ago:—

"I was anxious to ascertain what the effect would be of applying to the turnip crop an excess of ammonia. With this view, in the autumn of 1848, I applied to a given space of ground, being a wheat stubble, a liquid preparation of ammonia. I was fearful, if I applied it later, the strength of the application would destroy vegetation; indeed, it had this effect to a considerable extent on the weeds in the stubble, and also on the worms and other insects, which were found dead on the surface of the land, showing that a powerful alkali, such as ammonia acts as a poison on wireworms and other pests of vegetation—a fact in itself important, and consolatory to those who cannot divest themselves of the idea, when casting a few hundredweights of Peruvian guano on the surface of the land, that, while the cost of the application is certain, the benefit to be derived is altogether doubtful and hazardous. But to return to our

more immediate subject: the stubble thus treated was plowed and cleaned in the spring, in common with the adjoining land, and, early in June, drilled with Skirving's swede seed, the whole being manured with superphosphate of lime—that is, both that which received the ammoniacal application, and that which did not. The seed vegetated well, and it soon became a good plant throughout the field; but after a very few weeks, the land which had received the ammoniacal application could be distinguished at some distance by the dark colour and remarkable luxuriance of the greens. This continued throughout the autumn, and, on examining them a week before Christmas, it was found that the luxuriant greens had been the precursors of huge and monstrous necks, twelve to eighteen inches long, and several inches in circumference. On cutting through these necks it was perceived that they contained nutritious matter similar to the bulb. It might be thought that these huge necks were forced on at the expense of the bulbs, but this was found not to be the case; for, on testing some average rods with the other parts of the field, it was found that while the latter proved to be at the rate of twenty-two tons per acre, the ammoniacal bulbs yielded at the rate of twenty-seven tons. In neither case did the individual roots reach a great size, in consequence of having been left too thick (no less than 160 to the rod,) which arose from the circumstance of the rows being drilled only eighteen inches apart, whilst the roots were hoed out as if the rows had been two feet asunder. I have no doubt the crop would have been greater if the number of roots had been one-third less. I shall call attention to the fact that it was not till some weeks that the ammoniacally-treated swedes were noticable from the others: all came up equally well, and vegetated for some time with equal luxuriance, showing that the peculiar manure for the young plant is phosphate of lime in a soluble state. We learn from the experiment we have narrated that the peculiar effect of a large supply of ammonia to the turnip crop is to force on a luxuriant growth of greens and stems, but that this is not done at the expense of the bulb, but rather as an addition to it. At the same time, we might also draw the inference that a moderate application of ammonia is sufficient for the turnip crop." Professor Voelcker, however, found that a large quantity of sulphate of ammonia had no such effect on the greens: it was applied so late as June, broadcast, I presume, and in close contact with the seed—the other being applied in autumn, in a liquid form, to the soil. I am not recommending my experiment for general adoption, but you are familiar with the effect, however, of one or one and a half cwt. Peruvian guano, the effect of which on the autumn greens is to render them more luxuriant. There is none at first—but a visible effect afterwards, rendering them longer in ripening, whereby the mildew is to a great extent kept off, showing the importance of a mixture of ammonia with the turnip manure; and I can't coincide with those gentlemen in opinion who apply phosphate alone, as ammonia, whether in the shape of bone dust, half-inch bones, or Peruvian guano, is a decided advantage. The drawback I have said in Dr. Voelcker's case is, having obtained only a half crop at the best. It may be answered that each experiment fared alike. But it is important to observe that the atmosphere can supply, by means of rain and dew, a certain quantity of ammonia and nitric acid; now the quantity imbibed by a good root crop, such as turnips, is much more than that taken up by a small crop. In twenty tons of bulbs there is considerable nutriment and nitrogen. This, if absent in the soil, must be largely supplied from the atmosphere, from rain, and from the ammonia floating over the largely developed leaves. If sufficient with that in the soil to produce a good crop, the atmosphere may be alone sufficient to produce half a crop; and if we have here only a half crop, it is not proved that it is unnecessary or undesirable to apply ammonia to root crops. It is a pity the learned doctor, on a small portion of ground, did not water the crops; if he had supplied artificially what the rain failed to supply, he might have obtained different results. But this has been no fault of his; he has repeated the experiments for two years, and means to repeat them again; and as soon as he gets a good crop, say twenty tons per acre, we may begin to form a theory upon his facts. I don't object to anything he has done—no man experiments more carefully; no man is less likely to be led astray himself or to lead astray others. [The lecturer then sat down to enable any of the ques-

tions usual on such occasions to be put to him.]

The CHAIRMAN, at the conclusion of Mr. Spooner's lecture having announced his intention of departing from the usual mode of calling upon particular members to continue the discussion, expressed at the same time, a hope that any gentleman having practical questions to ask would put them.

Mr. Crane, as well as the Chairman and Mr. Dunham, then put a variety of questions, the objects of which, for the sake of compression, we must leave to be gathered from Mr. Spooner's replies, and

Mr. SUMMERS spoke as follows:

Mr. Chairman and Gentlemen.—I have a few observations to make on an ammoniacal manure which I applied to cereals and vetches two years ago. The following is the analysis of the manure—this analysis I received from Professor Way:—

Moisture,	7.91
Organic matter, &c.,	10.17
Sand, &c.,	1.68
Soluble phosphate,	3.10
Insoluble phosphate,	0.47
Sulphate of lime,	5.82
Sulphate of soda,	14.14
Common salt,	33.83
Nitrate of soda,	15.38
Sulphate of ammonia,	7.30
Ammonia in organic matter,	0.20
	100.00

This manure was applied in March to a piece of wheat which was sown after old lea, and which I thought required some nitrogenous manure—the minerals being more abundant than available nitrogen. It was sown over the whole field with the exception of the two ridges which were left to see the effect of the application. Where the manure was spread, a much darker hue was soon perceptible, and the wheat got the start of that on the two ridges that were left unmanured. This dark green gradually died away, and the wheat was again the colour of that on the two unmanured ridges, but the left was wider and the plant was stronger. A few days before harvest it could be distinctly seen that the unmanured portion was at least three days later in ripening than that which had been manured, and I believe that there was quite one sack per acre more in the manured portion than on the two ridges which were left unmanured. I calculated that I got seven sacks per acre on the two ridges, and eight sacks per acre on that which was manured. The same manure was applied to barley which followed a crop of wheat—it was spread over a part of the field where the chalk was turned up by the plow through the little depth of soil. Here the effect was very striking, the produce being, I believe, doubled—both straw and grain. I also applied it to spring vetches on a thin chalk soil. These vetches were sown after wheat; it was only sown over a part of the field, so that, as in the other instances, I had the opportunity of judging of the effect. It caused no apparent difference in the growth of the vetches; but, what was very surprising, it gave great vigour to the charlock that was growing with the vetches—the plants were twice the height where this ammoniacal dressing was laid on. I do not approve of top-dressing as a rule, but where it is resorted to, and where it is required, I would recommend the following as a good mixture for cereals:—

Nitrate of soda,	25 per cent.
Sulphate of ammonia,	25 "
Common salt,	30 "
Vitriolized guano,	20 "
	100

The nitric acid and ammonia in the nitrate of soda, sulphate of ammonia, and vitriolized guano, are of different solubility; therefore, where this mixture is applied, the plants will be supplied with food during their progressive stages of growth. In the vitriolized guano, we have also soluble phosphate, which is of special value to the barley crop. The salt I add, as a corrective of any tendency of the other compounds to produce over luxuriance.

Mr. SPOONER, in replying to the observations which had been made, only wished they had been more numerous, assured that if the members would only draw a cheque upon their memory and experience, and give the club the benefit of the amount for which that cheque would be honoured, they would all of them derive advantage. The Chairman had commenced with the question why the nitrogen of the atmosphere was not made available by means of some chemical application? He could only tell him, that if he knew of such an application and could put them up to it they would be much obliged to him. Sulphuric acid, of which he (Mr. Spooner) man-

ufactured largely, had, for one of its ingredients, the oxygen of the atmosphere; and as they could not obtain that from the atmosphere fast enough, they were obliged to have recourse to the use of nitrate of soda; and the oxygen which gave to sulphuric acid its pungency and potency was derived from the atmosphere by the aid of nitrate of soda. Of course he meant to say that it was converted from sulphurous to sulphuric acid by these means; and to sulphuric acid they (the farmers) were much indebted, for without it, or some acid equally strong, there could be no superphosphate of lime. Thus they could use up the oxygen of the air. But what would they think when he told them that whilst they did so, they were obliged to allow the nitrogen to escape up the chimney. If it only could be arrested, an important point might be gained, but chemists had united all their efforts to arrest it in vain. Sometimes, indeed, a shout had been raised like the false "hark hollow!" sometimes heard in fox-hunting; for the discovery after all had proved to be fallacious, and they were found to remain in possession of precisely the same amount of knowledge on the subject as before. The Chairman had next observed that nitrate of soda, being a stimulant, it was good for the outgoing tenant, but by no means desirable for the incoming tenant to employ. There was a certain amount of truth in this, but it would not do to take it. Good farming ought to be practised whether by the outgoing or the incoming tenant. If, indeed, a tenant be used ill, then he had every inducement to make hay whilst the sun shone; but he (Mr. Spooner) could hardly recommend it. And at the same time it was hardly desirable for the incoming tenant to despise the use of that which he saw other parties using year after year with advantage. It would therefore be prudent to use a certain amount of nitrate of soda and other salts. With regard to the top-dressing which Mr. Summers had recommended, it had its advantage, and they brought up wheat and barley crops by its means. A barley grower, whose produce was as good as any in the market, used some every year with profit. They must, in fact, resort to this or other means where their land was required to furnish crops; for if they only put on dung every four years something else was required to realize its advantages. If they improve their dung by feeding with corn or cake, or supplied the deficiency by means of artificial manures, what were they doing in the one case and in the other? Just supplying more nitrogen or more phosphate. Double the nitrogen and the phosphates, and they would double the value of their dung immediately. One ton of dung so enriched in the yard would, in fact, become more valuable than two tons; and this was the reason why the agriculture of England was now so superior that they could now produce eight or ten sacks per acre as easily as their grandfathers had produced six sacks—not that they applied more dung, but because it was of a better quality, with more ammonia, more nitrogen, more phosphate, and, consequently, capable of producing better crops. The question had also been started why lime sometimes weakened the soil, and why lands that had been overlimed were never so good again? Why? Lime was a powerful cause of the riches of the soil being used up. Ammonia applied to the land became fixed by the soil; but by lime and by water it became again soluble. This only showed that lime could not be dispensed with in modern agriculture, since it was so very active an agent in doing good and causing the riches of the soil to be freely used up. Thus it had been stated by one member of the club that his turnips, which had clubbed in sandy soils, when chalked grew properly. Now chalk was only lime rendered less potent. Where lime did not exist club-root would prevail. This was owing to the field itself and not to the turnips. But it had been stated that swedes had been good in a field so chalked, which could no longer grow good mangold. The injury in this instance was mechanical. The benefits of lime, however, were chemical. Lime was wanted to reduce certain acids which produced this disease called club-root; and if lime had been added instead of chalk, or if considerably less chalk had been added, the remedy would have held good without the evil. After some further observations on the advantages of the use of lime, Mr. Spooner concluded by saying that the subject was very copious, and it was impossible to do it entire justice, but enough had been said to show that nitrogen, in some form, was a manure peculiarly required by the grain crops. The effects of nitrogen were

not mathematical; it was necessary to apply a considerably greater quantity of nitrogen, to the wheat crop, for instance, than to the bean; yet the analysis of the bean crop afforded twice as much nitrogen as did the wheat crop. This was a theory not dependent on the chemical composition of the manure, but on the physiology and properties of plants. The wheat was a most grateful plant; yet, as regarded ammonia, it would appear to waste more than was applied. If they were to apply thirty lbs., for example, as an experiment, expecting to get it back, they would be deceived, as they would not get back half the nitrogen, contained in the manure. This showed the advantage of rotations in which one shift bequeathed to another a vast amount of nitrogen, the material of future crops, and aided in deriving it from the soil and the atmosphere by another direct application of agents. There was no better system than a wise and discreet rotation of crops; and, without making extravagant experiments, they must farm liberally if they would farm well and farm successfully.

On the motion of the CHAIRMAN, which was duly seconded, the club assented to the expression of thanks to Mr. Spooner, to whom there could be but one opinion of their being greatly indebted. He had supplied them with that kind or information which they most wanted as farmers. They wanted to know what kind of manure to purchase, and what kinds were wanted for particular soils. For, as different soils required different descriptions of manure, it was only the chemist, who deeply studied the matter, who was enabled to tell them how to lay out their money to advantage. That was not the first time that Mr. Spooner had travelled from home by the mail train to contribute to their information. His labours were of a practical nature, which they could all understand and appreciate. And they would all accord cordially in awarding him a vote of thanks. He (the Chairman) could only say that, so far as he was concerned personally, of such a practical nature were Mr. Spooner's remarks, that he had learnt more that evening concerning manures and their application than he had ever learnt before.

After a few words of acknowledgement from Mr. SPOONER, the meeting separated; Mr. Spooner just observing that the question had arisen whether dung should be applied to the surface and distributed, or plowed in at once, or matured in the dung-hill before-hand. He believed, himself, it was far better applied to the surface, which would permit as little as possible to fly off, as the rain water thus washed in its soluble part, and when the plow turned over the ground, instead of its being all four or five inches under, the greater part of the ammonia would be acting at only one or two inches deep from having been previously washed in.

For the Southern Planter.

Pea Fallow, Tobacco Growing, &c.

MR. EDITOR:

As a zealous farmer, wishing to do all the good I can, to the agricultural community particularly, I am prompted to express a few thoughts on subjects which are, I am sure, of interest to many of them, viz: the benefit of Peas as an article of manure, and the growing of Tobacco in Eastern Virginia.

I wrote a short communication for the Planter about twelve months since, advocating the five field system, and recommending a sixth field as a standing pasture. From the benefit I have received since the adoption of this system, I am led to declare myself a still warmer advocate of its merits. It has proved itself to me both an improving, and profitable course of rotation for the farmer. My plan is, never to sow wheat after corn, but to sow Peas on all corn land in the spring, (about the last of May or first of June;) and as soon as they put up three or four leaves, to dress them with a liberal supply of plaster, sowed broadcast.

I have never had an application of guano, a clover fallow, or a dressing of manure of any kind, to produce for me such remunerating crops of wheat as I have reaped after Pea fallow

In the year 1858, (well known as a particularly disastrous season to wheat,) I raised within a small fraction of fourteen bushels for every one seeded on Pea fallow, —whilst on my clover fallow I made but eleven bushels and a fraction. My wheat sowed last fall on Pea fallow, is at present the most promising I have.

I have read many articles in different

papers in which objections are raised to the cultivation of Tobacco. I must beg leave to say that, in my opinion, they are futile and untenable. I will name two objections I have heard urged: 1st. The crop is too exhausting. 2d. It works your negroes too hard. Well, as to the first objection, I have only to say, that there must be a system about everything, and I think I can show satisfactorily that under the system I have adopted, it can be raised with as little deterioration to the soil as almost any other crop. My plan is this: Put your Tobacco on a part of the field that you intend for corn, do not put wheat after the Tobacco, but let the land go in Peas the following spring with the corn land, and I am almost confident your land will not be injured by the Tobacco crop any more than by any other.

As regards the latter objection, viz: "It works your negroes too hard," I do not see any good reason that can be given for such an objection. Can you not work your negroes too hard about any other crop? Why, certainly. We are the superior race and endowed with stronger reasoning faculties. Slavery is a blessing. Slaves are human, and they should be treated as such creatures. They ought not to be overworked. It is inhuman and unchristian thus to treat them. I do believe that, *en masse*, if you wish your negroes to treat you well, you should treat them likewise. What man of any heart could work a slave and not feed and clothe that slave well? My motto is, "work in reason, feed and clothe well, and thrash if they don't behave."

Mr. Editor, I have digressed; however, before concluding, I make this prediction: that in ten years from this day, Eastern Virginia will be generally a Tobacco growing region. The crop pays better than any other, and judiciously managed will not impoverish, as is believed by so many.

SUBSCRIBER.

Longwood, King Wm. Co., April, 1859.

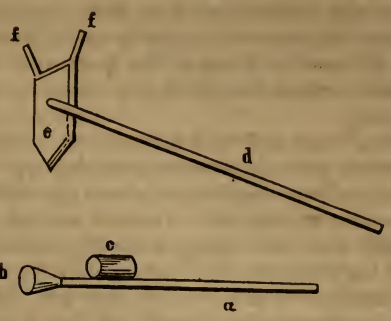
To Drive away Rats.

It is stated in the Boston Cultivator, that cotton sprinkled over with pulverized potash, will drive rats from premises infested by them, if crowded into their holes.

The peach crop of New Jersey is likely to prove very large the present year.

For the Southern Planter.

The Poor Man's Turnip Drill.



Take a hollow reed or elder stalk (*a*) three feet long, and the size of a stout cane. Attach to the top a funnel of tin or pasteboard four inches broad, (*b*), and an old tin cup at the side (*c*) six inches below the top, to hold the seed. To open and cover the rows, make an implement of wood thus: Take an old hoe helve, (*d*), and fasten to the end of it as a hoe a piece of oak plank 1¼ inch thick, 12 inches long, and 5 inches broad, (*e*); sharpen one end, to make a slight furrow by dragging after you as you walk, and arm the other end with two little wings or shares, (*ff*), of hoop iron, which will cover the furrow again as the implement is dragged after you inverted, and will leave the row exactly that convex shape produced by the best patent drills.

To plant a row and complete it with these implements, requires walking over it gently three times,—once to open, once to drop the seed, and once to cover. A handy person may plant and cover one acre a day of nicely prepared ground. Try it.

The reason of the thing is this: in dropping small seeds by hand alone, *you must stoop down*, else the winds will blow the light seeds out of the furrow, or even the divergence caused by the seeds moving against each other, and the fingers scatters them all awry. But it is this *stooping down* which kills you up. Your back aches, and in consequence of the discomfort and nervousness produced, your very fingers refuse to do their office nimbly, in distributing the seeds.

Now, the hollow drilling staff, when held with the left hand, (grasping it just below the tin cup,) enables you to walk pleasant-

ly along upright, while the fingers of the right hand easily roll the seeds in a little stream into the funnel; and the time required by the seeds in running down the tube aids to distribute them more regularly. If your fingers work tolerably well, you will see the seeds roll out of the bottom of the tube almost as though it were done by machinery.

The same staff will sow clover, lucerne, timothy, parsnips, carrots, peas, &c., &c.

If my poor neighbours, whose operations, like my own, are not extensive enough to justify them in buying a costly seed-drill, will try this, they shall pay nothing for the invention. And as every one can make the implements for himself, he has a convenient drill without cost.

COUNTRY PARSON.

For the Southern Planter.

Terra Culture.

LOUDOUN COUNTY, VA., 4th month, 21st, 1859.

J. E. WILLIAMS:

About two months ago, the farmers of this county had an opportunity of hearing Russel Comstock, of Dutchess county, N. Y., lecture on his favourite science of "Terra Culture," as he calls it. He professes to have discovered a system which consists in observing and following the laws of nature, by which the agriculturist may, with the same labour and with the same manure, increase his productions at least fifteen per cent.; and this system, he maintains, would, if steadily followed, prove a specific against the decay and unproductiveness of fruit trees, and also insure a healthy growth of vegetation, so that the depredations of insects would do little or no injury. This desirable information he offers to disclose to the farmers, for their special benefit, for and in consideration of the sum of two dollars to be paid him for every male, and one dollar for every female, at the same time requiring the execution of a written contract, pledging their honour not to disclose, under any circumstances, the secrets to any except those who have heard the same.

He even refused to allow a man to make the disclosure to his own wife. This does not seem like considering them as one. Perhaps we may account for this from the fact, that in his own case, he could not make himself and his wife so far appear one as to live together and perform the duties of man and wife to each other, they having separated; and he might suppose the wife in such case would not hesitate to disclose her husband's secrets. He attempts, however, to pass for a bachelor where he is not known.

Having seen some accounts of his antecedents from Northern agricultural works, and believing the whole thing to be a grand humbug, I opposed him in print in this county, as well as verbally, and he made but little progress here. He was, however, more successful in neighbouring counties where he was not known; and I hear he is is making his way South in this State, in Prince William and Culpeper counties. The agricultural press should expose his pretensions.

In 1851 he petitioned the New York Legislature for compensation, to induce him to make a public disclosure of his system—so called, but the bill did not pass. The New York State Agricultural Society in the same year, appointed a committee of five of its most intelligent members to confer with him and report whether, in their judgment, the subject was of such importance as to justify that Society in recommending to the legislature the propriety of paying him any amount for making a public disclosure. Four of the members of that committee (the other not acting) did confer with him and heard his disclosures, and unanimously reported "that there was nothing new in them, that, however good in themselves, they could be found in agricultural and horticultural works of the present day, and therefore could not recommend that he be paid anything." This plain and positive testimony he denied here as having been made as represented, and stated that the members of that committee now are willing that he should be paid. The individual who made the report has been written to, and in answer says, emphatically, that, "the report was *unanimous*, and that he is not aware of any change of opinion since." Thus flatly contradicting Comstock's assertions. This has been obtained since he left.

