VOL. XIX. [JULY.] No. 7.

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.

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RICHMOND, February, 1859.

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., JULY, 1859. No. .

For the Southern Planter.

Guano Controversy.

MR. EDITOR:

I am at a loss for a "caption" to this article, that will designate my subject at present, and still bear some relation to the original inquiry, out of which these collaterals have sprung. One would scarcely suppose from the points now under discussion between your correspondent "B." and myself that the discussion had its beginning in an inquiry into the "Stimulating properties of Guano;" and yet the connection is natural, inasmuch as its operation for good or evil depends in a great degree upon the susceptibilities of vegetables to these unwonted effects. And thus we are led off into a physiological discussion concerning the susceptibilities of plants, and as susceptibilities imply functions and functions organs, it brings us directly to the question, Do plants possess an organization analagous to the nervous system of animals?

Says "B.," "I have not asserted that there exist an organized nervous system, but such susceptibilities as sustain to the vegetable, a relation similar to that of a nervous system to animals." The meaning we extract from the foregoing sentence is, that plants either possess a nervous apparatus or some organized structure whose functions bear a certain relation to the functions of a nervous system: for what he calls susceptibilities must be the properties or functions of some organ from which it derives its susceptibilities.

Now, if he hesitates about calling it a nervous system, we must call upon him for a name for this new structure in the anatomy and conformation of plants, and then to demonstrate its functions and show us its relations to this system in animals.

In the meantime, we will endeavour to show that plants do not possess certain functions or properties that are possessed by all animals, in greater or less degree, and that are universally referred by all physiologists to an organized system of nerves, viz: sensation and locomotion. "B." stated in syllogestic form in a previous communication, that as some animals do not possess locomotion, they, too, must be destitute of nerves; but we deny the fact that there are any animals totally destitute of either of these functions. We are ready to admit that they are very feeble and of the lowest order, but that they are *totally absent* no physiologist has ever asserted. In the higher orders of animal existence, both the functions and their organs are so palpable as to be readily demonstrated, and always bearing the

relation to each other of cause and effect; so that in the oyster and zoophytes, and other specimens of feeble animal existence, where the nervous system is too rudimental to be demonstrated, we have a perfect right to infer its existence from the presence of its functions.

Now, what evidence is there that plants possess either sensation or locomotion? I believe it has never been asserted that they have the least pretension to locomotion, (except by the learned and distinguished physiologist from whom "B." quotes, and to whom we will refer again;) and as locomotion and sensation go hand in hand, and always co-exist in the relation of cause and effect; in the absence of the one there is no need of the other, and in the absence of both there is no need of the organization that produces and presides over them. Had Nature endowed plants with such organs and functions, she, in all probability, would have made them to stand out in the same bold relief in the one kingdom as in the other. In all other respects she has constructed plants with their organs and functions as conspicuous as those of the animal kingdom. As animals were certainly designed for one purpose and vegetables for another, why can we not accept these higher attributes of sensation and locomotion as the distinguishing characteristic—the beginning, at least, of a separation of the animal from the vegetable kingdom. To answer the ends of vegetable life, there is no need of such functions or such organs, whilst they are indispensable to animal existence. Every motion in the animal organism proceeds from the nervous apparatus. The phenomena of motion in the vegetable, as the circulation of the sap, and the closing of leaves and flowers, depend on physical and mechanical laws. Heat and light are the remote causes of motion in vegetables, their growth and development, and also the assimilation of their food, being dependent upon external circumstances and influences which produce motion. There are two sets of circumstances necessary to produce any activity in vegetables, viz: the presence of matter for assimilation and of heat and light; the increase of the plant being dependent upon the presence of material out of which its food can be elaborated through the operation of these indispensable agents; but heat and light are powerless of themselves without the presence of something upon which to operate. There is no organ in the plant whose functions they (that is, heat and light,) can in the slightest degree increase, without the presence of pabulum to act upon, and when this pabulum is elaborated, assimilation goes on under the control of a "*vis vitæ*," and growth and development are the necessary consequence.