One of his principal points is, the crown of the roots, or the place where the top and roots join at the surface of the ground. Here, he contends, is the seat of the life of

the plant or tree, and that in replanting a tree it should not be set deeper than it grew before. This recommendation, however, is no new thing. He places great stress on the preservation of the tap root, or the first root that puts out in the germination of the seed, and attributes much of the injury done fruit trees in transplanting to its mutilation. He prefers to plant the seed of fruit trees where they are finally to grow, and pretends if that is done they will need no trimming in future, or but very little. He carries with him a parcel of dry small nursery trees, of different varieties of fruit, and explains his theory by pointing to a root, and saying, "that was dead, and I can tell the cause of its death! If it had been treated so and so, it would not have died! By Terra Culture the balance between roots and top is preserved, and both are healthy!"

Another point with him is shallow planting of seed. One half inch, he thinks, is deep enough for all seed. He takes his hearers out into wheat fields, and finding large, strong growing plants, where the seed had been covered shallow,—he calls that terra cultured, and finding a weak growing plant that had been buried deeply,—he calls that common culture.

For corn, he recommends preparing the ground well; shallow planting and cultivation afterwards to just keep the weeds and grass down, and not disturb the surface roots, exactly what our best farmers recommend. He has some very large ears of corn, and estimates from raising a few hills in his garden how much may be raised on an acre.

In this way he takes the attention of persons who have never given the science of vegetable physiology any consideration, or looked into the process of growth; and for such he prepares certificates stating the advantages of the theory, and the value of this knowledge, and considering it discovered by him, they recommend him to others, —and he solicits and bores his hearers until they sign his certificates, and with these he makes his way to other neighbourhoods.

Few are willing to take the trouble of refuting him, and if they did in one place, he is gone somewhere else before it can be brought to bear upon him. He said here that my opposition had injured the farmers of this county thousands of dollars, and charged me with being actuated by the barest of motives. He has been opposed and carricatured by the agricultural press of the North, where he is well known, for some fifteen years, at times. A late number of the Rural New Yorker pictures a learned Professor of Terra Culture, with long beard and hair, and a cap on without brim, somewhat elevated and parting at top, but by reversing the picture shows the head of an ass grinning.

An intelligent friend of mine, who had never heard of him before, and being willing to gain all the information he could, heard him lecture in Maryland, and when he was done, plainly told him, "he had no secrets to keep; he knew all this long ago!" Another heard him in this county, and says, "he did not gain a single new idea!" Such humbuggery should be exposed, even if it should bring down upon our heads the charge of being "as ignorant as a gosling," as was done here. Pass him round.

YARDLEY TAYLOR.

Sombrero Guano.

ALEXANDRIA, May 14th, 1859.

Dear Sir,—We notice in your issue of May, a letter from Mr. S. T. Stuart upon the subject of Sombrero Guano, in which he states that his experiments with the article purchased from us, proved to *his* satisfaction that it was "almost worthless."

Believing that Mr. Stuart's object alone in making the communication was, as he states, to ascertain for himself as well "as the farming community, from actual experiment, the value of Phosphatic Guanoes now so generally recommended by dealers," and having as importers and dealers in the article, considered it *our duty* to obtain the information he desires *before "recommending"* the article to our agriculturists, we take great pleasure in enclosing to you copies of letters received by ourselves and others, from gentlemen of the highest respectability, residents of Virginia, the contents of which we "recommend" not only to Mr. Stuart, but also to the entire farming community, with the sincere desire that they may be the means of attracting greater attention to this really valuable fertilizer, which in our opinion is destined to take rank side by side with Peruvian Guano. * *

Your friends and serv'ts,

FOWLE & Co.

FAUQUIER, Co., December 21, 1858.

Messrs. FOWLE & Co.

Gentlemen,—I used Sombrero Guano on Corn last spring, and made excellent Corn. I mixed Sombrero Guano with Peruvian last fall and sowed for Wheat, which now looks equally as well as where the Peruvian was sown by itself, 250 lbs. to the acre.

Yours, respectfully,

K. E. COOMBS.

CUMBERLAND Co., VA., Nov. 25, 1858.

Mr. A. C. ELLIOTT.

Dear Sir,—The Sombrero Guano I got of you in 1857 was used on my wheat crop. I also used Peruvian Guano at the same time on same land and crop, and saw no difference in the result. The season was not good for wheat, *but I can say the Sombrero Guano alone produced equally as good a crop as the Peruvian alone.* I also experimented with the same guanos the present year on my tobacco crop. The Sombrero Guano, though used on the poorest land, produced equally as large a growth of tobacco as where the Peruvian was used, but the character of the tobacco was very different. The Sombrero Guano produced a green colored, rich, heavy tobacco, and the Peruvian Gnano, a thin, delicate yellow tobacco, with much less substance in it. I observe that the grass, where I used the Sombrero on wheat, is much more luxuriant, and afforded much better pasturage last summer than where the Peruvian was used. I shall use Sombrero Guano more extensively another year, and on my other crops as well as wheat and tobacco.

Respectfully,

FRANCIS ANDERSON.

CUMBELAND COUNTY, VA.

Being requested to furnish a statement of my experience in the use of Sombrero Guano, I offer the following certificate.

Learning that this article was utterly destitute of putrescent manure, I used none of it alone, but mixed one part of it with two parts of Peruvian Guano on my last year's crop of tobacco. This mixture was applied when the tobacco was worked the first time. The improvement in the crop, immediately after its application, was most manifest, and especially its superiority over some of the crop on which Peruvian Guano, without any of the Sombrero had been applied. The result was, that I made the best crop I ever made, and the best for the land that I ever saw. These considerations have brought me to the conclusion that the application of Sombrero Guano is the cheapest mode of applying phosphate of lime to our lands—an article so necessary to their high production. Holding this opinion, I certainly expect to use it again. The depredations of the joint worm on wheat have deterred me from wasting guano of any kind on that crop, and I sow but little wheat. I will only state further, that I have no confidence in making tobacco of high quality without the free use of domestic putrescent manures.

Given under my hand, the 19th January, 1859. W. S. MORTON.

BROOKHILL SCHOOL, VA. (near Charlottesville, October 6, 1858.

Dear Sirs,—I will thank you to send me one ton of ground plaster, and one ton of Sombrero Guano, with a bill.

I will take this opportunity to make amends for an injustice which I now think I did the "Sombrero Guano" last summer. My crop of tobacco just housed, was part of it, planted with that Guano—say four acres, with one ton—about 500 lbs. per acre, in the drill—the hills made upon it. My overseer and I were both entirely incredulous, and I joined in expressing my distrust of its virtues at Mr. F. Minor's, when Mr. Edmond was there. To my great surprise, just before cutting Tobacco, I noticed a wonderful difference in a portion of the crop, and inquiring of the overseer, he showed his marks, defining the ground where he had applied the Sombrero Guano. We, and others, judged that it was from ¼ to ½ better than the crop on adjoining ground of equal quality. The tobacco seems to be heavier and greener, stronger and of finer quality.

Respectfully, CHAS. MINOR.

To Messrs. Edmund & Davenport,

Richmond, Va.

CUMBERLAND Co., VA., Oct. 10, 1858.

Mr. ANDREW C. ELLIOTT.

Dear Sir,—It gives me much pleasure to inform you that, notwithstanding we have had a very dry and unseasonable year to test it, the Sombrero Guano I got from you last spring comes fully up to my expectations. Below I give the result of my experiments.

I applied Sombrero *alone* and Peruvian Guano *alone* on oats, side by side, on same land, and saw no difference in result between the the two—both produced good crops. On my tobacco plant bed I applied Sombrero and Peruvian mixed, in the proportion of two-thirds *Sombrero* and one-third Peruvian. I sowed the seed on the 18th March, which you know, is very late in the season to sow tobacco seed, (December to middle of February being the usual time,) yet I was enabled to plant my crop as early as any of my neighbors. My plants were green colour, healthy and vigorous in the bed, and after transplanted in the hill, retained their green colour to an unusual degree for the dry season, throughout. When planted, I applied the guano, mixed as above, (say two thirds Sombrero and one-third Peruvian,) in the tobacco hills, in the proportion of about 300 to 400 lbs. to the acre, and the yield was twice as great where the guano was used as elsewhere on the same land, besides retaining a healthy color and vigorous growth during the season, far beyond any other portion of the field. I made similar experiments with corn, applied in the hill in the proportion of about 300 lbs. to the acre, with similar results and the same on vines. I also used the same on turnips, in the proportion of about 300 to 400 lbs. to the acre; and I venture to say, with one exception, I have the best turnip patch in the county, and that one, doubtless, owes its superiority over mine to the fact of its being sowed 25 days earlier than mine—it being sowed 8th August, and mine not till 2d. September. The manure used on my neighbors turnip patch was, I understand, a mixture of Peruvian Guano, stall manure and plaster, heavily applied.

I am clearly of the opinion that, if ground fine enough, Sombrero Guano needs neither Peruvian Guano, ammonia acids or stimulants in any form to render it perfectly soluble and useful to vegetation. Only reduce it to a perfect powder, and I believe it is of itself the best, cheapest, and most convenient fertilizer known. Yours, &c.,

HUGH RAINE.

CHANCE ISLAND, CAMPBELL CO., VA. }
11th Nov. 1858. }

Mr. MOSES LACY.

Dear Sir,—I used the Sombrero Guano purchased of you last fall, on my wheat crop, and also this spring on my corn crop. The result on both crops was good—far beyond my expectations when I bought it. I made better crops of both wheat and corn than any of my neighbors who used Peruvian Guano or other fertilizers on similar lands. The quality of my wheat was unusually good. *I used it alone and with plaster; I saw no perceptible difference.* I harrowed it in with my wheat, and also top-dressed it in spring;—quantity used, about 200 lbs. to the acre—applied in the hill with corn—say about 100 lbs. to the acre. I take pleasure in recommending it to the public as a *cheap* and valuable fertilizer.

Respectfully, JAMES C. WALTON.

LYNCHBURG, 10th Nov., 1858.

Mr. A. C. ELLIOTT.

Dear Sir,—I used Sombrero Guano *alone* on my potato (Irish) crop this year with entire success. My faith was not strong enough in it to use it extensively, but having failed so often to raise potatoes on a certain piece of land that I thought rich enough to produce a crop without guano, concluded to try Sombrero Guano on it, and the result was not only a crop, but the best crop I ever saw on any land. I therefore attribute it entirely to the effects of Sombrero Guano.

M. LACY.

LYNCHBURG, Nov. 10th, 1858.

Mr. MOSES LACY.

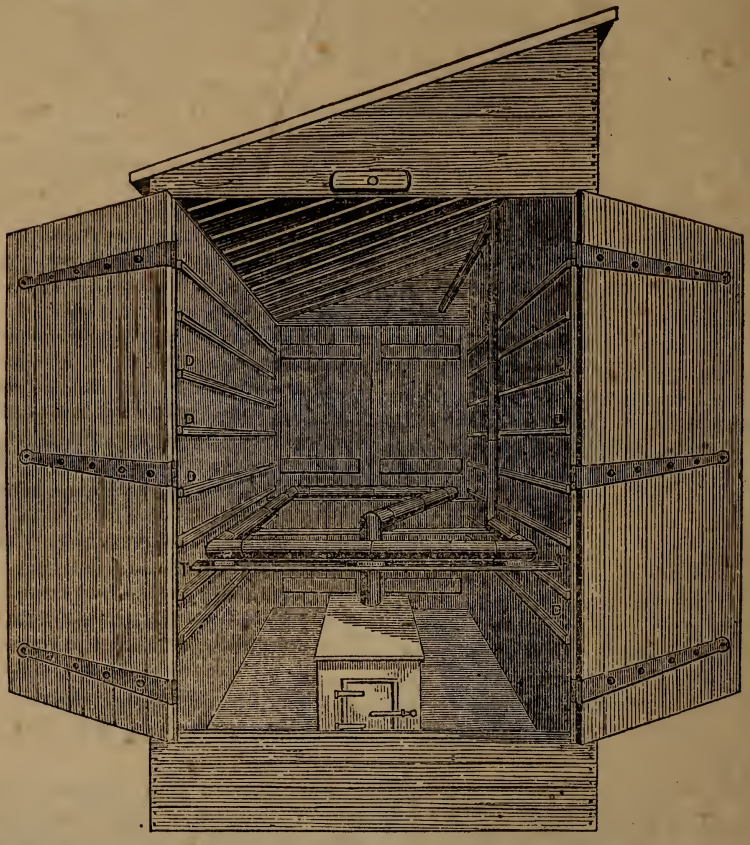
Dear Sir,—I used Sombrero Guano on a part of my crop of wheat last season with entire satisfaction, and I think it produced as well or better than the Peruvian Guano, used at the same time on same land, on wheat, side by side. I am fully satisfied in regard to the utility of Sombrero Guano, and have used it alone for this crop.

R. H. STATON.

Rotation of Crops.

In Beaver county, Pennsylvania, there is no established rotation of crops; yet, the best farmers endeavor to sow wheat on timothy, blue-grass, or clover sod, or on oat stubble, which has been cultivated with corn the previous year. They again sow on the wheat, in the fall, winter or spring, clover and timothy, the great object being to keep the field as long as possible in grass. In Berks county the system of rotation is, first, Indian corn and timothy or clover sward, followed the next season by oats.—*Patent Office Report.*

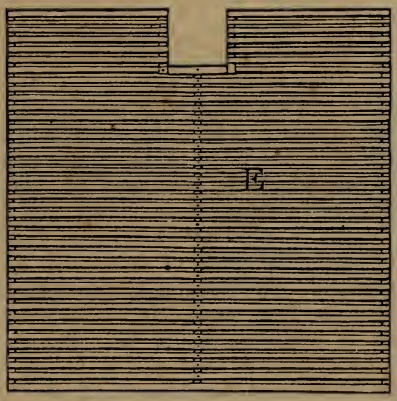
PLAN AND DESCRIPTION *Of a House for Drying Fruit, presented to the Virginia State Agricultural Society by* YARDLEY TAYLOR, *as a competitor for the Premium offered "for the best Kiln for Drying Fruit," to whom was awarded a Diploma or Certificate of Merit.*



Supposing that the Society, in offering a premium "for the best Kiln for Drying Fruit," did not intend to confine itself strictly to a kiln, properly so called, in distinction from a drying house, or other artificial means, but that its object was rather, to obtain *the best mode of drying fruit;* I am induced to offer this description of a house which corresponds with the one I have had in use for several years, except that experience has suggested an improvement here introduced, which I propose to adopt with reference to the manner of coiling the stove pipe rather more about the house, whenever a season shall occur in which I may have a large crop of fruit to dry.

The dimensions of the house are 8 feet by 3 feet 10 inches in the clear, with a slope to the roof of 18 inches. Two pieces of scantling 4 inches square and 7½ feet long serve as the corner posts of one side of the house, and two 4 inch pieces 6 feet long answer the like purpose for the other side.—These posts are boarded up with inch planks tongued and grooved together. Set the two sides perfectly upright, 3 feet 10 inches apart as prescribed above, and nail strongly across the bottom ends of the posts at the back and front ends of the house boards 10 inches wide, to serve as door sills, and then four inches from the top of the *shorter* across at right angles to the *taller* posts on the opposite side, nail other planks at each end of the house, suitable to the purpose of head pieces for the doors. Then with tightly fitting folding doors close the entire opening at the back and front ends, as represented in the engraving.

A stove (a six plate one preferred) at least large enough to take in a stick of wood twenty inches long, or longer, should be so placed within the house that the pipe may rise in the middle. The end of the stove would then be near the front door, and in the most convenient position for putting in wood. Some persons have preferred to place the stove with one end passing through the side of the house, but this I think is objectionable on account of the loss of heat. The stove should stand on the ground, and the first elbow of the pipe should be placed three feet six inches above the ground; then turn it horizontally and extend the pipe to the back end door, preserving the distance of nine inches from it, and also, from the wall of the house on the higher side; then turn the pipe along and across the back end door-way, extending it until it reaches within nine inches of the wall on the opposite side; then turn it along that side, extending it to the front door, then across that door-way to the opposite or higher side; then along that side to the point just opposite the upright part of the pipe where it first comes from the stove, being always careful to preserve the distance of nine inches between it and the sides and doors of the house; then turn the pipe upright to about the height of six feet; then conduct it nearly horizontally and carry it through the opening in the back and above the door as shown in the engraving. There should be three supports for the coiled pipe, one near each end door, and one near the middle, as at T in the engraving. These may be made of strong inch planks, three or four inches wide, well nailed to the sides of the house; there should be thin stone or slate resting on these supports for the pipe, to prevent them from taking fire. There should be ledges one inch square, made of strong plank and nailed on the sides six inches apart, as at D., to support the drying frames, which must be constructed to slide in and out freely. Two



f these ledges between the stove and the pil of pipe will be enough for the front end, ore would be in the way of supplying the el to the stove—but there may be three of em at the other end, and three at each end ove the coil of the pipe. The drying ames are made of inch plank, full inch ide, lapped together at the corners and iled with lathing nails, with one piece ross the middle nailed with large nails rough the outside into the end of the oss piece, and then laths, such as are used r plastering, are nailed across on the bottm about one-fourth of an inch apart, or a tle more—narrow laths are the best; then il a lath along the bottom, across the ends to make the frames slide in and out smoothly. These frames should be of a sufficient length and width to fill the space provided for them, but so as not to prevent them from sliding in and out freely. The two lower ones at the front end should have an opening in them to allow the stove pipe to pass up from the stove without touching them, as represented in the figure marked E, and those above the coil of pipe at the same end must have an opening at the corner for the same purpose, as represented in the drawing F. The frames at the other, or opposite ends, may be made full, without any openings, as only one end comes in contact with the pipes.

The roof may be made of inch plank, the first board being nailed on the end so as to project over a little; then nail one far enough from the first to allow the second board to lap about two inches on each of the others, and so proceed until the whole length of the house is covered. By this mode an opening an inch wide will be secured at each end of the bottom planks composing the roof—an opening which is absolutely necessary to pass out the moist air which rises from the drying fruit, for if it is retained in the house the fruit will scarcely dry at all in the upper frames, however great the heat may be.

To dry peaches properly they should be brought in fully ripe, so that they may be opened with the fingers without a knife; they should be then laid—back downwards—on the frames, which may, for convenience, be placed on a stool or bench, the operator being seated, if he prefers it; and when the frame is full it is placed upon the ledges in the house. An adult person may handle the frames without help, but if the operator is younger, then two persons—one on each side—may handle them conveniently. The doors should be kept open as little as may be. When the fruit is partially dry, it is best to remove it from the centre, where it is hottest, to the edge of the frame next to the house where the continued operation of drying will progress more slowly, and to keep the centre constantly filled with fresh fruit to supply the place of that which has been removed. By attending closely to these directions, the fruit may be dried much faster than it otherwise would be. The fire should be kept up as brisk and as hot as it well can be without scorching the fruit. If the weather is fair and it is desired to expedite the business, the fruit may be taken out when about half or two-thirds dry and spread on a scaffold in the sunshine, but if no such motive exists, it is better to dry fully in the house and then pack away in some secure place before injurious insects can reach the fruit. It will be advantageous to have the fire renewed about midnight, as by deferring it until morning the house will get cool during the night, and considerable time will be lost in again raising the heat to the proper degree.

Clingstone peaches are best dried by taking out the stone, as we then get rid of them and have only the valuable part to take care of. The best way to rid them of the stone is to take a narrow sharp-pointed knife, and then holding the peach one side uppermost with one hand, insert the knife with the other into the peach at the stem end and push the point of the knife to the middle of the upper side of the peach, then keep the point there and pass the knife around close to the stone and a ltttle below the middle of the peach on the outside—this will take off a little more than half of the flesh of the peach—then turn it over and insert the knife in the same manner on the other side—this will take off all the remaining flesh, except a little at the middle of the sides and a little around the edge of the stone. Clingstone fruit may be dried with a hotter fire than freestones, as they merely dry away, without raising juice in the grooves of the stone, as freestone fruit will do under strong heat.—The quicker a peach is dried the better it is if not scorched. There is, however, little danger of scorching in a drying house like this, if proper care is taken to prevent it.—Clingstone peaches when thus dried are preferred by many, but they are more troublesome to dry. Many persons on the other hand prefer to have them pared before drying, but the difference is not as great as is supposed, inasmuch as to pare them successfully, they must not be fully ripe, (particularly if they are freestones,) and this want of maturity and consequent poor quality preserves the same bad flavor in the unripe fruit which existed before it was dried.—With strict attention one bushel of peaches may be dried in twenty-four hours, and if the scaffold is used—as has been suggested—a still larger quantity may be dried.

This house is also well adapted to the purpose of drying apples, pears, &c. They are much fairer than if dried in the sun. They do not require as high a degree of heat as peaches.

To build such a house, which any ordinary carpenter can do, will require about 650 feet of inch plank. It will require a stove and about twenty-eight feet of four inch pipe, with seven elbows to furnish it. Many persons have these articles on hand for winter use, which they do not need in summer; they can advantageously appropriate them to this purpose.

DESCRIPTION OF A KILN FOR DRYING FRUIT, MADE OF BRICK.

For many years previous to the building of my drying house, I used a kiln, built of

rick, to dry peaches on. It was about 5 eet 6 inches wide, and about 14 feet long. First, there were three walls built, 9 inches hick, the whole length, and a wall across he farther end, these walls were raised about foot high, and two arches were then made onnecting them together the whole length xcept about 9 inches at the farther end; it as then built up and levelled off even with he top of the arches, upon this level place, ows of brick were laid from one end to the ther, far enough apart to allow brick to each from one row to another crosswise; it as then smoothly plastered over on the top, nd the chimney was built over the mouth f the arches. The heat from the fire in he arches passed up through the opening t their farther end, into the small flues that n lengthwise of the kiln, and the smoke hen passed up the chimney. The advange of this construction over other kilns hat I have noticed is, that it is not so liable burn as where the arches are thinner bove the fire, and it will retain its heat much nger. With close attention, and renewing e fire at midnight, from 1½ to 2 bushels of uit may be dried in 24 hours. But it takes rhaps four times as much wood as the ying house would need in the same time. here there is a large quantity of fruit, and ood is not much of an object, it is an exllent kiln for drying. I have dried 30 ushels of fruit in one season with it.

The cost of building one, where all things ve to be purchased, would be about as uch as a drying house, as it would need a of over it, and it would require about 1500 ick to build one of the size mentioned.

I prefer the drying house—there is less nger of scorching, and it answers better r drying other fruit, besides peaches.—here there is a large quantity to dry, a cond one may be built.

YARDLEY TAYLOR.

mmer Management of the Grape Vine.

EVERY one who has a garden has a grape e; but not every one who has a grape e knows how to manage it. We propose say a few words on the subject for the nefit of our amatuer readers, especially the season is now approaching when the es will require their chief attention.

"How strangely you talk!" we fancy e of our friends exclaim; "the season is w approaching!—why, we thought winter s the time to prune grape vines!"

That is all very well; winter is, to some extent, the time to prune grape vines,—but the skill required to perform the operation at that season is not a tithe of what the grape vine expects of you in the way of *summer pruning*.

Did it never occur to the pruner how absurd was the idea of allowing a vine to produce a great amount of wood for the mere fun of cutting it away again in the winter? Can nothing be done to avoid this waste of wood,—this abuse of the productive energy of the plant? To a great extent it can, and that by the process called summer pruning.

First, let us consider why we prune at all. We plant vines partly for their shade and partly for their fruit. If left to grow as "doth to them seem best," two or three strong shoots will take the lead over the others, and go off like a rocket to the top of the house, arbor, or trellis, on which they may be trained. These powerful shoots, having once got the ascendency like other beings in the animal department of our planet, seem to strive to keep the others down; "the rich become richer, and the poor poorer," until, before many seasons are over the weak branches die away entirely and their assassins are left masters of the field.

Now, this is a very unsightly affair, to say nothing of its inconvenience. To have a vine for shade, that gives no shade, because we have allowed all the leafy shoots to congregate on the highest pinacle of their glory, is bad enough; but to have the luscious, tempting fruit so very far out of our reach besides, is enough to give them a very *foxy* character, though they might belong to one of the purest of the pure varieties of the geuine *Vitis vinifera* itself. From this we can learn *why* we want to prune. We want to balance the strength of the vine. We want to prevent the strongly inclined shoots from getting more than their share; and to do this we lay a sort of tariff on them, which somewhat shackles their weaker brethren to overtake and run evenly with them. Every part of a plant is thus brought under control. The trellis is fully clothed with foliage from top to bottom, and the lowest and humblest shoot in that vegetable commonwealth holds up its head as vigorously and independently as the most favored by nature, with a position at the top of them all.

And now for theory of protection. It is

necessary to explain to the reader that the more severely we prune a grape-vine shoot —or any shoot—in *winter* the *stronger* it will grow the next year. On the other hand, the more we prune it in *summer*, the *weaker*, in proportion it becomes. If we cut down a willow in winter, the next summer it will make a growth of five or ten feet; but if you cut it down after it is in leaf, it will throw out but a few weak shoots, or probably die altogether.

This seems very incomprehensible on the surface, but, with the help of Physiology, can be made very clear. For instance, as soon as the leaves fall in the autumn, the tree, in a certain sense, hybernates,—it needs no air,—it does not *breathe*. But as soon as growth commences, it must have all this. Like an animal, it lives by breathing; and to effect this, it puts forth leaves. It breathes through its leaves. They are, in fact, its *lungs*. The sap is, indeed, drawn into the plant by the roots just as food is taken into the system by the mouth of an animal,—and after being rough or crudely prepared in the tree is finished off by being passed through the leaves for contact with the air, precisely as blood is passed through the lungs of the more highly organized being. So it is clear that if the leaves be stripped off, we prevent the plants breathing; we injure its lungs, bring on a species of consumption, which will rapidly send the plant, if the practice be continued long, to an early and lamented grave.

We will suppose a vine two years old, and with a cane that at the last winter pruning has been left 8 feet long. From the eyes or buds on the top of the cane shoots will push, which in the fall will be perhaps half an inch in thickness, while those from the buds nearest the ground will probably be less than a quarter of an inch. This is Nature's way of working, which, in this instance, we must decidedly object to.

So, when the shoots from the top of the cane push, and have reached about three feet in length, we pinch off the strongest one to about four joints or leaves in length, the next strongest about five joints, the next six, and those we wish to strengthen, not at all. A few weeks later the shoots so pinched off will commence to push on again, but this time weaker than before. They will now have to be watched. If the last formed shoots seems to grow only as strong as the lowermost ones, so well; the object has been gained. If, on the contrary, it still pushes with greater vigor, stop it again, till it becomes what you wish it to be.

To get shoots *where* we want them, and *as* we want them, is the only object of summer pruning grape vines. Many other kinds of fruit trees, if they grow freely and vigorously, will not bear fruit. The wood-producing and the fruit-bearing principles seem antagonistic; and summer pruning of such free-growing trees, by weakening the wood-producing power of the tree, throws it sooner into bearing. The stronger and the healthier the wood can be grown this season, the finer will be the fruit the season following.

We are ranked amongst "the meekest, mildest mannered men," but how it angers us at times to pass a vigorous healthy vine in July, and to see some ugly bifurcated animal, in pants and shirt sleeves, tearing away at the young leaves and shoots of the plant without the shadow of a reason, with all the ardor of a delightful pastime, and till scarcely any foliage is left on the vine. *Ain't I admitting the sun and air freely through the plant in order to ripen its fruit? Without reason? Eh!* Softly, my misguided friend. It is not merely the sun and air that ripens your fruit. It is the office of the leaves to do that; and the finer and healthier the leaves of your vine, and the greater the amount of these healthy and vigorous leafy appendages, the better your fruit ripens, and the finer will it be in all respect. Have you never noticed how a vine rejoices when it can steal among the branches of a lofty tree far out of the reach of your exfoliating fingers? Did you never see how some uncared specimen, which never in its infancy had the advantage of an "expert" to care for it, and recommend some "warm and sunny" spot as the very place for its future welfare; did you never see how in that neglected shady spot, where the mid-day sun in vain could penetrate, and the life-giving rays of the morning sun broke in only in winter,—where

"Plants at whose name the verse seems loath,
Filled the place with a monstrous overgrowth,
All berried, and pulpy, and blistery, and blue,
And livid and starr'd, with a lurid hue,
Where agarics, and fungi, and mildew, and
mould,
Started like mist from the damp ground, cold;"

and yet where the plant seemed to revel in perpetual healthfulness,—the fruit to color

o perfection, and the canes to live to a abulous age and to attain to quite marvellous limensions. And all this, not because of he shade *per se*, but because the thrip, and pider, and the myriads of insects that love o bask in the summer's sun; and the mildew, r blight, or *oidium*, or whatever you call it, hat loves to spread itself where drought nd moisture in the air, or extremes of heat nd cold rapidly alternate, do not find a foot-old.

The leaves—the leaves—take care of the eaves. Never remove for any other purpose han to weaken a strong-growing shoot. So hall your vine luxuriate and bear fruit, and fford you a grateful shade, free from most f the ills the grape vine is heir to; and if n its nature a spark of consciousness exist, hat atom of mind will expand with a fervid armth of gratitude to the writer of this rticle for saving it from the barbarous treat-ent it may have been heretofore subjected .—*Gardener's Monthly.*

Horticulture and Mental Cultivation.

The love of cultivating gardens seems to e innate in man, and only requiring, where seems to be absent, some small incentive call it forth, with all its grandeur and ly influence. It is the primeval occupa-n, and taught our first parents love to the eity and each other, in the umbrageous ades of the pristine Paradise. It is the tural associate of a cultivated mind; and range to say, some of the most beautiful storals and rural poesy in the English nguage have been written by men who ed in London, and who derived their in-iration from house-sparrows and bricks d mortar, thus showing that with the cul-vation of the mind—the approach to the re Adamic intellect—came the yearning r the flowers of the garden and the ever-cens of the shrubbery. It is also illus-ted on our own continent by the dwelling-aces of our great minds. We expect to d the giant intellects of the age at the ntres of learning, deep in the massive dy, and surrounded by the apparatus of llegiate information. To a certain period ey are there, bnt how soon Irving buries mself with nature only, at Sunnyside; d Emerson, the philosopher, flies to quiet ncord, to contemplate, amid trees and wers, the abstract truths that he evolves.

All nations, at all times, have acknowledged the value of horticulture as a humanizer and civilizer, just as cultivation of intellect calls for associate cultivation of flowers and plants. The one induces the other. An anecdote will prove this.

When the Rev. Mr. Boyd was appointed rector of Skipton Parish, in Yorkshire, England, he found a rude, unrefined, and, to a considerable extent, immoral population. The first step he took towards their amelioration was to lay out and plant a beautiful flower-garden attached to the rectory, to which he gave free access to his parishioners at all times. He afterwards encouraged some of them to ornament the gardens attached to their cottages by giving them plants and seeds; and in the course of a very few years this rude population was, by the kindly influences of horticulture and floriculture, transformed into a most orderly, gentle, and refined community.

This may be called a novel way of preaching the gospel, but it is a good and practical one, and we look to some such result as this from our own Central Park. Philadelphia finds it in her squares and fountains; Boston in her common; New Haven in her elms; and other cities should depend more than they do upon trees, flowers, shrubs and evergreens for the extinction of rowdyism, and less upon an uncertain punishment of offenders.

The benevolent ladies of our own city are beginning to appreciate the value of horticulture as a female employment, and are about to establish a horticultural school for females upon Long Island, where poor orphan girls may be taught gardening as an art. In after years those girls, saved as they will have been, from the vicious influences of a large city, and having a stock of robust health and an occupation that will keep their body and mind in active and pleasant exercise, will thank the lady, Mrs. Phelps, who founded it, more by the grand work they shall achieve, than by mere empty words.

It is a healthy sign of the onward intellectual march of the race, that gardening, as a business, and by amateurs, is becoming more and more extended, and that the army of civilization is looking with love and fondness at the trees and flowers, the leaves and grass, the blossom and the fruits, that are

found with successive beauty upon the way-sides of its track through the ages.—*Scientific American.*

From the Louisville Journal.

New Plan of Drying Peaches.

MESSRS. EDITORS:

As the *furze* which covers the peach is very objectionable in drying them with it on, and as peeling them for drying is a tedious process, and causes the loss of much of the sweetest and best parts of the fruit, a plan which will obviate both of these objections, and give us the dried fruit as good as if peeled, and in fact even better, is a desideratum, the supplying of which would be very acceptable to all who are in the habit of drying this most excellent and desirable fruit for table use. A lady friend of the writer has found it out and communicated it to him, and he will here describe it. Make a tolerably strong *lye* with wood ashes by boiling them in water—letting it stand after being boiled sufficiently, until the ashes settle to the bottom, when pour off the lye. Then put the peaches to be dried in this, *warm*, but not hot enough to cook them any; and rub them in it awhile. Then take them out and wash them in clear, cold water. This process will take all the furze entirely off, and leave them as slick and smooth as nectarines, with nothing but a thin skin on them. Then cut off and dry as usual. Peaches dried in this way will be found to be very sweet, and have all the advantages of not losing any by the usual process of peeling—as the sweetest part of fruit is generally that next the peeling. We have eaten pastry made with such peaches, and can speak from experience.

J. R. H.

Uses of Lime in Gardening.

BY WM. BRIGHT, LOGAN NURSERY, PHILA.

OF all the mineral and earthly substances employed in agriculture and gardening, there is not one, probably, about which there exists, in the minds of most persons, more doubt and uncertainty as to its real value and action, than in respect to the simple article *Lime*. Some farmers and gardeners think very highly of it, and use it constantly; others use it rarely, or discard it altogether. The most elaborate papers on the uses of Lime, (such as that in Johnston's Chemistry, for instance,) fail to enlighten the most intelligent readers as to the true nature and action of it upon soils and plants; and the most contradictory statements are constantly being published, in Agricultural journals, as to the practical effects of liming land.

The truth is, that while some of the most important uses of lime are overlooked, too much is expected of it, by many who employ it. Farmers and gardeners are nearly all apt to look too much to one substance as a fertilizer. One thinks he can do every thing with lime; another bases all his hopes of success on plaster; a third will have nothing but rotted sod, while a fourth thinks a grand panacea is to be found in guano. No error is more fatal to success than this one-idea notion. Lime is a very important auxiliary to other manures. It is in more ways than one a real fertilizer, and it *produces*, sets free and organizes fertilizing qualities in other matters; but it is by no means a universal manure or fertilizer.

To make a long story short, I propose to set down, in a series of paragraphs, the most evident and important uses of lime in gardening, and to call attention especially to two actions which it possesses, which are not very generally recognized or understood.

1. Lime is an alkaline earth, (a sort of salt,) and its first and most evident use is to *sweeten sour soil.*

2. Lime furnishes a substance which is present in considerable quantities in the ash of nearly all our cultivated plants and fruits. For this reason, partly, lime is specially useful to potatoes. The tuber of the potato shows but a trace of lime in a ton, and hence, some writers have hastly concluded, that lime, in quantity, is not essential to this crop. But look at the analysis of the straw or tops: there your will find nearly three hundred pounds in the product of an acre.

3. Freshly slacked, or caustic lime, acts as a *powerful decomposing agent*, when in contact with masses of earth or vegetable matter, setting free many substances which before existed in forms insoluble in water, and causing the natural decay of organic bodies to be hastened.

4. Lime causes cold, dense soils, to become more open and porous, and renders light sandy soils more close in texture, or more adhesive. These last are facts very generally understood.

5. Vegetable matter (that is loam, sods, stable-manure and straw) is the food of lime.

By its decomposing power, it may almost literally be said to eat up vegetable matter and loam. It effectuallly decomposes and drives vegetable matter and manure out of the soil, when in the caustic state. Hence, where there is little loam, there lime should be used sparingly.

6. Not only does lime decompose vegetable matter, but when used in excess it renders the results of decomposition *insoluble* in water. This is an important point. We have not space to elucidate it. But we state the fact, that lime not only decomposes, and renders soluble matter, but in excess, it renders the results of decomposition *insoluble*.

7. Lime, in close proximity with decaying nitrogeneous matters in the soil, (as horse manure, hair, leather, etc.,) becomes a real ammonia-producing agent; as it is a well-known fact, that lime and nitrogen, under such circumstances, unite to form Nitrate of Lime, fully equal to ammonia as a fertilizing agent, while potash and nitrogen form Nitrate of Potash, (salt petre,) the money-value of which as manure, needs no explanation.

8. Lime, when it has been burned and slacked, and again becomes mild, (or is changed into the form of carbonate,) is then a store-house of Corbonic Acid for the use of plants, and in a certain degree, has the same action upon vegetation as Carbonic Acid evolved from decaying vegetable matter. You will ask, how is this carbonic acid set free? I answer, in one instance, by the action of Carbonate of Lime upon silica or sand (which is chiefly an acid,) Silicic Acid is liberated, which in its turn acts upon the Carbonate of Lime, and large quantities of Carbonic Acid are let loose. Other changes, of a similar character, take place in the soil, caused by the actions and reactions of acids and alkalies, which result in the liberation of Carbonic Acid, held in combination by lime and thus it serves, in a measure, the same purpose as vegetable carbon, in its relation to plants.

The last two sections (7 and 8,) are those to which I wish to direct the attention of the reader, as they describe the least known and most important uses of lime.

My rule is to use lime, in the garden, constantly, but moderately; and especially to use it in combination with hair, leather and any slowly rotting nitrogenous matter; —and thus I secure two or three important points in "terre culture."

Gardner's Monthly.

23

Special Report of the Superintendent of the Virginia Military Institute, on Scientific Education in Europe.

We are indebted to the Superintendent, Col. Smith, for a copy of the report above referred to, which is comprised in a pamphlet of seventy pages octavo. The circumstances which gave rise to it, are briefly expressed in the following extract from the letter of Col. Philip St. George Cocke, President of the Institute, transmitting the report to the Governor of Virginia: "The Board of Visitors were induced to grant a leave of absence, during the last year, to Col. Smith, the Superintendent, to enable him to travel in Europe, for the double purpose of recruiting his health and strength, materially impaired by protracted official labors, and of examining the various institutions of learning as well as the systems of education in Europe, with the view of enabling the Board, in co-operation with the enlightened observation and extended experience of the Superintendent, *to give such direction and development to the system of education peculiar to the institute, as should best adapt that system to the growing wants and requirements of the times and of the country, and thereby insure, as the results of it, the highest degree of efficiency and of public usefulness.*"

The object of visiting "the various seminaries of learning and other institutions of education in Europe, with a view to ascertain the operations and success of the various systems of education which exist there, and *to inquire into the interests which are covered in the operations of the Military Institute of the State of Virginia,*" with which he was charged by the instruction of the Board, was pursued by Col. Smith, with untiring energy and indomitable perseverance. Through the characteristic courtesy and kind interposition of Judge Mason, our Minister to France, he obtained from the proper government official, letters of authority to visit the Polytecnic School at Paris, the General Military School at St. Cyr, and the Artillery and Engineer School of Application at Metz.

As his tour extended through England, Scotland, and Ireland, France, Belgium, the German States, including Prussia, Austria, Bavaria, and Wurtemburg, as well as Switzerland and Italy, his examinations were necessarily limited to some only, of the chief establishments of Europe. He was, nevertheless, enabled to gain a large amount of valuable and practical information in relation to the particular object of his

inquiries, which will enable him in co-operation with the Board, to give such elasticity and expansion to the system and scope of instruction pursued at the Institute, as shall adapt it to the *wants* of the country from time to time, as those wants shall be successively developed. We are happy to see that provision for agricultural instruction is already felt to be an *existing necessity*. We therefore hope very soon to find the institution adapting itself in this particular, to "the requirement of the times." We annex the entire report of Maj. Gilham, made to the Superintendent, and submitted along with his own report to the President of the Institute, following it with Col. Smith's account of the Agricultural School of Germany, at Hohenheim, to which Major G. refers.

MAJ. GILHAM'S REPORT.

Virginia Military Institute,
January 8th, 1859.

COL. F. H. SMITH, *Sup. V. M. I.*

Sir—The course of instruction in this institution is mainly of a scientific and practical character, wisely designed by the board of visitors to fit young men for the practical pursuits of life. Agriculture is the leading occupation of the people of Virginia, and of the south; that one upon which depend all other pursuits, and which affects the prosperity of even the state itself. A large majority of the young men committed to our care, are the sons of farmers, many of whom leave our walls to take charge of farms, while many others sooner or later, become tillers of the soil; therefore, it appears reasonable that provision should be made for agricultural instruction. Having given not a little time to the consideration of agricultural education, and having satisfied myself of its great importance, and of the practicability of introducing a thorough course in this institution, I beg leave to submit my views upon the subject, and to request that you lay this communication before the board of visitors at its next meeting.

Almost every where, at the present time, the prevailing sentiment is in favor of agricultural colleges and schools, and such a sentiment is quite prevalent in Virginia and the other Southern States. There are those, however, who, decrying every thing which is not "practical," cry out against "book farming," without thinking that perhaps the young farmer might derive something of the same sort of benefit from a *professional* education suited to his wants, as the lawyer, the divine or the medical man does from his. There can, I think, be no reasonable doubt that agricultural schools, if properly organized, would accomplish great good; and I shall take but little time in any argument to demonstrate this. Engineering is eminently a practical pursuit. The engineer may and generally does commence as an humble assistant, and gradually works up into the higher walks of the profession; and yet it is universally assumed that the engineer, if he hopes to master his profession in all its details, must, before entering upon it, be thoroughly grounded in all the arts and sciences upon which engineering depends. In other words, his education must be more or less special—professional. Agriculture, while a practical pursuit, is not a whit more so than engineering. Schools for engineers are considered necessities, and are patronized. Why, it may be asked, are agricultural schools less necessary, or less likely to be sustained? If the farmer is to dignify and adorn his occupation, and at the same time keep pace with the age, should not his education have as much of a special bearing as that of the engineer?

The best argument in favor of the utility of agricultural schools, is to be found in the fact that but few years have elapsed since schools of this kind were very rare, almost untried, now they may be counted by the hundred, and their numbers are still increasing. In Europe, the agricultural school is no longer an experiment. It is, if we are to believe the reports which reach us, accomplishing great good. The most renowned and probably the model school, is that of Hohenheim, for an interesting account of which I am your debtor. The others most noted are at Cirencester in England, Gignon in France, Moglin in Prussia, and Gorey Goretsh in Russia. In 1850 President Hitchcock, of Amherst, Massachusetts, enumerated 350 agricultural institutions in Europe. Since that time they have greatly multiplied, so that it is estimated that at the present time their number is not far from 500; and by far the greater number of them are the creations of the last twenty years.

The agricultural college of Cirencester, England, is probably more nearly suited to

our wants than any other. This institution has been in operation but a very few years, and is already doing efficient service, if we may be allowed to judge from the valuable contributions to scientific and practical agriculture which emanate from its faculty, and which are coming to us in almost every number of the Journal of the Royal Agricultural Society of England.

In our country, while very much has been said upon the subject, very little has yet been done towards the organization of agricultural colleges and schools. A commencement has been made, however; several agricultural colleges have been organized; and we may hope that schools of this kind, suited to our wants, will multiply with the same rapidity that they have in Europe.