In animals, on the contrary, we recognize a distinct power residing in a nervous system capable of renewing itself at every instant of life—a power peculiar to themselves—self-generating, depending upon none of those external influences to which vegetables are subject as the source of their motion, a mere operation of the will being sufficient to develop it and to produce the motion which is indispensable to the vital process. Joy or anger excites it, and disturbs its equilibrium. The action of "mere stimulants" produces the intensest activity, without any increase or development whatever.

Says "B.," "The gentleman will scarcely deny that when the vital forces or actions of plants are exalted or quickened, that the circulation of the nutritious juices in the plant are at the same time accelerated." In reply to which we say that "B." but makes the common mistake of putting the cart before the horse, or mistaking the effect for the cause. The acceleration of the nutritious juices, consequent upon an abundant supply; that is elaborated under the influence of heat and light, is what exhausts and quickens the vital forces or actions.

"B." informs me "I am mistaken in supposing alcohol innoxious to plants, and that I will be convinced of the mistake by pouring strong brandy on a delicate plant." I am rather opposed to wasting the material by such an experiment. Could he have been so indiscreet as to put his to such a vile purpose? If he will inform me how I can persuade his little nervous membranes to "*imbibe* a mouth-full," I would consent to spare as much: but I can't stand this pouring on, as I would not only waste my brandy, but burn my plant, though not quite so effectually as by using a strong acid, or fire, the effect of each and all such agents being to destroy the structure partially or wholly according to the degree of concentration by a chemical action. If I could direct a little "spirits and water" in-

ternally to its susceptibilities, I would sacrifice a little of the "over-joyful" to see a drunken plant. He also informs me that brandy is not a "mere stimulant" to animals, though it be the type of the class of "mere stimulants," from which I infer, he means, that while plants are susceptible to the action of "mere stimulants," animals are not. How is it with hope, and joy, and anger? Are they fattening also? But I hate to give up the brandy; and I know that "B." has the good taste to like it, too,—for he says that "it is destruction to rose bushes, but as fattening as Cod-liver to man," which we in all our admiration must doubt; and we will hazard our opinion that, if "B." will go it on brandy alone for one month his "fair, round belly and good caponed loin" will vanish into the lean and lank Cassius form.

Again he asks, "How does the gentleman know that all the positive phenomena of such action (stimulant) are found in connection with such a known system of nerves." Because I have never known the application of any stimulant to anything without nerves to produce phenomena in accordance with the functions of a nervous apparatus, and the manifestations of the functions of a nervous apparatus are what I call "the positive phenomena."

"B." quotes from a "learned and distinguished physiologist in vegetables" the following remarkable enunciation of facts; but however learned and distinguished his authority may be, he must excuse us for asking for the proof. An "ipse dixit," is one mode of imparting knowledge and a quod erat demonstrandum" is another. And where propositions are new and startling, we of little faith require the latter:

"Two properties direct the action of their small number of functions; a *latent* and *faint sensibility*, in virtue of which, each vessel, every part of the plant is affected in its own way by the fluids with which it is in contact,—a contactility as little apparent, though the results prove irrefragibly its existence; a contactility in virtue of which the vessels sensible to the impression of liquids close or dilate themselves to effect their transmission or elaboration. The organs allotted to reproduction animate, for a moment, this exhibition; more sensible, more irritable, they are visibly in action; the stamina, or male organs bow themselves over the female organs, the pistil shakes on the stigma the fertilizing dust, then straightens, retires from it, and dies with the flower, which is succeeded by the seed or fruit."

So you perceive the learned and distinguished physiologist has not only discovered "a latent and faint sensibility," but also the highest attributes of animal life, consciousness and volition. We can but think that the learned gentleman left the province of philosophical research for that of fancy.

"B." refers, very properly, the agency of heat, in producing such sublime phenomena in the mineral kingdom, to its expansive powers; but supposes it possesses another and distinct power when applied to the vegetable and animal kingdoms. He says, "the potency here excited is an exalting, quickening, life-giving energy." So it is; but how does it do it? We *apprehend*, (if he will permit the expression,) by the agency of the same expansive power elaborating the elements of nutrition out of pre-existing compounds, and when these elements are brought within reach of the assimilating power of vegetables, they produce "an exalting, quickening, life-giving energy."