While there appears to be but little diversity of opinion in relation to the utility of agricultural schools, there seems to be no little difference of sentiment as to what range of subjects a course of agricultural instruction should embrace, and the manner in which instruction should be imparted. Almost all of the institutions yet organized are located on farms provided for the purpose. Very much of the instruction is of a purely practical nature—the field taking the place of the lecture room, and the students being required to take part, not so much in the management as in the manual labors of the farm. Such a system may be very efficient in the education of young men for managers, stewards, &c., as most of the agricultural schools are designed for, but I cannot think that it would meet with favor in Virginia, or the other Southern States, or that it is desirable it should.

The young men of the South who would seek the benefits of an agricultural education, belong for the most part to that class who have means, who would, if not taking a special course, take the ordinary collegiate course of the country, and so soon as their education was completed, enter into the possession of their estates, to direct all farm operations, establish rules for the government of servants, &c., for themselves. Our first efforts, therefore, should be to establish such schools as would be required for the education of the proprietors of the landed estates of the country—men who stand in the same position, socially and politically, as the members of the bar or of the medical profession. This being the case, it is not to be expected that we can find in any existing school a model for our guidance; nor indeed is such a model necessary. We live under peculiar conditions and must organize schools suited to our peculiar wants.

Our agricultural system is peculiar, and must be so, as it is modified in very many of its details by the institution of domestic slavery. All or nearly all farm labor is performed by the slave. The master must direct him, or have him directed in nearly all that he does. Law and the common dictates of humanity impose important duties upon the master—at the same time that his own interests demand that the labors of the slave, while they are not too severe, should be constant and productive. The farmer in a free state, who requires labor, hires it when he wants it, and of such a character as he may most need. When no longer needed, or when not suited to his wants, his hands are discharged, and he obtains a new supply, or waits until the changing seasons bring around the period for more active labors. The southern farmer, however, having the slave from the cradle to the grave, must support him in unproductive youth, and in advanced age, and must so direct his labors when he is an efficient laborer, that no time shall be lost. In season and out of season, the master must find profitable employment for him. Added to this, there are moral responsibilities resting upon the master, which cannot be shaken off, or transferred to another—responsibilities which are unknown in free society.

Again: The productions of our climate differ in many respects from those of Europe, or even our own Northern States; and consequently, while the great principles of agriculture are the same every where, our system is materially modified on this account, and our instructions should be in accordance with this modified system.

We need, in the first place, a school of the highest order—one in which the young farmer may acquire as complete an education, suited to his wants as a professional man, as the lawyer and physician do in theirs, respectively. If we are to advance in agriculture, we must put it upon the same ground, educationally, that the professions, or I may say, the other professions occupy. Our young men must be taught to feel that there is in agriculture as much to call forth all the energies of the mind, as in any other pursuit whatsoever; and in

educating them for it, the course of instruction should be so framed as to give the mind full expansion in that direction.

But while the farmer's education should be for a special object, and consequently take a special or professional turn, it should not be too technical. He is in a position to exert a commanding influence, and owes certain duties to society, which can be better discharged by his having a knowledge of many of the more important branches which constitute a part of the ordinary collegiate course. We may give young men the college course, to be followed by one purely professional, or we may so arrange a course of instruction for four years, as to include the special in the general one. By the latter arrangement, the student would master the principles of his profession, while he was also acquiring those branches which are deemed necessary to every educated man. In the existing state of public sentiment in our country, there can be no doubt that the latter plan is the one best calculated to insure the desired object. The benefits likely to result from the introduction of agricultural schools, must be more apparent to the great mass of our people, before parents will be willing to give their sons a complete collegiate course, to be followed by an agricultural one. To secure the latter, the two must be combined, and this I propose shall be done by the organization of an agricultural department in this institution.

Our young farmers should be so educated, that they may with efficiency and skill direct the labors of others, rather than for the performance of manual labor themselves. We want scientific farmers—not mere laborers. We should aim to teach the principles upon which the plough is constructed—its various forms, uses, &c., rather than to make ploughmen. Not that I would entirely ignore practical instruction. On the contrary, I would make that a prominent feature. It is the very best means by which to illustrate important principles, and fix them to the mind. The agricultural student should have opportunities for becoming familiar with all of the operations of the farm; but it does not follow from that, that he should take any part in its actual labors. His office should be to *observe*, and receive instruction from those competent to give it, while the labors are going on, and not waste his time in the acquisition of a species of practical knowledge, that never could be of much service to him.

Again: While the student is acquiring those principles which are to guide him in his pursuit, he should be thoroughly imbued with the necessity for system, order and good government on the farm; to accomplish this, he should, in the efficient discipline of the school, have always before him an example at once of the necessity for, and the beneficial effects of good government. If he is educated to habits of order and subordination, we have the surest guarantee that he will, in after life, fully appreciate their importance, and be governed by their principles.

We come now to consider the special branches which should claim our attention in the education of young men for professional agriculturists. Our first aim should be to educate them in such manner that, when in the pursuit of their profession, they may be fully alive to the importance of observing accurately the phenomena of nature; and that they should be capable of classifying the observed phenomena, referring them to the principles upon which they depend, and of so reasoning upon them as to turn them to practical account. This can only be done by thoroughly grounding agricultural students in the principles of all the sciences which investigate the phenomena of agriculture, and by which its processes are conducted.

For example—the farmer meets with a great diversity of soils upon his farm, or he sees the soils of the region in which he lives are unlike those of another region. If he is familiar with the principles of chemistry and geology, he will not only know that these various soils had their origin in the rocks underlying them, but will be able to trace out the changes that have taken place in the rocks to produce them, and by simple observation may learn much, very much, of their composition, physical condition, probable requirements, &c. But if he is not familiar with the application of science to the explanation of agricultural phenomena, he may not know that the soil is formed from the rock which underlies it, or if his observation has taught him this important truth, it will be of no practical utility to him, for the reason that a knowledge of principles is necessary to correct reasoning upon the subject.

Again: By familiarity with the principles of science, the farmer will become an observer of, and turn to practical account, phenomena that might otherwise have entirely escaped his notice, even supposing him to be desirous of noting every thing worthy of attention. To use the example just cited, how many educated and enlightened farmers are there who have seen the rocks underlying their soils from their youth, without for once taking any account of the influence the former must have had in the formation of the latter, and simply because they know nothing of the application of geology to agriculture.

While the student was acquiring the principles of science applicable to his profession, the numerous details of practical agriculture should not be overlooked. This branch of the subject I leave to be discussed in another place. I do not wish it to be understood that by practical instruction I mean that any young man could be a thoroughly scientific and practical farmer, on the receipt of his diploma from the agricultural school. To promise any such thing would be preposterous. I would expect the professional education to do for the farmer what the medical school does for the physician, the law school does for the lawyer, or our national military school does for our officers.

The medical student is taught the principles of science upon which successful practice depends; he is taught what is regarded by the profession as the proper way to treat disease in all its forms; he is allowed to accompany his professors in their visitations to the hospitals, &c., in all of which he receives a large amount of practical instruction—and yet no one presumes him to be a finished medical practitioner when he receives his diploma. He has, however, such a foundation of scientific and practical knowledge, that when aided by diligence, experience and judgment, he may take a high stand in his profession. So in the agricultural school—we should expect to give the student such a course of theoretical and practical instruction, that when he enters upon the practice of his profession, his education may be of great assistance to him, enabling him to conduct his farm operations with greater skill, and consequently with greater profit to himself, at the same time that he would be setting a useful example to others, provided he, with diligence, energy and judgment, makes use of the knowledge acquired in the school, and of that which he acquires in the practice of his profession. His scientific and practical attainments can only be useful to himself and to others, if used aright.

I proceed now to enumerate the subjects which it seems to me it is more specially important to embrace in a complete course of agricultural instruction, without referring to those branches which belong in common to all liberal education.

1st. *Mathematics.*—It needs no argument to show the necessity for as complete a course of mathematics as is ordinarily taught in collegiate institutions. Besides the training of the mind to habits of correct reasoning, the student of scientific agriculture requires a knowledge of mathematics in the prosecution of his other studies; and in the practice of his profession, will almost daily stand in need of more or less mathematical knowledge.

Surveying, which is properly an application of mathematical principles, should be taught practically. The student should learn how to survey fields and farms accurately, &c. He should be able to use the level and the theodolite, and be familiar with leveling in all its details.

2d. *Natural Philosophy.*—This should embrace, 1st, a full course of mechanics; the laws of equilibrium, and motion of solids, the equilibrium and motion of fluids, &c.; the available power of steam, water, wind, the horse, and man; the application of principles to the various farm implements, machines, &c., should all be fully discussed. 2d. A less extensive one on *meteorology*. Under this head the importance of regular observations of atmospheric phenomena to the agriculturist should be shown; the instruments in use should be explained; the formation of clouds, rain, snow, dew, frost, &c.; the local and general causes which affect climate, the fall of rains, &c., should also be discussed. 3d. The effects of heat, light and electricity, as mechanical agents, should also receive attention.

3d. *Chemistry.*—So much has been said and written about the benefits to be conferred by chemistry upon agriculture, or by "agricultural" and analytical chemistry, that many persons have supposed, and not a few have taught that scientific agriculture was nothing but an application of chemistry. That chemistry has conferred, and will con-

tinue to confer important and lasting benefits upon agriculture, there is no doubt; but no one who is familiar with its principles, and has a proper appreciation of the requirements of scientific agriculture, could regard it in any other light, after all, than as *one* of a circle of sciences, all of which are necessary to agriculture as a whole.

The undue prominence which but a short while since was given to chemistry as the one science which could throw light upon the farmer's path, taken in connection with the fact that designing men have been systematically practicing upon the credulity of the public, and coupled with the additional fact that there are agricultural phenomena which chemistry has yet failed to elucidate, has led many at the present time to deny the utility of chemistry altogether, or to place too low an estimate upon its value to the farmer. When we reflect that in nearly all the processes of improvement of the soil, such as manuring, &c., in the germination of the seed, the growth of the plant, the formation of fruit, and the after conversion of vegetable into animal matter, although influenced by heat and light, the changes are all chemical, no one, it seems to me, could doubt the propriety of, or the necessity for the scientific farmer being familiar with the principles of chemistry, and its applications to the explanation of the phenomena which come under his observation.

This course should be taught by recitations from some well digested text-book, with occasional lectures from the professor. A laboratory should be fitted up for manipulation, in which the students should be required, under the direction of the professor, to manipulate for themselves; to prepare, study the properties, and test the various substances embraced in their course. Having had some experience in this method of teaching chemistry, I unhesitatingly recommend it over the old method of lectures and illustration by the professor.

But while I would thus render the chemical instruction practical, I wish it to be distinctly understood that I have no desire to make it appear that by this method I would expect to turn out "analytical chemists." The time given to the study of chemistry in any institution in our country, is, with a very few exceptions, too short to admit of a complete course of instruction in this branch of chemistry. Such instruction is not at all necessary. The farmer has to deal with *principles*. If, in the elucidation of these principles, he has occasion to call in the aid of analysis, let him go to the professional chemist; and if he is familiar with his subject, he can reason upon the results obtained by the chemist, as well as if he had obtained them for himself.

4th. *Mineralogy and Geology*.—The first of these sciences gives us a knowledge of the composition and properties of the individual minerals which are found in the soil, and in the rocks which underlie it, and if properly taught, the student will be enabled to reorganize all the more commonly occurring ones himself. The second, treating of the formation and history of mineral masses, or aggregated minerals, the origin of soils, the component parts of the various formations, the changes to which they have been subjected, &c., opens up a wide field of useful enquiry to the farmer.

These sciences, to be practically useful, should be taught practically, as in the case of chemistry. In mineralogy there is no difficulty, as the student might be required to examine and test each mineral until familiar with it in all its varieties. In geology, too, much can be done in the lecture room, by making the student familiar with the various rocks which compose the different formations, by causing him to study the characters of characteristic fossils, &c. But in order to make the instruction really practical, the student should have opportunities for studying the geology of the country around the institution, and of visiting interesting and instructive localities.

5th. *Natural History*—embracing botany and zoology. Under the head of botany, the course of instruction should include a complete outline of vegetable physiology, in which the offices performed by the roots, stem, bark, leaves, &c., should all be fully explained, and one of systematic botany, including separate descriptions of the various agricultural plants, and of the "blight," fungi, &c., which are hurtful to cultivated crops.

The course of instruction in zoology should embrace a complete outline of animal physiology, the division of the animal kingdom into four great groups, the subdivisions of the vertebrated, with a more particular account of the mammalia, including particular descriptions of the domestic animals, as the horse, the cow, the sheep, &c. Under the head of invertebrated animals, the habits,

transformations, &c., of insects injurious to vegetation, should be discussed, with the particular descriptions of those which more commonly prey upon the various crops of our country.

6th. *Engineering and Architecture.*—The first I would limit to the consideration of the various building materials, their relative strength, durability, value, &c., and the various processes of cutting and felling, making embankments, draining, the construction of common roads, farm bridges, &c. The course of architecture should embrace its principles, together with its application to the construction of the various buildings required upon the farm, from the mansion of the proprietor to the most unimportant structure. Economy, health, comfort and utility, should be consulted in all cases. I would not expect the farmer, however, to take the place of the professional architect. On the contrary, the insight which he would get of the subject would be sufficient to show him the necessity for consulting the professional man in all important improvements.

Rural architecture has not received the attention in our country that it deserves. Our people need to have their natural tastes *educated* to a proper appreciation of its importance to a cultivated people; and I conceive of no better plan of effecting this, than by securing a general diffusion of correct principles in the way proposed.

7th. *Right-lined and Topographical Drawing.*—This instruction becomes necessary in connection with surveying, engineering and architecture.

8th. *Medical and Veterinary Practice.*—The application of science to the investigation of the causes of, and the means of cure of the diseases of domestic animals, is justly regarded as a necessary part of the education of the scientific farmer; and we accordingly find that in the best agricultural schools provision is made for instruction in veterinary medicine. A course of scientific agriculture would not be complete without it. The instruction in this subject should embrace the structure and anotomy of the domestic animals, their diseases, mode of treatment, &c.

If such instruction is necessary to the educated farmer, in order that he may take proper care of the various animals on his farm, how much more necessary is it that the southern farmer should have some knowledge of the human frame, the prevailing diseases of the region of country in which he lives, and the ordinary modes of treating them. He not only has the health of his immediate family to look to, but that of all his servants. On a large farm there must always be more or less sickness; and if no physician is on the place, there must be almost daily calls upon the master for medical advice. He must be something of a physician, in spite of himself.

In the education of the farmer, I would provide for instruction in human physiology and anatomy; the symptoms, &c., by which he may know various diseases—how to treat them; how the sick should be nursed, &c.

I would have it understood, however, that in proposing such a course of instruction, I have no idea of making a physician of the farmer. I would simply expect to qualify him for the better performance of the various duties which a proper care for his own interests, and a due regard for the welfare of his servants, impose upon him. He would be competent to the skillful treatment of all simple diseases—would know how the sick should be cared for, and would be sufficiently familiar with symptoms to know when he ought to call in the physician.

9th. *Science and Practice of Agriculture.* This course should embrace, 1st, the history of agriculture; the general objects of agriculture; and the application of the sciences of chemistry, geology, botany, &c., to agriculture. Under this head, the origin, nature and composition of soils; manures, their composition and value, sources of supply, application, &c.; the characters of the various agricultural plants, kitchen vegetables, fruit and forest trees, &c.; farm implements and machinery; the general effects of heat, light and electricity on vegetable growth, &c., &c., should all be fully discussed.

The course of practical agriculture should embrace all farm operations—such as plowing, harrowing, seeding, draining, harvesting, irrigation, rotation of crops, &c., &c.; the cultivation of the various crops; the management of land in pasture and meadow, soiling, &c.; the economy and management of slave labor; the different kinds and characters of live stock; principles of breeding, rearing, feeding and fattening of stock; the dairy, milk, butter and cheese; general principles to be observed in the erection of farm buildings, &c. The whole to conclude with instruction in keeping farm accounts,

the laws of enclosure, laws of tenure, and the laws relating to the owning and hiring of slaves.

In order to give greater efficiency to the instruction in practical agriculture, a farm should be purchased, and provided with a dairy, necessary farm buildings, implements, machinery, &c. Horses, cattle, &c. should be reared upon it, and it should be systematically cultivated.

A small portion of the farm, say a few acres, should be set aside for experimental purposes, to test new process before applying them on a larger scale, or recommending them to the public. Another portion should be set apart for a fruit and vegetable garden, where the student would have opportunities for the study of horticulture, and where he could learn practically the various processes of grafting, budding, pruning, &c.; and another for a botanical garden, so as to enable the professor to illustrate the botany of agriculture to the fullest extent.

The students should have frequent opportunities for making themselves acquainted with the various operations of husbandry, and of becoming practically acquainted with the uses of the different implements. They should also in turn be put in charge of the different departments of the farm, such as the stables, reaping, threshing, &c.

Finally—In order to enable the professors in all the departments to illustrate the numerous applications of science to agriculture, an agricultural museum should be attached to the institution, in which should be found models of all approved agricultural implements and machines, and every kind of agricultural product, such as the different grains and grasses, every quality of tobacco, wool of every degree of fineness, models of fruit, vegetables, &c., &c., together with specimens of the various kinds of wood used for building, ornamental, and other purposes.

With this communication I transmit copies of the courses of instruction in the royal agricultural college of England, at Cirencester, and of the great school of Hohenheim in Prussia, from which it will be seen that the plan proposed agrees in its main features with that adopted in these schools. As you, sir, have lately visited and critically examined into the practical working of the Hohenheim school, I hope you will favor me, by transmitting to the board of visitors, with this report, some account of your observations, together with such suggestions as your visit to that school may have led you to believe would be valuable in this connection.

It only remains for me to show how we may engraft this course of instructions upon the institute course, so that any cadet who may desire it can avail himself of its advantages.

By reference to the course of instruction of the institute, as at present organized, it will be seen that provision is made for mathematics, natural philosophy, chemistry, mineralogy, geology, engineering, architecture and drawing; and that the time given to each of these subjects is sufficient, and in some cases more than sufficient, for all the requirements of the agricultural student. The only subjects, therefore, for which provision must be made, are, *natural history, medical and veterinary practice, and scientific and practical agriculture.*

The course of instruction of the institute is completed in four years, and is so arranged as to fill up the time completely, leaving no room for the introduction of new subjects. In order to obviate this difficulty, so as to secure ample time for the acquisition of the three branches mentioned above, I propose that at a given point in the course every cadet shall have the right of choosing whether he will take the agricultural course or the regular course. If he takes the former, his course from that time becomes modified; certain subjects, which to him as an agriculturist would be unimportant, should be omitted entirely, while others should be abridged or otherwise modified.

Thus the course of natural philosophy embraces, besides the mechanics, which is of great importance to the agricultural student, a full course of optics and astronomy. The whole of the optics might be omitted, as in no way necessary, while that of astronomy might be made more elementary. The instruction required in engineering would, as I have already shown, be very limited. The course of engineering, as now taught, is far more extensive than would be required, while that of architecture would want considerable alteration, and some extension. A portion of time might be saved in the department of drawing, and in some others. After a careful consideration of the subject, I feel assured that ample time might be secured for the agricultural course in all its details.

In order to provide full instruction for an agricultural class in the institute, it would be necessary to have at least one additional professor, a *professor of agriculture*, and to secure a farm in its immediate vicinity. To the professor of agriculture I would assign the departments of natural history, and scientific and practical agriculture, while the instruction in human physiology and anatomy, &c., and in veterinary medicine, might very well be entrusted to the surgeon of the institute.

In order that the board of visitors may see at a glance what the entire agricultural course would be, if the above recommendations were adopted, I present it in tabular form, giving the studies of each year, and the time devoted to every subject.

First Year.

Mathematics, daily, the entire session.
Geography, daily, from 1st September to 1st January.
English grammar, daily, from 1st September to 1st January.
French, daily, from 15th January to 1st July.
Latin, every other day, from 15th January to 1st July—alternating with drawing.

Second Year.

Mathematics, daily, the entire session.
French the same.
Latin, every other day—alternating with drawing.

Third Year.

Mathematics, daily, to 1st January.
Natural philosophy, daily, from 15th January to 1st July.
Chemistry, daily, from 1st September to 1st January, and from 15th Janury to 1st July, every other day—alternating with mineralogy and natural history.
Latin, daily.

Fourth Year.

Scientific and practical agriculture, daily, the entire session.
Rhetoric, logic, English literature, and constitutional law, daily, throughout the session.
Geology, every other day, from 1st September to 1st January—alternating with engineering and architecture.
Infantry and artillery tatics, every other day, from 15th January to 1st July—alternating with human physiology, &c., and verterinary practice.
Moral philosophy.

Thus it will be perceived that we have full time for the prosecution of all those studies which I have mentioned as necessary to the professional education of the farmer, without encroaching upon the time heretofore given to English, French, Latin, Rhetoric, English Literature, Constitutional Law, &c.—all of which are as necessary to the general education of the farmer as that of any other professional man; and by comparing this proposed course of instruction, and the time devoted to its acquisition, with that actually taught at Cirincester, or Hohenheim, it will be found to compare most favorably with either.

I am, colonel,
Very respectfully,
Your most ob't serv't,
WILLIAM GILHAM.

The great agricultural school of Germany is at Hohenheim, in Wurtemburg, six miles south of Stuttgard. Hohenheim (*High-Home*) was originally a *ducal palace*, which was transferred, on the coronation of the present king of Wurtemburg, to the uses of an agricultural school. The extensive ranges of court rooms, servants' rooms, halls, stables, &c., which constituted the arrangements of the royal residence, came in most admirably for the new uses to which they were applied. The public halls answered very well for the exhibition and instrumental rooms; the stables, for the cattle and sheep—while dormitories for 130 students were easily provided in the long ranges of the second floor. The school was unfortunately in vacation when I visited it, but I found one of the sub-officers there, who spoke French, and he, together with an intelligent student from Belgium, showed me every attention, and seemed pleased to afford me all the information at their command.

This school is a great scientific and practical school of agriculture. It is not a manual labor school, although any student is at liberty to labor if he choose. The basis of the school is careful instruction in scientific agriculture, embracing chemisty, geology, mineralogy, mechanics, physiology, animal as well as vegetable, and every thing belonging to the diseases of animals and stock. The principles thus taught in the class room are made the basis of the experimental instruction on the farm, for 1,000 acres of good arable land are attached to the school. Does science show that the application of a

particular manure will be judicious—the experiment is made, and the results carefully noted, and this not slightly, but with patient and laborious care. When the result is fully established, it is proclaimed, and becomes the established rule for the farmer every where. Is the manufacture of *cheese* the subject before the class—the professor will deliver his lecture, explain the rationale of the process, and also the manipulations necessary; and while the lecture is in progress, the milk will have passed from its liquid state to that of pressed cheese. So that theoretic and applied science is so join ed in the instruction here, that *Hohenheim* is regarded throughout Germany as *the* authority on agricultural matters, which determines all questions of policy in this branch of industry; and a knowledge of this fact makes the professors slow to express an opinion on any point, until conclusive evidence satisfies them which is the true answer. Thus, an enquiry was presented as to the relative economy in feeding 100 weight of hay to cattle or sheep, and the result was favorable to the latter in the proportion of some 20 per cent.

All new implements of agriculture are sent to Hohenheim for testing. The professor will explain to his class, before they are tried, the mechanical principles involved, their effect upon the draught of the animal, as founded upon his physiological structure; and then the test is made.

In Germany, oxen pull by the horns, the band passing in front of the head just below the roots of the horns. This is not an accidental arrangement, but reasons are given for it, founded upon the form and strength and durability of the animal.

The model rooms contained every variety of agricultural implements, among which I noticed with pride the reaper of our own *countryman, McCormick*. The implements which were not on hand for use in the field, were exhibited by most carefully constructed *models*. In the *seed*-room, every variety of seed and root was tastefully arranged; and these specimens are not exhibited merely to be looked at. Their peculiar properties are carefully unfolded by the lecturer, as he presents them to his class. My eye rested upon a fine specimen of a common potato. I took it up, and finding it much lighter in weight than a potato of its size should be, I enquired how it had been so carefully preserved. My guide laughed heartily at my question, and replied, that the specimen I held was a *model in wood*. And models in wood were shown, in like manner, of apples, cherries, &c., all of which would have equally deceived me, had not my attention been drawn to the model potato. In the same room were specimens of wool of every variety, carefully arranged by classification.

I was particularly interested in the hall of *forestry*. Here every variety of *wood* was seen in choice specimens, and classified, each class embracing those timbers which possessed distinct peculiarities: thus timbers which would bore without splitting; then those that might be turned; and also those that could be reduced to thin laminæ—all of which was very suggestive to me as presenting one important defect in our American education. With every variety of the noblest forest trees upon earth, so little attention is paid to their study, that our young men scarcely know the *names* of the trees as they pass them in the woods, much less their qualities and properties; and yet is there any part of agriculture so well deserving of attention as the culture, preservation and properties of our forest timber.

The cattle stables contained some 70 or 80 very fine cows of the *Swiss* breed, the calves from which were raised and sold for *labor*. They are never removed from their stalls except to water, twice each day; and their food is regulated by carefully tested experiments.

Some *twenty-five* mechanics are employed constantly at the school in making implements and models, which are sold.

The school is composed of the *academy* proper, and *institute*, or school of application. The charges of the first are about 30,000 florins (say $12,000) annually, and these are met by the tuition fees of the students. The expenses of the *institute* amount to 40,000 florins ($16,000), and the sales of stock, produce from the farm, and models, about equal the expenditure—so that, as nearly as I could ascertain, the school is *self-sustaining*.

The expenses to each student amount to about $300 a year, and this sum may be reduced by the student availing himself of the facilities for cheap boarding in the neighborhood. I found the school deficient in public documents. They had nothing except in *German;* and I was only able to get a couple of pamphlets in this language, giving a programme of the course of studies and discipline.

Prize Essay on the Temporal Advantages of the Sabbath.

A benevolent individual in England, "deeply impressed with the intimate connection between the preservation of the Sabbath and national morality, prosperity and order," "offered three prizes of £25, £15 and £10, for the three best Essays upon the Temporal Advantages of the Sabbath to the Laboring Classes, and the consequent importance of preserving its rest from the encroachments of unnecessary labor." The competition for these prizes was expressly limited "to the working classes themselves," and in response to the offer, more than a thousand Essays were received by the appointed adjudicators "within the short space of about three months." The first premium was awarded to the author of the Essay entitled, "*Heaven's Antidote to the Curse of Labor.*" The author who, be it remembered, is a journey-man printer—thoroughly discusses his subject in its various relations:—"The Physical, Mental, Intellectual, Domestic, Moral and Religious Advantages of the Sabbath." The treatise covers more than ninety pages,—a well-sustained effort of ability throughout. We transfer to our columns his views, as expressed on one branch of the general subject, namely:

THE DOMESTIC ADVANTAGES OF THE SABBATH [CONSIDERED IN RELATION TO THE WORKING CLASSES.]

Besides numerous incidental and collateral benefits resulting from the advent of the Sabbath, in relation to the homes of the working classes, there are three great ends directly promoted by it that are worthy of special regard: it favors the cultivation of natural affection, it secures family fellowship, and it generates and fosters domestic piety.

I. UNDER THE AUSPICES OF THE SABBATH NATURAL AFFECTION IS NURTURED AND INCREASED.

The institution of families does not owe its origin to human ingenuity. God himself has grouped the human race in these miniature associations, and, by the refined instincts which he has implanted in their bosom, has, in all ages, and amidst all the confused comminglings of mankind, preserved this unique institution from destruction. The homes of men are the centres of nearly all the light and warmth that cheer the social world; the arks that shelter mankind from the raging tumults and storms of life; the cells where the loving and the loved hoard the sweet fruits of their reciprocal affection; the well-springs that supply mankind with the purest draughts of earthly happiness. Attachment to home is always strongest in the hearts of the virtuous and the good, whilst it will be found, that those who have abandoned themselves to sensualism and vice, have first learned to loathe the quiet joys, the chaste delights, and the gentle affections of the family circle.

All our natural affections are quickened by frequent and kindly domestic communion. The offices of love, the acts of devotedness, and the proofs of tenderness, constantly repeated among relatives mingling in the same dwelling, cannot but powerfully affect their emotional nature, and continue to weave, day by day, a chain of love around their hearts. The strength of this chain will depend, in a great measure, upon the frequency or infrequency of the intercourse subsisting between the respective members of the household. It is proverbial that absence tends to the estrangement of the heart, even from those claiming the closest kinship with us. Where our seasons of communion, therefore, only occur at lengthened intervals, or where they are hurried and embarrassed by the intrusion of care and anxiety, the bonds linking together the members of the family must of necessity be thereby relaxed and weakened.

These observations bring at once to our view the position of the working classes, in their respective families, as it respects the cultivation of those natural affections from which so large a share of their earthly enjoyments spring. During the days of labor the artisan or the husbandman is, to a great extent, an involuntary absentee from his home. He rises early in the morning, before the remainder of the family are up, and goes forth like the sun, to perform his daily circuit of duty. If the scene of his operations happens to be near, he shows himself punctually at the hours of refreshment, partakes hastily of the family meals, and again disappears; but if, as is frequently the case, his sphere of labor be remote, then he returns no more to his fireside till the evening is far spent, and when the children, or the sick wife perhaps, have retired to rest, whilst in very many instances the great distance of his employment will de-

tain him from the bosom of his family till the broad shadows of the closing week are stretched across the land. This is the perpetual lot of millions of our toiling tribes. What opportunities, then, have they, in these swift visits to the domestic hearth, or in the drowsiness of evening exhaustion, to breathe sympathy or minister comfort to an ailing and suffering wife? What opportunities to win, by parental endearments, a lodgment in the hearts of their offspring? What leisure to sit under the shadow of the gourd their own hands have planted, and eat of its delicious fruits? If some provision had not been made to obviate the effects of this domestic deprivation, the families of the working classes generally would present a painful spectacle of mutual indifference and disaffection between husbands and wives, and of alienation between fathers and children; for when the natural affections, which mainly give birth to all the delights of home, are suffered to languish through neglect, there are no evils or distractions to which such households may not become a prey.

But the same Benevolent Being who has, by certain constraining laws interwoven with our nature, clustered mankind in these little communities, has also, even in the most unpropitious circumstances, afforded facilities for promoting those refined instincts on the strength of which the happiness of the family institution chiefly depends. God has given to the sons of labor the Sabbath for a sacred possession. On this day the separations of the week do not take place; the dissociated are brought together into fellowship, the brother caresses the sister, the father lavishes his fondness upon the children, the husband tenderly greets the wife, and the zone of charity encompasses the household. The pulses of affection are quickened in every soul; each beholds his or her happiness imaged in the beaming countenances of all beside, and thus love ripens apace beneath the clear sunshine of the heart.

If the Sabbath fails to bring household harmony and interchanges of affection, as it does in too many cases, we must attribute it, not to any defectiveness in the provisions of the day, but to the prevalence of discordant passions in the bosoms of the members of the family. Their heart-strings are out of tune, consequently the music of domestic life is marred. The father is austere and despotic, it may be, or the mother is querulous and ill-tempered; in either case the green affections of childhood are blighted as soon as they appear. The husband is perhaps enslaved by intemperance, and robs his family to satiate his lusts; the down-trodden wife either upbraids him, or sullenly submits to her fate, and the slighted children learn to dread and recoil from their degraded sire. To such the Sabbath re-union brings no divine concord, no holy heart-communion, and thus ruthlessly does sin oftentimes blur the bright beauty of Sabbath homes, and neutralize the kind intents of him who is alike the founder of families and of Sabbath days.

II. THE SABBATH SECURES TO THE WORKING CLASSES OPPORTUNITIES FOR DOMESTIC FELLOWSHIP.

This is but an amplification of the idea upon which we have already dilated. During the week by far the largest portion of their time is consumed amidst their coadjutors in toil, many of whom are comparative strangers to them, others are unworthy of their confidence and friendship, whilst the fellowship of not a few is decidedly distasteful and distressing. It imparts a double joy, therefore, to the intelligent and virtuous man, to be able to escape for a season from such contacts, and to find a temporary retreat in the bosom of a cheerful family. Here he can breathe freely, in an atmosphere untainted by the impurities that have surrounded him throughout the week. Here he can solace his soul with the sweet converse of those he loves. On this day he has time to imprint, line by line, lineament by lineament, an indelible image of himself on the hearts of his sons and daughters. On this day he has leisure to extract the honey of domestic happiness from the beauteous flowers bursting and blooming around him in the garden of his home. On this day he has opportunity to cultivate the affections of his children, by directing them towards worthy objects; to admonish them of their faults and follies, to point out the temptations to which they are exposed, to forewarn them, with a parent's earnestness, of the perils that beset their steps, to impregnate their minds with sound principles, to instil virtuous sentiments, to extirpate vindictive dispositions, to encourage the exercise of the intellect, and strive to exalt the moral

sense, in short, to weed out of their natures whatever would prove detrimental to their happiness or usefulness, and at the same time to foster in them whatever might tend to improve their characters, or give stability to their future lives.

If this parental mission, to which the Sabbath peculiarly calls the heads of households, were but conscientiously fulfilled, what myriads of youth might be snatched from infamy, and what numbers of sorrowful parents, whose heads are prematurely bending to the grave, might spend a happy and extended old age beneath the family vine they had planted in their days of strength. But, in the most critical periods of their children's history, their minds and morals were neglected—left exposed to the sower of every sort of evil—and now, alas! they are harvesting a terrible retribution in the crimes and sufferings of their scattered offspring!

Contrasted with this dark picture, how blessed is the retrospect of a well spent Sabbath in the family. What a sweet preparative for the struggles of the coming week! Where is the father who would not go forth on the Monday morning with a heart brimful of rapture to toil anew for his wife and children? And how often as the hot dews of labor roll from his forehead, and his weary arms drop pithless by his side, will the swift thoughts of home rush over him, reviving him like new wine, and quickening all his flagging energies? The exertions of such a man, acting under such abiding impulses, cannot be otherwise than fruitful; and how precious should such fruits be esteemed, when cast into the family lap for the impartial use of all!

It is equally cheering to the matronly wife to be privileged, for one day in seven, to entertain her lord in the peaceful realms wherein she lives and reigns. Exiled to a great extent from her presence in the week, she ardently longs for the day when her husband shall fill the vacant chair beside the hearth, irradiate the cottage with his smiles, and delight her ear with that voice whose tones of tenderness whispered away her heart in the romantic days of her maidenhood.

But, if the communion of a well-ordered home be thus refreshing to parents, it is difficult to overrate the hallowing influence it exerts upon the minds of the rising members of the family. It helps to consolidate the virtuous formations of their characters. It preserves the guileless and unsuspecting from the fatal seductions that bestrew the highways of the world. It restrains those prurient desires that so often burn in the bosoms of the young, to rush into the world and into the blighting excitement that rages out of doors, and teaches them betimes that real happiness may be imbibed at the quiet cistern of domestic enjoyments, but never from the turbid currents of a dispated life.

And then, this influence is as lasting as it is beneficial. The recollections of a happy home will cling to the young adventurer when his turn comes to plunge into the wild waters of a turbulent world. In the case of him who is under the sway of virtuous principles, these sacred remembrances will never lose their power; whilst in the case of him who has swerved from the path of rectitude, the Sabbath counsels of a serious father, and the fervent pleadings of a pious mother, will vibrate upon his ear amid the guilty excesses of a profligate career. The earliest impressions of home are generally the deepest, and the last to be effaced; and where these are of a pleasing and salutary character, they will often act like an anchor, in steadying the heart of the young sinner, and preventing him from driving headlong on the rocks of destruction! But there is yet another aspect in which the domestic advantages of the Sabbath may be viewed.

III. THE SABBATH AFFORDS FACILITIES FOR THE PROMOTION AND EXERCISE OF FAMILY PIETY.

The ordinary work-days of most of our operatives are necessarily so engrossed by their out-door occupations, and the time consumed in going to and fro, that, whatever their inclinations may be, they seldom have opportunity to indulge in the offices of family devotion. Business, as now conducted, is so thoroughly worldly in its spirit and requirements, and so greedy of every moment it can wrest from its slaves, that no space is left between the rising and the setting sun, for the pious laborer to assemble his household around the domestic altar. His meal-times barely suffice to enable him to reach his home, to appease the appetites of nature, and to retrace his steps again. Thus the devout workman, however his soul

may pant for a brief daily season which he may consecrate to the social exercises of religion, finds himself irresistibly borne onwards by the tide of human selfishness, and compelled to conform to many of the customs and restrictions imposed by the ungodly.

But here again, as elsewhere, the mercy of Heaven interposes on behalf of its vexed children. Every seventh day that breaks upon the groaning world publishes liberty to these lamenting captives. The rich banquet which this day spreads, atones, in some measure, for the spiritual scarcity of the week. On the Sabbath the perusal of the Scriptures may be resumed, the re-united household, free from the inquietudes and claims of secular duties, may meet for praise and prayer around the throne of grace; the well-matched pair will take sweet counsel together, and of the Lord; the inquisitive children, gladdened at their father's sojourn among them, will drink from his lips the words of sacred instruction; friends and kindred dropping in, will fraternize with the family in their communings with each other and with heaven, and go away bearing a rich blessing in their souls; songs of rejoicing and canticles of praise will resound through the templed cottage, whilst the foretastes of heavenly bliss will often ravish the hearts, and the foreshadowing of a coming glory will gleam upon the countenances, of its happy inmates. Nor will the public ordinances of divine worship interrupt this holy fellowship. An intelligent and earnest piety in the rulers of the family, will generally so contrive, as that most, if not all, of its members may repair in company to the house of God, and there celebrate divine mercy with the great congregation of Israel.

Such are some of the inestimable privileges which the Sabbath institution guaranties to the families of the working classes. It requires, therefore, but a glance to perceive the deranged and godless state to which the repeal of the Sabbath law would reduce them. The natural affections of the lower orders would thereby be blunted, and a diminished interest in each other's well-being would ensue in consequence of the infrequency and hastiness of their family intercourse. The several members of the same household would grow up in strange and freezing apathy towards each other. The children would seldom see the father, except for a few hurried minutes, and then it would be when he is chafing beneath the labor-yoke, and when his eye is continually roving to the admonitory hands of his watch—a time not at all calculated to encourage the reciprocities of paternal and filial love. The father, too, on his part, never having a few consecutive hours of leisure, to enable him to explore the mine of household treasure which he nominally possesses, would soon feel the chain of labor drag as heavily as his dead heart within him, while the brawny arm of energy, and the soul of enterprise, would flag, because the inspirations were wanting. For, where ambition, or covetousness, or emulation stimulates one to indefatigable effort, love impels thousands on in the fierce races of human industry. Think of this state of things everywhere existing among the working classes—think of homes divested of their attractions—think of the bonds of sympathy between the closest kindred universally relaxed—think of the strong affinities of nature which, for lack of adequate domestic fellowship, are dying out of human hearts—think of hard labor, thus deprived of its elastic spring, going on with sluggishness and languor, for who would toil and sweat, and "grind the bones out of his arms," without a powerful motive?—and what motive is sufficiently strong to urge millions of our yoke-fellows to menial offices all their lives, save necessity to provide for themselves, and love towards those dear ones who have a natural claim upon their services?—think of the consequences that would ensue from the withdrawal of this mainstay of the industrial habits of the people, and infer therefrom the inexpressible advantages accruing to innumerable family groups, and to society at large, from the maintenance of the Sabbath from all secular and carnal innovations.

The extinction of the Sabbath, moreover, as a day designed to be especially devoted to religious pursuits, must lead to the extinction of domestic piety; and wheresoever piety shall cease to have a voice and an altar in the house, it will simultaneously cease to have an embodiment in the church, and an existence in the world. Were religion, with its angel-retinue of graces, to be thus banished from our earth, godlessness and impiety, with their demon-throng of attendant evils—oppression, extortion, discord, hatred, revenge, blood-thirstiness, and

every species of sensuality that can debase the human form—would reign and riot unchecked among mankind! Between us and a catastrophe so dire stands the Sabbath day, whose seemingly frail barriers were originally built, and whose dilapidations from age to age have been repaired, by the hands of a divine artificer.

The Rules to be Observed in Making Butter.

In making good butter there are several nice operations to be gone through with, which require an eye to cleanliness, forethought and experience.

1. On milking clean, fast yet gently, regularly twice a day, depends the success of the dairyman. Bad milkers should not be tolerated in a herd; better pay double the price for good ones.

2. Straining is quite simple, but it should be borne in mind that two pans about half full each will produce a greater amount of cream than the same milk if in but one pan; the reason of this is the greater surface.

3. Scalding is quite an important feature in the way or making butter, in cool weather; the cream rises much quicker, milk keeps sweet longer, the butter is of a better color, and churns in one half the time.

4. Skimming should always be done before the milk becomes loppered; otherwise much of the cream turns into whey and is lost.

5. Churning, whether by hand or otherwise, should occupy fifty minutes.

6. Washing in cold soft water is one of its preserving qualities, and should be continued until it shows no color of the milk by the use of the ladle; very hard water is highly charged with lime, and must in a measure impart to it alkaline properties.

7. Salting is necessarily done with the best kind of ground salt; the quantity varies according to the state it is taken from the churn; if soft, more—if hard less; always taking taste for the surest guide.

8. First working, after about 24 hours, is for the purpose of giving it greater compactness.

9. Second working takes place at the time of packing, and when the butter has dissolved the salt, that the brine may be worked out.

10. Packing is done with the hands or with a butter mall; and when butter is put into wooden vessels, they should be soaked two or three days in strong brine before using. After each packing, cover the butter with a wet cloth, and put a layer of salt upon it; in this way the salt can easily be removed at any time, by simply taking hold of the edges of the cloth.

Butter made in this way will keep any length of time required.—*J. C. Adams, G. Farm.*

The above, which we cut from the *American Eagle*, York, Pa., contains much that is is true and important. Whether the 6th item about washing, is correct we doubt. Indeed we believe the less water is used the better, that water injures rather than helps the keeping qualities of the butter.—*Editor Plough, Loom and Anvil.*

The Original Horse Tamer.

The N. Y. *Spirit of the Times* says Denton Offutt, who claims to have taught Rarey 26 of the 31 great principles included under the head of his art, has sailed for England, where he is to teach the art of taming vicious animals to the nobility. He claims that he can do all that Rarey can and something more. The *Spirit* says of him, "Offutt is an original in his way, and goes into the philosophy of things, not confining himself, like a currycomb, to the surface of the horse, but working his way under the skin, and into the muscles and bones, and developing what he is pleased to call "the magnetique and galvanick powers, as is connected with the navis sistem."

Dairy Salt.