Heat has but one force and one power, and that is manifested alike upon all bodies and all matter. It is a great disengaging force tending to separate particles of matter, and its antagonistic force is "affinity." Yet it is frequently employed to aid the power of affinity, by presenting matter in a more eligible condition.

We acknowledge the receipt of the "autograph," and must confess to no little anxiety to meet in person the individual (on many accounts) that owns so remarkable a cognomen, and am not surprized that he hesitates to give it to the public. For, were it "Scroggins," it would not be less euphoneous than the veritable "autograph."

W. A. BRADFORD.

Clarke Co., June 8th, 1859.

Sex of Eggs.

A correspondent of an English paper affirms that he learned whilst in France, among the best poultry breeders, that the long narrow eggs were set aside as male eggs, or those that would produce male chickens if hatched out, and that the round dumpy ones would produce female chickens.

Meteorology in its Connection with Agriculture.

An Abridgement of an Article written and published in the Patent Office Report of 1855.

BY JOSEPH HENRY, SECRETARY OF THE SMITHSONIAN INSTITUTION.

All the changes on the surface of the earth, and all the movements of the heavenly bodies, are the immediate results of natural forces, acting in accordance with established and invariable laws; and it is only by that precise knowledge of these laws, which is properly denominated science, that man is enabled to defend himself against the adverse operations of Nature, or to direct her innate powers in accordance with his will. At first sight, it might appear that meteorology was an exception to this general proposition, and that the changes of the weather, and the peculiarities of climate, in different portions of the earth's surface, were of all things the most uncertain, and farthest removed from the dominion of law; but scientific investigation establishes the fact, that no phenomenon is the result of accident, nor even of fitful volition. The modern science of statistics has revealed a permanency and an order in the occurrence of events depending on conditions in which nothing of this kind could have been supposed. Even those occurrences which seem to be left to the free will, the passion, or the greater or less intelligence of men, are under the control of laws, fixed, immutable and eternal. No one knows the day nor hour of his own death, and nothing is more entirely uncertain than, in a given case of expected birth, whether a boy or a girl shall be born; but the number out of a million of men living together, in one country, who shall die in ten, twenty, forty or sixty years, and the number of boys and girls who shall be born in a million of births, may be predicted from statistical data with almost unerring precision. * * * All events are governed by a Supreme Intelligence, who knows no change, and, under the same conditions, the same results are invariably produced. If the conditions, however, are permanently varied, a corresponding change in the results will be observed. * * * It is this regularity which is observed in phenomena, when studied in groups of large numbers, which enables us to arrive at reliable and permanent laws in regard to meteorology, and to predict, with certainty, the average temperature of a given place for a series of decades of years, and which furnishes the basis, in accordance with the principles of assurance, of a knowledge of what species of plant or animal may be profitably raised in a given locality. * * * We need but to unite the results of observations with those of experiments in the laboratory, and mathematical deductions from astronomical and other data, to enable us, not only to refer the periodic changes to established laws, but also to trace to their source, various perturbing influences which produce the variations from the mean, and thus arrive, at least, at an approximate explanation of the meteorological phenomena which are constantly presented to us.

No truth is more important in regard to the material well-being of man, and none requires to be more frequently enforced upon the public mind, than that the improvement and perfection of art depend upon the advance of science. Although many processes have been discovered by accident, and practised from age to age, without a knowledge of the principles on which they depend, yet, as a general rule, such processes are imperfect, and remain, like Chinese art, for centuries unchanged or unimproved. They are generally wasteful in labor and material, and involve operations which are not merely unessential, but actually detrimental. The dependence of the improvement of agriculture upon the advance of general science, and its intimate connexion with meteorology in particular, must be evident, when we reflect that it is the art of applying the forces of Nature to increase and improve those portions of her productions which are essential to the necessity and comfort of the human race.