A correspondent of the *New England Farmer* furnishes the following mode of preparing dairy salt: "Take the best crystal salt, wash it, dissolve, strain, settle and turn off; boil it down in some perfectly clean iron vessel, skim as boiling; when stirred off dry, it will produce fine salt, white as the drifting snow, which, if stirred up in a glass vessel of water, will produce no sediment, and will be distinct from any mineral or other possible impurity."

A fool in high station is like a man on top of a monument—every body appears small to him, and he appears small to every body.

Shrubbery.

We have of late been oftener addressed about laying out and improving gardens, than we could find time to reply to properly. At any rate, we were forced to cut our reply short when the writers' queries concerned more the philosophy and the abstract of the art than their application to a distinctly described plot of ground.

This brought to our mind the idea of now and then giving our views of the details of landscape-gardening in these columns.

And we single out shrubbery for this article, because it would appear to us that this class of ornamental plants is best known to the public at large. A city man wants to pitch his tent outside the gates, and these days of horses and steam-cars fairly threaten to bring the city into the country,—or a farmer actually comes to think he might do a little towards appearances and beauty in the surroundings of his house, what else presents themselves to their minds but flowers and trees?

Quite natural, too, for crude minds who are only impressed by the colors of the flower or the grandeur of the tree, and have no eye either for effect or for detail. Mention the word "shrub," and they look upon it as something inferior, as by-play, as not at all essential to their purpose. They want something to look "big."

We will, therefore, try to show the value of shrubbery. Let us suppose that we have to deal with several acres, which are to be laid out, or, if laid out, are to be improved by planting. Now, flower-beds judiciously planned, placed and executed, are well enough, but by far the greater part of the ground is to be park or park-like. You have large trees in abundance, we will say. You cut paths and drives through them, you open clearings, perspectives, and use a good deal of newly-awakened ingenuity, (reader bear in mind we speak not to the initiated,) still, with all your efforts, the grounds seem and are monotonous. It is a forest, at best a grove. Look close and you will find that either the trees are not diversified enough in kind, or the ground without much variation in surface, or running water missing. In all probability, however, you will find that the trees are too much of one age, and offer the eye no variety in outline and effect. Now, how remedy that?—Simply by offering more foreground to the spectator; in other words, cut down a good many trees, so that the rest may be seen to better advantage. And let the fringe of the woods remain jagged, so that the leafy line runs in and out, that the clouds my run their broken shadows playfully on it, that the sun may hide between the green promonitories, that the fresh grass may, bay-like, run into the plantation. Bring into prominence old trees by cutting away the rabble round them; young trees, by isolating and clumping them, that they may show like a juvenile party, and not stand meaningless among their elders. And—we have arrived at the point now—bring out your shrubbery. It is that which is the link and the transition from open space and green grass to forest growth. It is shrubbery by which the comparatively blank space of turf and the tall occupants of the soil are best measured, by which they both get their value, by which they both are best set off, and by which their contrast is best and most pleasantly felt. All this is of tenfold force if you have to deal with level ground where Nature did not bring you variety as her gift. But even where the introduction of shrubbery is least necessary, it will still improve and heighten the romance of the grounds.

Suppose, now, we have to deal with a half-acre lot. Here shrubbery rules omnipotent, and the tall trees have to play second part; for what else, dear reader, do you want to create round your house but a small and fair epitome of Nature, a short abstract with the best points in it. To be sure for immediate effect, you will plant all manner of young trees, and in this you are right. But one single Pine or Elm will, when grown up, give you probably more shade, darkness and dampness, for that side of the house, than you wish; and it will not "live and let live" the smiling grass now round its base. Your place will *not* be that epitome and short abstract wished for, but will be only so many trees of lank trunks and rigid countenance, with a house standing gloomily amongst them. And now take to shrubs, planting a tree only where you want *actual shade*. Dispose of the shrubs as if you had a five-acre lot and as if *they* were *trees*. Avail yourself of the great differance in height and shape amongst them. Look how they will frame and dimple your *large* lawn, (for you must have a large lawn, be your place ever so small,) since you will remove or cut them down when they get too big. Look how they will consort so gracefully with your

flower-beds, which trees will never do, not even young ones hardly. And look what a finished appearance, nay, what a semblance of vastness they will impart to your cherished little home.—*Gardener's Monthly.*

The Southern Planter.

RICHMOND, VIRGINIA.

Agriculture as a Profession.

The lot of every man in the entire human family, has been cast for him by the wisdom of Divine Providence, and although it may sometimes seem that to some partienlar member, the lines have fallen in pleasant plaees—yet the destiny of life and its attendant eircumstances, may be summed up in the words of Job, "*Man is born unto trouble.*" No occupation, or profession, can exempt him from the disquietudes and penalties attaching to his birth-right. We are sensible of happiness only when we contrast our present feelings with those of a past period, which excited in us emotions far less agreeable. It is natural for us all—in ignorance of the vexations and cares which may visit our neighbors—to bewail our own hard lot, and think it *the most arduous* of all professions. We should often be speedily cured of this fallacy could we exchange places with some of those whose positions and employments excite envy. If it be true that "nothing is worth having which costs no trouble," then is life not only the more desirable, and to be enjoyed the more, for having within an element which can always furnish it with the spice of variety, and frequent strong contrasts, to relieve it of monotony. But while all persons of every class must expect to bear their share of the "ills of life," still there is to be had among the different avocations of men, at least "a choice of evils." While each profession exacts the onerous performance of different labors, there is, too, a difference in the *rewards* which they bestow upon their faithful followers.

Our own great nation's father said that agriculture was the most "noble, healthy, and useful employment of man." Surely, 'tis wisdom "not to give up happiness for power," and that profession which is at once the most noble, useful, and healthy of all others—gives the most flattering promise of bestowing happiness, by furnishing the all important source of "a sound mind, in a sound body."

While agriculture is free from many of the corroding and heart-sickening cares which fall to the lot of the merchant, lawyer and physician, and does not demand harder physical labor than the mechanic must exert, she does demand, from the man who would succeed in it, as much patience, perseverance, good sense and sound judgment, as does *any* other. The farmer should have these qualities, as well as prudence and industry. He should not only be willing to think for himself, but he should strive to enable himself to think aright, by cultivating, to the best of his power, these qualities. His labor being no greater than that of other men, he has pleasures which are bestowed upon him by the nature of his duties, which cannot be found in any other pursuit. "Under his own vine, and fig tree," he enjoys more freedom and relaxation of body and mind, than the denizen of the city, who, shut out for a large portion of his existence from the view of nature's sweet face, and the balmy air of the fields, is dependent upon the public for support—often longing for a repose, and a "sniff of fresh air," which he cannot obtain within the confines of the city. The same good qualities of character, which win success in other pursuits, will secure for the farmer, if not wealth and luxury, competence, if he is content to force his wants within the limits of proper expenditure, and not neglect his business. But apart from all considerations of "money making," the occupations of agriculture bring pleasures which cannot be derived from any other source. If the farmer has done his work well, he will see the benefits arising from it, not only in the improvements of houses and lands, but in the ameliorated condition of every living thing confided to his stewardship; and he may feel, with excusable pride, that he has not been merely "a cumberer of the ground," but a liberal and generous son to the mother who fosters and supports him. But if he has not in any degree helped to subdue and replenish the earth, so that useful and remunerating crops may usurp the place of noxious weeds; if he feels no pleasure at witnessing a field

"clothed in living green" by his own industry and good management, other than the hope of increased profit for his coffers; if his heart is not full within him, when he sees this eloquent rendering of nature's thanks for his generous care, and he fails to recognize in such a picture the blessing of Providence on his own industry, then is he the wrong man in the wrong place—his post might be better filled by another. Naught but vexation, labor and exposure will await him, while the chief rewards of the agriculturist never can be his. Let no man enter into the ranks of the agriculturists, lured hither by the sole aim of amassing dollars and cents. Such an one is only a fit recruit for a corps of "land skinners," whose occupation consists in marring the beauty of nature, and the handiworks of nature's God.

A proper discharge of the duties pertaining to the agriculturist, demand, therefore, his most unremitting attention to the following points:

1st. His obligations to his own farm and household—embracing the improvement of his land by proper tillage, manuring and draining, with a judicious rotation of crops—a regard for the physical and moral wants of his family, including his employees, and the extension of liberal and humane treatment to his domestic animals.

2nd. His duty to his neighbors—not only by living as far as it be possible for them—in amity, and social fellowship with them all; but in setting them an example worthy of imitation, both as regards the excellence of his tillage, and general good management of all committed to him, but in stimulating and helping them onward, to the best of his ability, in all improvements of their social, mental, and moral condition.

The man who lives with a sense of these obligations before his eyes, and in the habitual discharge of them, *not only deserves, but wins, the respect and warm esteem of his fellows.* He will enjoy the tranquil happiness and rewards of a peaceful conscience, which ever attends the consciousness of duty done.

Tobacco-Handler.

We witnessed a few days ago, the operation of a newly invented rolling machine for straightening tobacco before it is put into the hogshead It is the invention and patent of a gentleman from Albemarle County, Va., and will be for sale at the establishment of Messrs. George Watt & Co., of this city, where a model can now be seen.

The principle is the same as that of the "rolling mill" for making "iron rods." The tobacco (in bundles) is run through round grooves made in two cylinders, both of which are kept in motion by a windlass and one cog wheel, and is subjected to pressure (the degree of which is regulated by a spring) from head to tail. This operation is performed quite rapidly, the size of the machine allowing some five or six bundles to be put through at one time.

Hints to Horse-Keepers.

EMBRACING

How to Breed a Horse. How to Physic a Horse. (Allopathy & Homœopathy)
" " Buy " How to Groom a Horse.
" " Break " " " Drive " "
" " Use " " " Ride " "
" " Feed "

And chapters on Mules and Ponies. By the late Henry Wm. Herbert, with additions including "Rarey's Method of Horse-Taming," and "Baucher's System of Horsemanship"—Directions for the Selection and Care of Carriages, and Harness of every description, and a Memoir of the Author.

Price $1 25. Beautifully illustrated.

We have received from A. O. Moore, Agricultural Book Publisher, No. 140, Fulton street, New York, a copy of this work, which is, as it purports to be, "A *Complete* Manual for Horsemen." We do most cordially recommend it to horse owners, as the very best work we have ever seen on this subject at a moderate price It is cheap, useful, and entertaining.

The Quarterly Journal of Agriculture.

Published by the United States Agricultural Society and edited by Ben. Parley Poor, Washington, D. C., pp. 88, octavo.

This paper is conducted with industry, good judgment and ability. It is published at the Rooms of the Society and mailed to Life and Annual Members. It is printed on good type, but very inferior paper.

The Virginia University Magazine.

Published under the auspices of the Literary Societies of that Institution, and edited by James Edwin Cox, of Chesterfield; John A. Herndon, of Pittsylvania, and Wm. Wallace Bird, of Washington, D. C.

Its character, Literary and Antisectarian. Reading matter, 48 octavo pages. Price $2 per session of nine months.

TABLE OF CONTENTS.

The Courtship of Miles Standish; Maury's Physical Geography of the Sea; Genius; New Preachment from an Old Text [*There is no new thing under the sun*]; Amy Lee; Progress; Three Weeks at Old Point; Something in Rhyme; A Heart's History, and Editor's Table.

The Hampden Sydney Magazine.

Published by the Union and Philanthropic Societies of the College, and edited by R. D. Beach, B. Hughes, W. M. Tredway, jr., J. M. Smith, R. C. Osborne, R. W. Ramsey, J. M. Murkland, and I. P. Osborne.

Devoted entirely to Literature, and strictly neutral in Politics and Religion. Contains 40 pages of reading matter at $2 per session of ten months.

LIST OF CONTENTS.

Mecklenburg Declaration of Independence, concluded; Something to Live For; Something to Love; Night Visions of a Member of the Club; Great is Diana of the Ephesians; Are Ladies Angels? Welcome to May; The Nuptial Day; A Tale of Zahara; Old Maids; Editor's Drawer, and Editor's Notes.

We cordially welcome these periodicals as highly prized accessions to the list of our exchanges. They both challenge the most respectful consideration by their well sustained claims to literary excellence; maintaining in the character of their articles an expression of style, at once luminous, chaste, and classical, and characterized by purity of taste, beauty of diction, and fulness of illustration, without superfluity of ornament.

The conductors of these magazines have a mission of public beneficence to fulfil, worthy of their highest aspirations and efforts, which we are persuaded can only fail of its accomplishment through the want of a proper appreciation of their labors and sympathy with them in their work.

Let all who would cherish and sustain our own institutions, who would strengthen the growth of pure moral principles, and elevate the standard of the literary attainment, and intellectual development of our own sons—bone of our bone, and flesh of our flesh—count it not unworthy of their liberal patronage to sustain these periodicals, nor of their special, earnest efforts to extend their circulation as diffusively as possible.

The Construction and Use of Reaping Machines by the Romans.

[We are indebted to the research of that accomplished scholar and historian, PROFESSOR HOLMES, of the University of Virginia, for the following most interesting description of a Reaping Machine of such antiquity as to have been in use among the Romans, probably from near the commencement of the Christian era.

It was furnished more than a year ago in response to the request of Mr. Noland, of Albemarle, preferred to the Professor through a friend, and was by him transmitted to the late Editor of this paper for publication. It was accidentally mislaid, so that its recovery was not in time for its seasonable appearance last year. Through the kindness of Mr. Ruffin we are enabled to present it to our readers at this time, when the subject of Reapers is most likely to attract their notice.—EDITOR S. PLANTER.]

Charlottesville, April 15th, 1858.

DEAR SIR—In accordance with your request, I send you for communication to Mr. Noland, the interesting extract from Palladius, which proves that the Romans were acquainted with the Reaping Machines, and gives a satisfactory description of its construction and use.

The date at which Palladius lived and wrote is uncertain, but the most probable period assigned for the composition of the work on Agriculture, is the middle of the Fourth Century of the Christian era. As Palladius, however, was mainly a compiler, and borrowed largely from Varro, Columella, Gargilius Martialis, the agricultural authors employed and mentioned by the elder Pliny, and the Greek writers who furnished the materials subsequently incorporated into the Geoponica, the era of Palladius by no means determines the date of the inventions or processes specified by him. Thus, we might safely infer from the character of his work, without other evidence, that the Reaping Machine was not first introduced in his day, but had been transmitted to it from a previous age. But we are not left to conjecture. In the middle of the First Century after Christ, the same machine is briefly noticed in the Natural History of Pliny—and there may be reason to suspect that a similar implement is referred to by Varo, a century earlier, though Varo's statement is

so hurried and obscure as not to afford a safe foundation for any decided conclusion.

Before quoting and translating Palladius, I ought to mention that I have had so few opportunities of examining our various modern Reapers, and have, moreover, so little aptitude for understanding descriptions of machinery, even when written in English or specified in patents, that I may readily have misapprehended the import of some of the phrases employed by the ancient author. Any error of this sort will be rendered still more excusable when the corrupt Latinity of that day, and the uncastigated text of Palladius are taken into consideration. Still the description seems to me sufficiently intelligible to enable any good mechanic to manufacture a specimen according to the specifications given.

The following is the language of Palladius:

Pars Galliarum planior hoc compendio utitur ad metendum, et pæter hominum labores, unius bovis opera spatium totius messis absumit.

Fit itaque vehiculum, quod duabus rotis brevibus fertur. Hujus quadrata superficies tabulis munitur, quæ fornisecus reclines in summo reddant spatia largiora. Ab ejus fronti carpenti brevior est altitudo tabularum. Ibi denticuli plurimi ac rari ad spicarum mensuram constituuntur in ordinem, ad superiorem partem recurvi. A tergo vero ejusdem vehiculi duo brevissimi temones figurantur, velut amites vasternarum. Ibi vos capite in vehiculum verso jugo aptatur, et vinculis, mansuetus sane, qui non modum compulsoris excedat. Hic ubi vehiculum per messes cœpit impellere, omnis spica in carpentum denticulis comprehensa cumulatur, abruptis ac relictis paleis; altitudinem vel humilitatem plerumque bubulco moderante, qui sequitur. Et ita per paucos itus ac reditus brevi horarum spatio tota messis impletur.

Hoc campestribus locis vel æqualibus utile est, et in us quibus necessaria palea non habetur.

Palladius, De Ke Russica—JUNIUS.

In the level districts of the Gauls the following device is employed, and for the labour of men is substituted the service of one ox, which takes off the breadth of the whole harvest.

A carriage is made, and placed on two small wheels. The body of the machine is square, and protected with planks, which, leaning outwards, render the upper part wider than the lower. The planks in front are lowest. Here numerous pine teeth are arranged regularly, being proportioned to the growth of the grain, and bent backwards on the upper side. To the back of the vehicle two very short shafts are attached, like the poles of a litter. Then the ox is harnessed with the yoke and chains, his head being turned to the body of the machine. He must be gentle enough to be easily managed by his driver. When the machine is pushed through the grain every ear is seized by the teeth and collected in the wagon, the straw being broken off and left. The ox-driver, who follows, regulates from time to time the height at which the straw is cut. Thus, by a few traverses and returns, in the space of a few hours the whole reaping is accomplished.

This plan is expedient in level or smooth countries, and when it is not deemed necessary to save the straw.

To this description I add the passage in Pliny which shows that this Reaping Machine was known and used in the same regions three centuries before Palladius.

Galliarum latifundus valli prægrandes dentibus in margine infestis duabus rotis per segetem impelluntur, jumento in contrarium juncto. Ita direptæ in vallum cadunt spicæ.—*Plinius*, Nat. Hist., xviii. 72.

On the large estates of the Gauls huge boxes with teeth projecting from the front, and carried on two wheels, are pushed through the crop, the ox being attached behind. The ears, thus torn off, fall into the box.

The passage of Varro referred to, need not be quoted, but may be found.—*De Ke Rus.*, Lib. I., Cap. L.

I refrain from any comments on the description of this machine, as many considerations will readily suggest themselves from the inspection of the quotations—but will only observe that in several respects the ancient mode of construction seems to possess considerable advantages over its more complicated modern successors, especially in the manner in which the power is applied.

These indications will, I hope, prove sufficient to satisfy the reasonable curiosity of Mr. Noland.

I remain, very respectfully,
Your obd't serv't,
GEO. FREDERICK HOLMES.

DR. NELSON, *Charlottesville*, Albemarle Co., Va.

For the Southern Planter.

Tobacco----Not the Bane of Virginia Husbandry.

Having undertaken to reply to Gen. Cocke's articles, entitled "Tobacco, the Bane of Virginia Husbandry," it now devolves upon me to notice briefly the points presented in his contribution, No. 3, to your May number. I omit any farther argument against his position, that it is the most laborious of all crops, having previously admitted the labor involved, and justified it on the ground that this labor was at no time excessive, and that it was amply repaid by the value of the crop. . . . . Before proceeding to the discussion of graver issues, I must notice the emphatic charge of Gen. Cocke, that the planter, in consequence of tobacco absorbing all the manure, has frequently to submit to the heavy affliction of having "no greens to boil with his bacon," but fortunately, he says, "Divine Providence has kindly provided *poke, dandelion and peppergrass,*" on which *Nebudchadnezzar diet* the poor planter is compelled to graze for many weeks in the spring. Not being of *Dutch* extraction, I can only say in answer to this overwhelming argument, against tobacco, that a certain income is, to men in the condition of *this deponent*, of far more consequence than "greens," but if they cannot be dispensed with, there is no place in the world like a *tobacco plant bed* to insure a supply of cabbage plants, consequently, this is among the advantages of tobacco—it insures a supply of cabbages. The stinted household comforts, with which he charges this crop, are the result of bad management, and not tobacco. The premium lists of the Virginia Agricultural Society, will show a large proportion of premiums, for fine stock, awarded to planters, while I distinctly recall one instance, in which the Richmond Examiner (upon grounds which I did not think sufficient) alluded to the stock exhibited by a distinguished wheat grower, as apparently having been fed on "total abstinence principles." . . . . Gen'l Cocke charges that tobacco and grass are "irreconvertable antagonists." . . . . I claim that it is folly to sow grass seed on any land not left by the preceeding crop in fine tilth and good heart, and that tobacco, fulfilling these conditions, is the best preparation for grass, and insures a stand. . . . . It is usual for the planter, if he is a good manager, to make clover enough for his own consumption, and if he does not compete with the north, it is frequently because, remote from public routes, he is driven from the market by the cost of transportation. That hay and tobacco are not "irreconvertable antagonists," I refer to the fact, that Z. R. Lewis, and Henry Guant, on James River, secured, last summer, more hay than I have ever seen on the Bremo, or any other wheat estate on James River, and that the James River and Kanawha Company, last year, purchased their supplies of hay from a planter, who, in point of management, is among the least of that large body of intelligent agriculturists, whose vindication, for want of a better champion, I have attempted.

If northern hay is to be driven from our markets, why does not Tide-Water Virginia do it. She has no staple that interferes, and thousands of acres adapted to the purpose, and convenient to navigation, invite her to this profitable enterprize. As to the impoverishment of lower Virginia, claimed by Gen'l Cocke, to be the result of the cultivation of tobacco, many years since, it may be said, that much of that district was *born poor,* and that much has been exhausted by the improper cultivation of corn, to which latter crop is directly traceable nearly all the "gullies" that disfigure our State. . . . . Had its early settlers evinced the same zeal in the improvement of their soils, and the application of Ruffin's discovery, that they manifested in the pursuit of the fox and the enjoyments of social intercourse, that portion of the country would not be as sterile as Gen'l Cocke represents it to be, under a grain system, which has prevailed exclusively for many years past. . . . . Having previously considered the charge, that it is the "most exhausting of all crops," I will now only refer to the opinion of a distinguished French* writer, who declares "that tobacco, instead of exhausting the land, *improves* it like the artificial grasses;" and to the following direct testimony of Arthur Young, an authority which Gen'l Cocke will not dispute. Mr. Jefferson urged the substitution of wheat for tobacco, which is Gen'l Cocke's position. Arthur Young says, (see his agricultural tour through France,) "that as the exhausting character

*De l'Administration Provinciale, parell. le Trone, Tom. 1, p. 267.

of *wheat*, which is sufficient to reduce a soil almost to a *caput mortuum*, it is too well known, and too well described to allow any question at this late day, and how wheat is made to raise animals, we must go to America to learn, for just the contrary is found here. Tobacco (he continues) cannot demand an uncommon degree of heat, because it has been cultivated on 1000 acres in Scotland; and *as to its demanding too great exertion*, the free labor of Europe *voluntarily* addicts itself to its cultivation, which has in it nothing so laborious as cutting wheat. I take it, (says Arthur Young,) that the American case is this, *ill husbandry, not tobacco, exhausted the soil.*" There it is, in a nut shell, and the whole argument, which is too lengthy for an insertion here, is a complete vindication of tobacco from the charge, that it is necessarily exhausting. But Gen'l Cocke has, himself, made an admission fatal to his argument on this point, for in a note to his May number, he says, "it is admitted that tobacco-makers, by the improvements of modern culture and the introduction of guano, may *positively* improve their estates." These authorities settle this point, and it needs no farther discussion. . . . . Gen'l Cocke says his views "have been presented to the agricultural community as seeming to rest on the well known principles of rural economy." They are defensible on no such ground. Misery and ruin would be entailed on thousands, if he could succeed in suppressing this interest, the value of which is computed by millions. If he makes a personal appeal to any planter, to abandon tobacco, it devolves upon him to show what will supply his loss of income, but he has not yet done so. Every cultivator should consult the nature and disposition of his land, and at the same time properly estimate the nature and capacity of his labor, and proceed to the cultivation of the most profitable staple that presents itself, even if it is only to *make black-eyed peas.* Upon this principle the planter adheres to tobacco, for he has the experience of a century to prove that it is the natural and proper staple for his soil. . . . . Gen'l Cocke recommends, in lieu of the tobacco preparation for wheat, a difficult, expensive, and laborious system of fallow, which would be appropriate to not ten acres in a hundred, in the generally broken district of the country in which tobacco is grown. . . . . Suppose Gen'l Cocke was divested, for a series of years, of his magnificent river estate, and was condemned by inexorable necessity to the cultivation of one of a thousand broken and partially cleared farms, which is the description of many a planter's home. Let him be forced to cultivate this farm, overrun by sassafras and briars, without a capital and possibly in debt, with limited labor and with the claims of a large family, all of them to be supported and educated, I respectfully ask him, "what will he do with it," and it is a question upon which far graver issues hang, than have ever been evolved by Bulwer from the disposition of the lordly Darrell's domain. . . . . Thus situated, (and thousands of those whom he is now persuading to abandon the cultivation of tobacco have these difficulties,) how would he go about improving his land, and making a living at the same time? Would he introduce the drill and reaper on lands too steep to cultivate with a double team? Will he recommend guano, bone-dust, and lime, to a man unable to buy and glad to resort even to "poke dandelion and pepper grass," rather than lose valuable labor in making doubtful experiments? Will elaborate wheat fallows, prepared with $100 clod-crushers, be the system, where the land is so broken that the planter uses a ground-slide instead of a wagon, to keep from turning over? Must such a man spend his energies in the cultivation of crops not adapted to his farm, merely that he may have a better opportunity to lay in a supply of "greens and turnips?" No, let him discard all implements not suited to his land, let him stick to the grubbing-hoe and the coalter, and his "pepper grass" diet, if he can do no better, and in a few years he will be able to buy a better farm, when he can adopt some of the improvements, which are well enough in their place. How does the wheat substitute answer elsewhere? It is well known that no portion of our State is more indebted than the Valley of Virginia, in portions of which so disastrous have been the failure in crops, for several years past, that a call was made through the public press, invoking the assemblage of the Legislature, that a *stay* law might be passed and relieve its burdened population until better times. . . . . I am authorized by Mr. Mayo Cabell to state, that Mr. Thomas Nelson, who recently bought Benvenue, assigned as his reason for removing

from Clarke, (the banner county of Virginia,) that so uncertain and precarious was wheat culture, even on the fine lands of that county, that himself and sons had been constrained to remove to Eastern Virginia, and adopt the mixed system of farming. His fine estate in Clarke, valued at $45 per acre, only yielded 500 bushels of wheat, while here it is not uncommon for the planter to make from one to two hundred dollars to the hand from tobacco, and fine crops of corn, wheat and oats, besides. . . . . I now come to Gen'l Cocke's final argument, the example and experience of Mr. Richard Sampson. . . . . He says it is, probably, the strongest argument he has presented, and I answer it is no argument at all. . . . . When Gen'l Cocke has provided every planter with as good an estate as Richard Sampson's, (and he will have to go to the Mississippi to do it,) it will be time enough to put them on Mr. Sampson's system. . . . . It is claimed that Mr. Sampson is the most successful agriculturist in Virginia. I am informed that he laid the foundation of his fortune by making tobacco, and both himself and Gen'l Cocke have been judicious enough to expend the immense incomes derived from this source in the permanent improvement of their estates. . . . . But I have no hesitation in saying, that planters can be found in every county, who, taking capital, &c., into consideration, are doing as much for the improvement of their lands, and have been as successful as any wheat grower Gen'l Cocke can produce, himself included. Mr. Sampson says, "when he made tobacco, it took half the labour, and yielded but one fourth of the value of the other products." This is a most unfortunate remark for Gen'l Cocke, for what now becomes of his argument, that tobacco starves everything else. The whole drift of his argument has been to prove that if tobacco is cultivated, it must be done at the expense of other crops; and Mr. Sampson testifies, not that it prevented him from cutting other crops, but that at the time he abandoned it, it did not pay, which is very probable, inasmuch as tobacco, like all other staples, occasionally falls below the cost of cultivation. . . . . In conclusion, Mr. Editor, I must say that while Gen'l Cocke recommends a system very well adapted to wealthy farmers on valuable estates, I have sought in this discussion to promote the good of the greatest number, knowing that men of wealth can live under any system. I have appeared, reluctantly, as a contributor to your journal, for I claim no privilege, on the score of perfect practice, to instruct my agricultural brethren. What little local reputation I once had in farming, I lost when I abandoned tobacco and tried to make wheat my staple crop; and I am aware that I have been guilty of rashness in entering the lists with my respected opponent.

My parting advice is, don't quit tobacco until you get an "Alabama adjunct," for you will never get it by farming if you do.

J. B. McClelland.

May 13th, 1859.

Breadstuffs—War—Money.

The probable influence of the war upon American interests is a subject of continued anxiety in the commercial circles, and thus far the signs are of adverse effects. It is very early to judge of the crops, which both here and abroad, have but spread verdure upon fields, and have yet to encounter many vicissitudes before they can develope their extent and quality. On them depend, however, almost entirely the amount of benefit, or rather the extent of injury, which United States commerce is to suffer by the war that may involve all Europe in its vortex. The excitement that the food markets have thus far experienced is factitious. There are as yet no indications that for the present year, at all events, more food will be wanted in Europe than their own large crops will supply. The largest customer for foreign corn in peace or in war is, doubtless, England, and the price there depends upon the quantities which France and Europe generally can spare. This year those countries have a large surplus, and war operations for the present will only diminish that surplus, but there may be after all as much as will meet the wants of England. The prices everywhere are unusually low, but some speculative movement has raised prices in Great Britain 37c. per bush. at a season when prices usually rise, and from prices that have not been lower in ten years, and which are now far below the prices in New York. Under all these circumstances, there is little chance of any very large exports of breadstuffs and provisions from the United States for some months.

In order the better to estimate the exact effect of war upon prices and quantities of

food, we turn to Parliamentary tables, and take the actual prices at various points of Europe during the first 13 years of the present century, when every part of Europe was visited in turn by victorious troops. It will be observed that the effects were not what are supposed generally upon the value of food, as follows:

IMPORT OF GRAIN INTO GREAT BRITAIN.

	From United States.	Total from all ports.	Great Britain	France.	Boulogne.	Berlin.	Dantzic. Export.	Corunna.	Ancona.
	Qrs.	Qrs.	s. d.	s. d.	s.	s. d.	s. d. Qrs.	s.	s. d.
1800	77,609	1,264,520	66 11	50 5¼	37	39 1	73 9 439,271	22	40 11
1801	245,371	1,427,765	110 5	56 4	45	42 4	78 11 404,232	30	63 8
1802	79,413	647,663	115 11	62 4	16	47 2	53 5 563,472	23	85 2
1803	109,131	373,725	67 9	63 2	16	56 10	46 3 367,102	16	72 6
1804	4,258	461,139	57 1	49 2	35	56 6	53 3 449,210	26	54 5
1805	13,453	920,833	60 5	49 0	22	60 1	69 10 482,890	20	34 1
1806	79,763	310,342	87 1	49 6	17	77 6	58 6 63,145	15	40 3
1807	249,712	404,946	76 9	48 10	17	49 8	.. .. ..	18	38 9
1808	12,836	84,888	73 1	42 5	17	45 6	.. .. ..	17	30 2
1809	170,939	455,987	94 5	38 0	16	27 9	44 0 ..	16	29 0
1810	98,175	1,567,126	103 3	49 7	19	26 0	53 4 205.701	28	39 0
1811	18,011	336,130	92 5	67 1	23	38 8	36 3 46,053	28	54 0
1812	10,797	290,709	122 8	87 11	34	38 0	.. .. ..	28	54 0
1813	810	559.000	106 6	57 10	31	36 8	.. .. ..	23	38 0

It will be observed in this table that the prices in England were by far the highest, and that England was the only importer, except Spain, while she was the only nation exempt from war operations. She obtained a considerable portion of her supplies from the United States, until the embargo of 1810. In France, the price was the highest in 1804, when the Empire was inaugurated. At Berlin, the price was the highest in 1806, when the French were in possession. At Dantizir, the rates were low, and she did not cease to export, except in those years when the French sustained a siege in the city. In 1800, the year of Marengo, corn was lower at Ancona than in several succeeding years. It was highest in 1802 in time of peace, owing probably to the exports. At Corunna, in Spain, the prices are given in reals, or 5. per Ferrado of ½ bush., hence in 1801 wheat was about $3 per bush., but in 1808, when the French entered Spain, the price was only $1.70 per bush., and in 1809, when the English held Corunna and Sir John Moore's army was driven out, the price was only 16 reals, or $1.60 per bush. From that date, however, to the close of the war, it continued high. The quotations at Boulogne are in francs per hectolitre, of which three equal an English quarter of 8 bush. In the two years ending Sept., 1805, 200,000 French soldiers occupied the camp at Boulogne for the invasion of England. In Sept. of that year the camp was broken up and concentrated round Ulm to meet 500,000 Austrians, Russians, English, Neapolitans and Swedes. During the two years that Boulogne was occupied, the average of grain was 22½ francs per hetolitre, or 54s. per quarter. When the troops left the price fell to the former rate—about 36s. per quarter, but it will be observed that while the camp was at Boulogne the general average for France was less than before. It is to be further borne in mind that the means of communication in those days were less than now—land carriage was very difficult and by water impossible, except to England. At the present time all the Russian and Egyptian grain countries are open to French and English markets by steam. Spain, which was then an importer of grain, has now become an exporter of late years, and is not likely to be immediately disturbed by the war. The above war demand was mostly for England, not because of war but because of bad harvests. The other countries of Europe have greatly improved in numbers of people, agriculture and means of communication. It is probable that a war out of the limits of France will benefit her agriculture more than that of the United States. In the meantime, the price of cotton declines rapidly under the

war news, thus diminishing the character and aggregate of cotton bills. The disposition is also abroad to keep as much money in hand as possible, to take advantage of contingencies that may arise, and also to provide against unforeseen events. There are no investments in American stocks, but, on the other hand, quantities come out to be sold and the gold remitted home. The usual remittances of interest and dividends find no offset in funds for investment. The imports of goods are large, and the expenditure for travellers abroad is unusually large. Under these circumstances the export of gold for the first two weeks in May has been $4,500-000, and for the month the amount will not be much under $10,000,000. For the moment a new demand for gold is developed in the chance of a much larger number of immigrants to arrive. These persons come down to Havre, Antwerp, Bremen, and Hamburg, from all parts of Germany, with funds each of their own districts. Formerly, they brought that specie with them and sold it in the interior on their arrival in New York. It is now the case, however, that they are supplied with American coins at the place of their departure, hence among the late exports of gold have been considerable quantities of $10 pieces, or Eagles. Bars and $20 pieces are not very available for the emigrants, but the $10 pieces are very convenient. It is of course the case that all such pieces so sent abroad return in the pockets of the immigrants, and are expended here to some extent, but they are also carried into the interior and hoarded for a time. This now forms one element of the present export of gold, and it is not at all improbable that the number of arrivals will be very large—flying from the present horrors of war, with prospective ones of famine, which usually follows war. A great deal of gold will doubtless be wanted for army uses. The late elder Rothschild, in his evidence before the Bank Committee, stated that the last war of Russia upon Poland in 1830 produced an active demand for gold for the military chests. It is less heavy than silver, and therefore more available for that purpose, and "price is no object for such purposes—if 5 per cent. won't command it, 10 per cent. will." That was but a little war. France, Italy, Austria, Germany, and Russia, now all join in a demand for that purpose, and while every prudent banker and merchant increases his reserve of specie to the extent of his ability, all inhabitants of the probable theatres of war hoard money for the same reason. All these circumstances tend to produce scarcity of money, to send goods and securities to this country in or to realize the metals. The price of cotton has fallen, under the war news, but it does not appear to be a well-founded reason, judging from the past. Since the wars of the early part of the century the import of neither cotton nor wool into Great Britain was in any degree checked; on the other hand, the import of cotton which had been 9 million lb. in 1800, rose year by year to 93 million lb. in 1610, and the import of wool in the same period rose from 5 to 11 million lb. Notwithstanding the Continental system, those goods forced their way to the Continent, and redressed the exchanges against the large subsidies sent to the different Allies of England.

If we are guided by these facts of history, in addition to the more recent experience of the Crimean war, we shall come to the conclusion that the benefits to be derived by war have been exaggerated. There is little room to look for any increased business for ships or exporters, as a consequence of the calamities of Europe, but on the other hand, partly by reason of our loss of credit, we shall feel the influence of the demand for money which actuates governments, bankers and merchants at such a crisis.

United States Economist.

For the Southern Planter.

Frog Showers.

WASHINGTON CITY, May 18, 1859.

Sir,—In the Southern Planter for the month, you have an article on the "Cause of Frog Showers," extracted from Buckland's Curiosities of Natural History. The author treats the idea of the frogs coming down from the clouds, with ridicule and suggests that having been "hatched and quitted the tadpole state and their pond at the same time, days before they become visible to, or rather observed by, mortal eye, &c., they wisely retreated to the coolest and dampest places they could find, viz: under clods and stones, where, on account of their dusky color they escape notice. Down comes the rain, and out comes the frogs, pleased with the change," &c.

It is the fault of scientific men in dressing up suppositions, to give such rein to

their imagination, that the simplest facts of nature are very frequently left out of view, from a wish to avoid what at the first sight appears to be a difficulty or superstition—and thus a still greater extravagance is *imagined* than the error to be combatted.

In the matter before us, we have an instance in point; and although I shall not pretend to show how the frogs get to the particular spot after a shower, I think I can show that Dr. B.'s theory is fallacious.

Some years ago, I happened to be in Edinburgh, (Scotland,) and while walking, one summers' evening, along the London road, having come to a gentle turn beyond the high school, found myself at the summit of a hill, the road descending in a straight line to the Piershill Barracks for about half a mile. At this point I observed a shower pass across the road, a short distance in front of me, wetting it for one or two hundred feet in width pretty thoroughly. On reaching the spot, I was surprised to find it covered with young frogs about the size of a finger-nail, and as I am curious in regard to natural phenomena, I commenced an examination into the matter as far as I could, with a view to satisfy my own mind as to whether the frogs could have been hatched on or near the spot, or had descended with the shower. I was rather loth to believe the latter, and like Dr. B. would willingly start from *terra firma* for a foundation to build a fact upon.

But, on the right hand side of the road was a high garden wall, and at some distance down was an iron gate leading into the grounds of a private residence; on the left a rough stone wall about four feet high, and beyond a plowed field. There was not a stone or pebble about the road, under which tadpoles could hide.* There was not a pond to be found on the hill—and the garden to the right, and the field to the left in the track of the shower, were covered by young frogs. Could these tadpoles, when just hatched, have travelled over field and road and garden? Could they have passed over walls four feet and six feet high? Could they have gone round by the gate to spread themselves exactly in the track of the shower, or a hundred yards down the road to the left to reach by another field or two the one in question?

The frogs seemed stunned or stupid, and it was hardly possible to walk without treading on them. If they had that moment come to life, or a higher existence, would they not have been very active?

Now, sir, we have some very remarkable facts on record, and admitted by naturalists, in regard to the transportation through the air of heavy bodies—why then a difficulty here? I cannot explain the phenomena of which I was an eye witness without coming to the conclusion that the shower had more to do with their dispersion in its track than Dr. B. would have us believe. For, there were no cool places in the road for them to hide away in tadpole state for any length of time or any time at all—there was no pond near, nor that had been dried up—there were two walls over which tadpoles could not climb—and therefore, unless we go to the extravagant conclusion that the *whole* country had been covered previously by tadpoles, which had wandered from some distant pond, we must give she shower credit for more than wetting the frogs into existence.

C.

* Mr. Buckland is misapprehended by C., if he supposes that author meant to alledge that *tadpoles* could hide themselves under stones, &c. He says "the animals," (young frogs) "have been hatched and *quitted their tadpole state* and their pond at the same time," &c.

Editor S. Planter.

Fruit Trees.

Summer pruning, or pinching the points of young shoots, seems not to be so thoroughly understood as its importance demands. It is not too much to assert that the highest degree of cultivation cannot be reached, until its importance and necessity is fully comprehended and recognized. The whole aim of pruning is to modify and direct growth so as to render it subservient to the wishes of the cultivator. At no time can this be more readily attained than during the season of growth. It is much easier to prevent a shoot from growing now where it is not wanted, than to cut it off after growth is completed, just as it is easier to rub off a bud than cut off a branch. We allude to established trees. It would be well for all cultivators to study this matter practically. Especially is it desirable that a practice should not be condemned, in the absence of knowledge as to the proper applications of the principles upon which it is founded.

From Patent Office Report, 1857.

Adaptation of the Mountain Regions of the South to Sheep Husbandry.

BY GEORGE C. PATTERSON, OF ROGERSVILLE, HAWKINS COUNTY, TENN.

The opinion, which has heretofore generally prevailed, that the northern portions of the United States are better adapted to the purposes of sheep-farming than the southern, is gradually being removed by successful experiments, showing not only that this impression is founded in error, but establishing, conclusively, the converse of the proposition; that is, that, in all the essentials for profitable sheep-farming, a large portion of the Southern States possesses advantages incomparably superior to those presented by territory further north.

Beginning at or near a point on the 39th degree of north latitude, 150 miles from the Atlantic coast, and proceeding in a southwestward direction, as far down as the 34th degree, we find an expanse of country embracing about 180,000 square miles, the geological and climatological characteristics of which give to it advantages for sheep husbandry unequalled in any other portion of the United States, of the same extent.

This area of, say, 600 miles in length by 300 in width, includes large portions of Virginia and Tennessee, with considerable parts of Kentucky, North Carolina, Georgia, and Alabama, and a small portion of South Carolina and Mississippi.

The natural configuration of this vast region is not the least of the many desirable advantages it presents. It is situated many hundred feet above tide-water, fanned by the purest atmosphere, and supplied with innumerable salubrious streams. Having a high and dry range, so conducive to the healthfulness of sheep, and presenting a succession of mountain and valley, it affords the most ample defence against the heat of summer, as well as the bleak winds of winter. Artificial protection, indispensable at the North, yet so apt to induce disease, is thus rendered unnecessary in this more favored situation.

These valleys, or mountain gorges, are most prolific in a variety of herbage suitable for sheep, and, during winter, they afford a supply of pasturage so abundant that very little additional food is required. Especially is this the case when a portion of the range is reserved for the winter season, which is the proper course. Hence, the sheep have access to a continuous supply of green food, by which the secretory organs are retained in full action, and an uninterrupted growth of wool is promoted; while cases of constipation, frequently fatal at the North, by reason of sudden changes from green to dry food, are unknown here, there being scarcely a day in the year in which sheep cannot find sufficient green food to keep their digestive organs in healthy condition.

Many of the more elevated portions of this region are so naturally disposed to grass that it is only necessary to clear out the undergrowth—which can be done at an expense of about $2 per acre—when the indigenous grasses, such as Timothy, bluegrass, white clover, &c., will immediately spring up and take possession of the land. There are few ranges of any extent that do not furnish ample quantities of arable land for all the purposes of the sheep-farmer; and they frequently include a fair proportion of excellent meadow land. The soil in this region is generally good, and it is by no means uncommon to find it fertile even to the tops of the mountains; and although there are to be found considerable bodies of thin soil, yet even these are more disposed to the production of grass than lands of a better quality further south.