Modern science has established, by a wide and careful induction, the fact that plants and animals principally consist of solidified air, the only portions of an earthy character which enter into their composition, being the ashes that remain after combustion. All the other parts were originally in the atmosphere, were absorbed from the mass of air during the growth of the plant or animal, and are given back again to the same fountain from which they were drawn, in the decay of the vegetable, and in the breathing and death of the animal.

The air consists of oxygen, nitrogen, car-

bonic acid, the vapor of water, traces of ammonia, and of nitric acid. A young plant, placed in the free atmosphere, and exposed to the light of the sun, gradually increases in size and weight, and receives carbon constantly from the corbonic acid of the air, which is decomposed, and evolves the liberated oxygen. The power by which this decomposition is produced is now known to be due to the solar ray, which consists of a peculiar impulse, or vibration, propagated from the distant sun, through a medium filling all space.

It is a principle of nature, that power is always absorbed in producing a change in matter. This change may be permanent, or it may be of such a character, as to reproduce the power which was expended in effecting it. * * * For example, the effect of the impulse from the sun is to decompose the carbonic acid which surrounds the leaf of the plant, or, in other words, to overcome the natural attraction between the carbon and the oxygen of which the acid is composed; and, in this effort, the motions of the atoms of the etherial medium are themselves stopped. The power, however, in this case, is not permanently neutralised; for, when the plant is consumed, either by rapid combustion or by slow decay; that is, when the carbon and the oxygen are again suffered to rush into union, to form carbonic acid—the same amount of power is evolved in the form of light, heat, or nervous force, which was absorbed in the original composition. If the plant, moreover, be consumed in the animal, the same power is expended in building up the organization, in producing locomotion and the incessant action of the heart, and the other involuntary movements necessary to the vital process.

Plants are, therefore, the recipients of the power of the sun-beam. They transfer this power to the animal, and the animal again returns it to celestial space, whence it emanated. Properly to so direct this power of the sun-beam, that no part of it may run to waste, or be unproductive of economical results, it is essential that we know something of its nature; and the lifetime of labor of many individuals, supported at public expense, would be well expended in exclusive devotion to this one subject. The researches which have been made, in regard to it, have developed the fact, that the impulses from the sun are of, at least, four different characters, namely, the lighting impulse, the heating impulse, the chemical impulse, and the phosphorogenic impulse; and it has further been ascertained that, though each of these impulses may produce an effect on the plant, the decomposition of the carbonic acid is mainly due to the chemical action. A series of experiments is required to determine the various conditions under which these impulses from the sun may be turned to the greatest amount of economical use, and what modifications they may demand, in order to the growth of peculiar plants. The fact has not yet been clearly ascertained, whether some of these emanations cannot be excluded with beneficial result, or, in other words, whether they do not produce an antagonistic effect, and what relative proportions of them are absorbed by the atmosphere, or reflected from our planet, without reaching the earth, by the floating clouds of the air. To determine these, requires a series of elaborate experiments and accurate observations. We have said that the chemical vibration is that which principally decomposes the carbonic acid, in the growth of the plant; but we know that the heating impulse is an auxiliary to this, and that heat and moisture are essential elements in the growth of vegetation. The small amount of knowledge we already possess of the character of the emanations from the sun, has been turned to admirable account in horticulture. In this branch of husbandry, we seek, even more than in agriculture, to modify the processes of nature; to cultivate the plants of the torrid zone amid the chilling winds of the northern temperate zone; and to render the climate of sterile portions of the earth congenial to the luxurious productions of more favored regions. We seek to produce artificial atmospheres, and to so temper the impulses from the sun, that the effects of variations in latitude, and the rigor of the climate, may be obviated.