This thin soil is generally of loose texture, and, therefore, liable to be washed off by rains, unless appropriated to grass. The common sedge is the kind usually found upon it. When this is burned off, in early spring, a luxuriant range is afforded for sheep during the summer. It is not advisable precipitately to substitute the cultivated grasses on this land, since it is not capable of growing them successfully. By burning off the dry and decaying growth of the previous year, when its accumulation interferes with a succeeding growth, and close depasturing for a few years, the sedge will gradually give way to the more valuable grasses. It is well known to all sheep-farmers that, when lands are freely pastured by sheep, their capacity for producing grass is much assisted, as by close grazing the more useless grasses, briars, &c., are subdued, and the desirable descriptions allowed to strengthen their hold, and this, together with the tramping of the land and the droppings of the sheep, induces a more dense sward.

The "Randall Grass," said to have been discovered in one of the western counties of Virginia, promises to be the most valuable for sheep-grazing in the regions spoken of. From the many experiments resulting from the distribution of the seeds of this grass through much of Virginia and Tennessee, it seems to have met with universal favor. In character and growth, it closely resembles orchard-grass, but is more tenacious of life, flourishing under the most unfavorable treatment, and resisting the intrusion of sedge and other inferior grasses. It has a more profuse foliage than the orchard-grass, and a more slender and soft stem; it will retain its green color during the severest weather of winter, and exhibit an earlier growth in the spring than other grasses known in this region.

A comparative statement of the expense of maintaining sheep at the North and in this Southern country will exhibit the decided superiority of the latter, and materially assist us in forming correct conclusions. If we examine the various communications on this subject, contained in the Agricultural Reports of the Patent Office, we shall find the average expense of wintering sheep at the North to be about $1 25 per head, while in the region herein treated of it does not exceed 25 cents, or one-fifth the above amount; and in most winters, when the snow does not lie more than a day or two at a time, the cost of wintering is hardly worth computing. This difference in the expense of maintaining a flock is considerably widened when we contrast the value of lands in the respective districts. Those at the North, we may safely place at an average price of $20 per acre, while in the Southern region any quantity of lands suitable for sheep-walks can be purchased at an average of $1, and many large tracts at half that price, or even less; thus affording decided advantages to persons of small capital.

That the climate of the Northern States is more favorable to the growth of fine wool than the region to which I refer, repeated experiments are disproving. Although it is an admitted law of Nature that the covering of an animal will adapt itself in a great degree to the climate in which it abides, yet this does not prove that fine wool cannot be grown in a warm climate any more than that fine furs or fine feathers cannot be found there; for many animals, bearing the finest quality of furs, inhabit the most southern borders of our country, such as the beaver, otter, muskrat, and flying squirrel, and may be classed among the finest fur-producing animals; they are all found in Texas, as well as in the Canadas. The Merino sheep has been bred for ages as far south as the 36th degree of north latitude, in Asia; and we are informed by eminent writers on the subject that there is no perceptible difference in the fineness of their fleece from that of the flocks of Europe; and we have the testimony of the head of the great Lowell Manufacturing Company, who has purchased extensively from all parts of the United States, that "wherever there are good shepherds there is sure to be found good wool." The veritable samples of wool grown by an eminent sheep-farmer of Tennessee, (Mr. Cockrill,) are said to have exceeded in fineness those selected by an agent of our government from the best flocks of Europe; and this gentleman attributes its superior quality to the climate of that region, although it was grown nearly two degrees south of the scope of country of which I am treating, and not in the true grass region. Whether Mr. Cockrill is correct or not in his opinion, the fact is incontrovertible that the climate has worked no deterioration in the quality of the wool in the many years he has given wool-growing his attention. But whatever difference of opinion may exist on this subject, it is established beyond doubt that wool grown in a warm climate has a longer and softer fibre than that produced in the colder countries, although there may be no difference in the fineness of either; and the manufacturer will give a decided preference to the longer and softer staple.

Since the introduction of the Saxon sheep at the North, it is found that they are not capable of resisting the severity of that climate, and the breeding of them is abandoned as unprofitable; but it is reasonable to conclude that this most valuable variety of fine-woolled sheep, before long, will find its fixed place of habitation in the more congenial climate of the South.

There are but few wolves in this region, and as they commit their depredations only at night, all danger from them may be obviated by penning the flocks at such time, when they will also be secure from the attacks of curs, which are unfortunately but too plentiful in this wild and uncultivated region.

For the Southern Planter.

On the Culture of Tobacco.

OAKLAND, *Stafford Co., Virginia,*
May 30th, 1859.

Mr. Editor,—I have read with interest
e articles written for your valuable "Plan-
," by the parties pro and con, on the cul-
ation of Tobacco. I am a young farmer
l of course respect the opinions of farm-
of experience, yet when there are two
nions as to the cultivation of any crop,
take one as the best, until our own expe-
nce confirms it or proves it otherwise. I
cultivating tobacco, and naturally side
h the writer in favor of its culture, deem-
it, from my little experience, not only a
sent-paying crop, but as the best mode of
tivating our lands so as to produce, by
per rotation of crops, the largest yield in
ure. We know that tobacco requires rich
d, and to be thoroughly cultivated, so we
constrained to make all the manure we
possibly, and prevent any waste, to en-
"the tobacco lot," then the land is put
finer tilth than for any other crop and
d work always repays, and the cultiva-
of the plant is so thorough, that after
plants are cut, the land is in the best
ible condition for wheat, upon which
er or any grass being seeded, you are
to get a good stand of grass, thus keep-
your land in an improving condition in-
d of exhausting it.

f a farmer choose to expend everything
he shape of manures, labor, &c., on his
cco crop, that is not to be laid to the
ge of the crop, but to the want of ex-
ence, or the proper system of farming
he part of the farmer. This is an age
rogress in the sciences and arts, and in
more so than in mechanism. The im-
ements in our numerous and varied ag-
tural implements, enable the farmer of
present day to perform double the work
in better manner, with the same force,
formerly, when the one-kind plough
almighty-hoe, were the sole dependence
he farmer, so that the tobacco crop now
t the "Bane of Husbandry" of former
s. Some of the reasons adduced by the
r against tobacco are true and forcible,
a laborious and pressing crop, more so
any other crop in proportion to quanti-
land in cultivation, but does any other
pay a like return? And does not any
g crop require much labor and care?

The crop is not of necessity kept on hand so long as has been stated, for we generally plant from the latter part of May to the 1st of July, and it can easily be bulked down, stripped and prized for market by March or April, and not be in the way of the next crop, or of planting corn. My overseer, who has also read the articles by the two parties, pro and con, and who is a warm advocate for the cultivation of tobacco, has handed me the following as his mode of cultivating my crop and wishes it sent to your magazine.

1st. comes the "Plant Bed."

"For this, select a low, moist place, not wet or springy, and if possible lying to the South and protected on the North and West. If there be growth on it, cut it off and rake the ground clear, then pile on brush, say from three to four feet high, and burn it well and regularly over the bed, then hoe it up directly some three or four inches deep, cut all the roots up clear and rake them off, (a coulter may be used to advantage,) next lay off lands three feet wide, as in wheat; take a table-spoonfull of seed for every hundred square yards, and mix them with a sufficient quantity of fine, dry ashes, so as to enable you to sow the seed more regularly, (it is best to sow over the bed once, and then sow back on it again in reverse) and then trample it in with the feet. If the winter be a hard one, cover directly with open brush, but if of moderate degree, cover up the beds just as the plants come up, and let it remain until frost has well gone, then uncover. Don't use pine or cedar brush, as it renders the plants too sensitive to cold or frost. Guano can be used either when seeding or after the plants are up, it is best to top-dress your plants soon after your plants begin to grow. Should the fly appear, give them a dressing with dry ashes and guano mixed; it acts well, and forces the plants out of the power of the fly.

2nd. The preparation of the land.

If it be a fallow, plow it up in December, or certainly in the early part of the winter, so that the freezing and thawing may mellow the land, and prevent the cut-worm, which would prove very injurious; plow deep and turn the furrow-slice well, then in the spring put on your manure and turn it in, but not deep enough to turn up the old sod, next harrow well and throw up into lists of three feet wide, and chop the hill two and a half feet on the bed. The time for plant-

ing is as early as the ground is sufficiently warm and no danger of frost, (the deadly enemy of tobacco,) and when the land is moist, or still better, during a rain if it be not a driving one.

3d. The working of the crop.

As soon as you find the plant has begun to grow, cut down round the plant slightly and then run the side-wipes, next run a single horse-plow and throw the dirt from the plant, next reverse and throw the dirt to the plant. Work it whenever it requires it. After we work it the last time, we begin to prime and top; prime it nigh enough to prevent the rains from bespattering the plant with sand. We begin to top in July and top the first to ten leaves; in August to eight, and afterwards to six. When ripe, cut it and let it lay in the row until well fallen and then remove it to the outer edge of the field and slightly cover it to prevent the sun from burning it, from thence haul it to your scaffold at the tobacco-house, hang from seven to ten plants according to size on sticks, four and a half feet long, and place them on the scaffold as close together as possible for four or five days until they become a mottled yellow, then separate to ten or twelve inches apart, and hang for four or five days more.

4th. The housing, curing and stripping, &c.

It is taken from the scaffold to the House, and the sticks hung from eight to ten inches apart. When it has hung long enough for the little fibres of the leaf to crack, you can then begin to make your first bulk ready for stripping, it must be bulked down when coming "in case" and not when going out "of case." Should the floor of the house be damp or the tobacco mould from long spells of damp or rainy weather, use a little fire of hard wood or charcoal and then cover the floor with straw. It should be assorted and stripped and tied into bundles of six to eight leaves, and the heads wrapped smoothly and the leaves all of the same length in each bundle. After stripping, rehang it, it is afterwards bulked down for prizing, not so high as for stripping. It should be done by a careful hand; it is then prized and marketed at the owner's pleasure."

The above is our plan. We do not claim any originality, but only give you our method by which my crop has been worked with perfectly green hands, and have not found it "the bane of farming."

Tobacco was cultivated in this country many years ago, but, on the price falling, it has not been cultivated but by very few, and only on a small scale until now, many are beginning to cultivate it in my neighborhood. Old Stafford is waking up from her long slumber, and is endeavoring to throw off the stigma of her poor and badly cultivated lands. The yield of wheat, corn, tobacco, &c., bear a fair comparison with some of our richest countries in the State; the the lands are being sold rapidly to new parties, are worked much better and are rapidly improving both in productiveness and value. Rich fields of wheat and clover now greet the eye where sheep-sorrel, hen-grass and water-weeds and craw-fish holes once had possession. Our wheat crop this season is so far a fine one, but the joint-worm has attacked it in the last week and is doing serious injury; our corn has come up finely and growing rapidly; most of our tobacco was set out during last week's rainy spell, and nearly every one seems to be alive and budding out. Some of our fruit was killed by the late frosts, but we will have a fair quantity still. My garden is one of the finest I have seen and paying me well for my outlay in actual money, to say nothing of the pleasure and other benefits derived from it; work it on the "high pressure" system and succeed well. Our valley is up and doing and presents to the eye of the passerby a rich and beautiful sight.

Wishing your valuable "Planter" in the hands of every farmer, and your pocket filled with its subscription price,

I remain, respectfully,

"POTOMAC VALLEY."

Small Pens for Fattening Pigs.

This is a matter of much more importance than might appear at first glance. Our attention has been called to it by an uneasy frisky sow, that we had occasion to purchase in September. She had enjoyed the run of a pasture during the summer, and was thin in flesh. We put her into a large pen, about twelve by thirty feet, and though she had fattening food in abundance, she kept constantly upon the move, that the food seemed to help her very little. She had a comfortable, dry sleeping apartment, with plenty of hay, but if she slept well by night there was no rest by day. After seven weeks of this regimen, we yarded off a coy.

er of the pen, making it about eight feet quare. Her errant propensities were cured once, she takes her rations with decided usto, and sleeps well between meals. There as a rapid increase of flesh and fat soon ter the close yarding.

From observations extending over a dozen ears or more, made in villages and in the ral districts, we have noticed that the ttest and best pork is make in the former, here one or two pigs are usually kept in a hall pen. The villager has but a small om, and crowds his pig into narrow quarrs for the whole year. It is fed on slops r eight months, and for the last four is ammed with scalded Indian meal. He ts pork of decidedly better quality than can purchase, and gets it cheaper. The hole energy of the animal is forced, by his ining, into the production of flesh and t.

The pigs of the farmer, on the other nd, run in a pasture, or on the common, six or eight months, and are shut up, a zen or more, in a large pen to fatten, beuse he has plenty of room. The energy the animal has gone very much to the velopment of snout and feet, and the pronsity to run and to root is not circumribed very much in his roomy pen. By ristmas he is not more than two-thirds tened, and he has consumed quite as ich as the village pig, which is ready for knife. We have two yearling pigs, od for four hundred and fifty pounds of rk by Christmas, that have never been t of a pen, eight feet by twelve, since y were eight weeks old. Small pens, pt dry, and regular feeding, is the secret their thrift.—*American Agriculturist.*

Education.

If I were to reduce to a single maxim concentrated wisdom of the world on the ject of practical education, I should but nciate a proposition which I fear, is not orporated as it should be into the practice schools and families. That principle is, t in educating the young, you serve them st effectually, not by what you do for m, but what you teach them to do for mselves. The popular opinion seems to that education is putting something into mind of a child, by exercising merely power of receptivity, its memory. I say . The great principle on which a child should be educated, is not that of reception, but rather that of action, and it will ever remain uneducated, in the highest sense, so long as its higher mental powers remain inert. It was well said by the eminent Dr. Mason, "Let the aim of education be to convert the mind into a living fountain, and not a reservoir." That which is filled by merely pumping in, will be emptied by pumping out.

Renovation of the Peach Tree.—The Editor of the New England Farmer says that a gentleman residing in Cambridge informs him that charcoal placed around the roots of diseased peach trees was valuable. He immediately removed the soil from around the trunk of a sickly tree in the garden, supplied its place with charcoal, and was surprised at its sudden renovation and subsequent rapidity of its growth, and the tenacity with which the fruit held on the branches and the unusual richness of its flavor when matured.

White Wash for Fences.—One ounce of white vitriol (sulphate of zinc,) and three ounces of common salt, to every three or four pounds of good fresh lime, will render it durable where it is exposed to the weather.

Receipts from a Lady.

A lady friend has sent us the following receipts for making lemon pies and French honey, which we publish with great pleasure in the *Telegraph:*

Lemon Pie.—The juice and rind of one lemon; one cup of water; one tablespoonful of corn starch; one cup of sugar; one egg, and a piece of butter the size of a small egg, for one pie. Boil the water; wet the corn starch with a little cold water; stir it in until it boils up; pour it upon the butter and sugar; after it cools, add the egg and lemon, and bake with an upper and lower crust.

French Honey.—One pound of white sugar · six eggs, leaving out the whites of two; the juice of three or four lemons, and the grated rind of two, and a quarter of a pound of butter. Stir over a slow fire until it is about the consistency of honey.

Silver and Silver-Plated Articles.

The readiest mode of cleaning these articles is to wipe them over with a weak solution of liquid ammonia. This readily removes the sulphide, and no rubbing, or scarcely any is required—the same agent will be found useful in cleaning gold chains and jewelry.

Human Grief.

The sharpest thorn protects the sweetest rose,
The sweetest rose is sweeter crushed,
On darkest clouds the brightest stars repose,
And music's softest strains in cat'racts hush'd.

Its precious juice the *trodden wine-press* yields;
The udder *pressed*, its pleasant food;
Rich harvests in *deeply furrow'd* fields;
The *smitten* rock pours out the colling flood.

Our human griefs, not always wisely felt,
Than joys, are often more our friends;
The dross abides in hearts that never melt;
To tears the rainbow oft its radiance lends.

Prophetic Hope illumes the gloom of grief;
The furrowed heart *its* harvests bears;
The angel reapers gather in the sheaf
Of golden grain, grown in the field of cares.

O weeper! on the weary way of life,
Look on thy suffering CHRIST, and SING!
A moment more of sorrow and of strife,
And thou art garnered from the winnowing!

Childhood.

Childhood, sweet and sunny childhood,
With its careless, thoughtless air,
Like the verdant, tangled wildwood,
Wants the training hand of care.

See it springing all around us—
Glad to know, and quick to learn;
Asking questions that confound us;
Teaching lessons in its turn.

Who loves not its joyous revel,
Leaping lightly on the lawn,
Up the knoll, along the level,
Free and graceful as a fawn!

Let it revel; it is nature
Giving to the little dears
Strength of limb, and healthful features,
For the toil of coming years.

He who checks a child with terror,
Stops its play and stills its song,
Not alone commits an error,
But a great and moral wrong.

Give it play, and never fear it—
Active life is no defect;
Never, never, break its spirit—
Curb it only to direct.

Would you dam the flowing river,
Thinking it would cease to flow?
Onward it must go forever—
Better teach it where to go.

Childhood is a fountain welling;
Trace its channel in the sand,
And its currents, spreading, swelling,
Will revive the withered land.

Childhood is the vernal season;
Trim and train the tender shoot;
Love is to the coming reason
As the blossom to the fruit.

Tender twigs are bent and folded—
Art to nature beauty lends;
Childhood easily is moulded;
Manhood breaks, but seldom bends.

DAVID BATES.

One by One.

One by one the sands are flowing,
One by one the moments fall;
Some are coming, some are going,
Do not strive to grasp them all.

One by one thy duties wait thee,
Let thy whole strength go to each,
Let no future dreams elate thee,
Learn thou first what these can teach.

One by one (bright gifts from Heaven)
Joys are sent thee here below;
Take them readily when given,
Ready too to let them go.

One by one thy griefs shall meet thee,
Do not fear an armed band;
One will fade as others greet thee,
Shadows passing through the land.

Do not look at life's long sorrow;
See how small each moment's pain;
God will help thee for to-morrow,
Every day begin again.

Every hour that flects so slowly
Has its task to do or bear;
Luminous the crown, and holy,
If thou set each gem with care.

Do not linger with regretting,
Or for passing hours despond;
Nor, the daily toil forgetting,
Look too eagerly beyond.

Hours are golden links, God's token,
Reaching Heaven; but one by one
Take them, lest the chain be broken
Ere the pilgrimage be done.

r WLE & CO.,

ALEXANDRIA, VA.,

IMPORTERS AND DEALERS IN ALL KINDS OF

FERTILIZERS,

Have received their SPRING SUPPLIES, and offer for sale—

No. 1 PERUVIAN GUANO,

t up in bags, furnished and branded by the Agents of the Peruvian Government.

COLUMBIAN GUANO,

bags and barrels, a very excellent Manure, rich in Phosphates, as will appear from annexed alysis by Dr. R. H. Stabler.

ganic Matter, yielding Ammonia	14.55
ater	8.55
osphate of Lime	60.88
agnesia	.10
nd and other insoluble matter	15.92
	100

SOMBRERO GUANO.

In calling the attention of the public to the recently discovered deposit of this valuable ferti-er, we will merely state, that like all other phosphatic GUANOS, its most valuable constituent phosphoric acid, or bone phosphate of lime; and that its mercantile value as compared with ier GUANOS of its kind, may be easily determined by the amount of phosphoric acid or bone osphate of lime it contains. In order, therefore, to give the public a thorough knowledge of hat SOMBRERO GUANO does contain, we beg to refer to the following list of eminent chemists different parts of the world, who have analyzed different cargoes, from average samples taken themselves from the cargoes just as they arrived from the island, without drying or selection specimens for analyzation. Each analysis will be exhibited, if required, under the original nature of each chemist named.

Of phosphoric acid, estimated as equivalent to phosphate of lime, it is found to contain—

			per cent.		per cent.
Prof. Morfit, of New York,			79.70	By Prof. Maupin & Tuttle, University of Va.,	85.16
" Piggot, Baltimore,			79.31	" Gilham, of Virginia Military Institute,	81.
" Hayes, Boston,	of 1st sample,		89.60		
" " "	2d	"	89.20	" Stabler, Alexandria, Va.,	79.
" Reese, Baltimore,	1st	"	85.14	" Booth, Garrett & Camac's (Philadelphia,) analysis of three cargoes.	80.
" " "	2d	"	86.60		
" " "	3d	"	72.04	" Way, London,	71.
" " "	4th	"	72.04	" Nesbit, "	79.
" Chilton, New York,	1st	"	86.34	" Voeleker, Royal Agricultural College, England,	75.
" " "	2d	"	84.94		
" Piggot, Baltimore,	1st	"	76.85	" Leudet, Havre, France,	78.
" Huson, Liverpool, Eng.			80.20	" Kindt & Toel, Government Chemists, Bremen,	78.
" Deck, New York,	1st	"	88.00		
" " (of a selected specimen)			98.25	" Johnson, Yale College,	80.25

Thus proving that the value of this GUANO is not determined by a SELECTED CHEMIST, or SELEC- SPECIMENS, or even SELECTED CARGOES, but an average of the inportations just as they arrive, l just as they are offered to the public for sale.

And for a like array of eminent authority, promiscuously obtained from promiscuous cargoes, in ferent parts of the world, we challenge a comparison with any phosphatic GUANO now for sale.

A. A. & A. MEXICAN GUANO, in barrels.

BONE DUST, of best quality, in barrels.

SUP. PHOSPHATE OF LIME,

nufactured by POTTS & KLETT. and COE & CO., warranted equal to any ever offered to the ming community.

nalysis by Dr. R. H. Stabler.

able Phosphate of Lime	37.00
phuric Acid	11.00
anic Matter	29.10
ter	22.90
	100

p '59—3t