From all that has been said, therefore, it will be evident, that the hopes of the future, in regard to agriculture, principally rest upon the advance of abstract science—not upon the mere accumulation of facts, of which the connexion and dependence are unknown, but upon a definite conception of the general principles of which these facts are the result. All the phenomena of the atmosphere should be studied and traced to the laws on which they depend. The labor bestowed upon investigations of this kind is

not as, the narrow-sighted advocate of immediate utilitarian results would affirm, without practical importance; on the contrary, it is the basis of the highest improvement of which the art of agriculture is susceptible. On every acre of ground, a definite amount of solar force is projected, which may, under proper conditions, be employed in developing organization; and the great object of the husbandman is, to so arrange the conditions, that the least amount possible of this may be lost in uneconomical results. Independent, however, of the practical value of a knowledge of the principles on which the art of agriculture depends, the mind of the farmer should be cultivated, as well as his fields, and, after the study of God's moral revelation, what is better fitted to improve the intellect than the investigation of the mode by which He produces the changes in the material universe.

The climate and productiveness of a country are determined, first by its latitude, or its distance on either side of the equator; second, by the configuration of the surface, as to elevation and depression; third, by its position, whether in the interior of a continent, or in proximity to the ocean; fourth, by the direction and velocity of the prevailing winds; fifth, by the nature of the soil; and, lastly, the cultivation to which it has been subjected.

First, in regard to latitude: The productive power of a soil, other things being the same, depends on two circumstances, solar radiation and moisture; and these increase as we approach the equator.

If the kind of food were a matter of indifference, the same extent of ground which supports one person at the latitude of 60° would support twenty-five at the equator; but the food necessary to the support of persons in different latitudes varies with respect to quality, as well as to quantity, and the other conditions mentioned, with regard to climate, should enter largely into the estimate we form in relation to the actual productiveness of different parallels of latitude.

* * * *

The air diminishes in temperature, as we ascend, but the rate of this diminution varies, within certain limits, in different parts of the earth. * * * * *

We may assume, that in the temperate zone, the diminution due to altitudes, or mountains, is about 1° of Fahrenheit for 300 feet. Furthermore, the air, as we ascend, and the pressure of the superincumbent strata is removed, becomes lighter; and though the temperature of the several portions diminishes very rapidly, yet the whole amount of heat in each pound of air is very nearly the same. For example, if a certain weight of air were carried from the surface of the earth to such a height that it would expand into double its volume, the heat which it contained would then be distributed throughout twice the space, and the temperature would consequently be much diminished, though the absolute amount of heat would be unchanged. If the same air was returned to the earth, whence it was taken, condensation would ensue, and the temperature would be the same as at first.

On this principle, a wind passing over a high mountain is not necessarily cooled; for the diminution of temperature, which is produced by the rarefaction of the ascent, would be just equivalent to the increase which is due to the condensation in an equal descent. This would be the case if the air were perfectly dry; but, if it contained moisture, paradoxical as it may seem, it would be warmer when it returned to the lower level than when it left it. In ascending to the top of the mountain, it would deposit its moisture in the form of water or snow, and the latent heat given out from this would increase the heat of the air, and when it descended, on the opposite side, to the same level from which it ascended, it would be warmer, on account of this additional heat. The configuration of the surface of our continent, on this account, has therefore a marked influence on the temperature of its different parts.

The effect of the position of a country, as regards its proximity to the ocean, on its climate, will be evident from the facts relative to the radiation and absorption of heat by different substances. All bodies, on the surface of the earth, are constantly receiving and giving out heat. A piece of ice, exposed to the sun, sends rays to this luminary, and receives in return a much greater amount. The power, however, of radiating and receiving heat, in different bodies, is very variable. Water, exposed to the same source of heat, receives and radiates far less in a given time than earth; consequently, the land, especially in the higher latitudes, during the long summer days, or

during the growing season, receives much more heat than the corresponding waters of the same latitude; and, though the radiation at night is less from the water than the land, yet the accumulating increase of temperature of the latter will be much greater than that of the former. The reverse takes place in the winter. While, therefore, the mean temperature of the ocean and of the land, in the same latitude, may remain the same, the tendency of the land is to receive the greater portion of the heat of the whole year during the months of summer, and thus, by a harmonious arrangement with respect to the production of organic life, to increase the effect of the solar radiation, and to widen the limits within which plants of a peculiar character may be cultivated. Proximity to the sea, however, has another effect on the climate, which depends upon the currents of the former, by which the temperature of the earth, due to the latitude, is materially altered. Heated water is constantly carried from the equatorial regions towards the poles, and streams of cold water returned, by means of which the temperature of the earth is modified, and the extremes reduced in intensity. * * * *

The effect of the prevailing currents of air, on the climate of different portions of the earth, is no less marked than proximity to the sea. * * * * *

Professor Coffin, in his admirable paper on the winds of the northern hemisphere, has shown that, from the equator to the pole, the whole space is occupied by three great belts, or zones, of prevailing wind; the first extends from the equator to an average latitude of 35° north, in which the current is from the northeast, constantly growing less intense as we approach the northern limit; the second is that from 35° to about 60°, the current from the west being more intense in the middle of the belt, and gradually diminishing, almost into a calm, on either side; third, from 60° to the pole, or rather, to a point of greatest cold in the Arctic regions, the wind is in a northeasterly direction.

The first of these belts would constitute what is called the trade winds, produced by the combined effects of the heat of the sun, and the rotation of the earth; the second, is the return trade, and the third, the current which would be produced by an opposite effect to that of the rarefaction of the air by the sun at the equator, namely, the condensation of the air by the cold portion of the earth. The air should flow out, in every direction, from the coldest point, and, combining its motion towards the south with the rotation of the earth, it should take a direction from the east to the west, or become a northeasterly wind.

The effects which these currents must have upon the climate of the United States will be made clear by a little reflection. The trade winds within the tropics, charged with vapor, impinging upon the mountainous parts of South America, in their course towards the west, will deposit their moisture on the eastern slope, and produce a rainless district on the western side. Again, a lower portion of the Atlantic and Gulf trade wind will be deflected from these mountains along the eastern coast of the United States, and through the valley of the Mississippi, as a surface wind, and thus give rise to the moist and warm breezes from the south, of our summers, while the principal or upper portion of the trade wind, or the return westerly current, sweeping over the Pacific ocean, and consequently charged with moisture, will impinge on the coast range of mountains of Oregon and California, and, in ascending its slopes, deposit moisture on the western declivity, giving fertility and a healthful climate to a narrow strip of country bordering on the ocean, and sterility to the eastern slope. All the moisture, however, will not be deposited in the passage over the first range, but a portion will be precipitated on the western side of the next, until it reaches the eastern elevated ridge of the Rocky mountain system, where, we think, it will be nearly, if not quite, exhausted. East of this ridge, and, as it were, in its shadow, there will exist a sterile belt, extending in a northerly and southerly direction many hundred miles. The whole country, also, included between the eastern ridge of the Rocky mountains and the Pacific Ocean, with the exception of the narrow strip before mentioned, will be deficient in moisture, and on account of the heat, evolved, as before shown, by the condensation of moisture on the ridges, will be at a much higher temperature than that due to latitude. This mountain region, and the sterile belt east of it, occupy an area about equal to one-third of the whole surface of the United States, which, with our present knowledge of the laws of nature, and their

application to the economical purposes, must ever remain of little value to the husbandman.

According this view, the whole valley of the Mississippi owes its fertility principally to the moisture which proceeds from the Gulf of Mexico, and the intertropical part of the Atlantic ocean. The Atlantic Gulf stream, therefore, produces very little effect in modifying the climate of the northern portion of the United States; first, on account of the cold polar current which intervenes between it and the shore; and secondly because of the prevalent westerly wind, which carries the heat and moisture from us, and precipitates them on the coast of Europe.

The influence of the nature of the soil, on the climate of a country, may be inferred from its greater or less power to absorb and radiate heat, and from its capacity to absorb, or transmit over its surface, the water which may fall upon it in rain, or be deposited in dew. In the investigation of this part of the subject, the observations of the geologist, and the experiments of the chemist and the physicist, must be called into requisition.

In regard to the influence of *cultivation* on the climate of a country, much also may be said, though, at first sight, it might appear that man, with his feeble powers, could hope to have no influence in modifying the action of the great physical agents which determine the heat and moisture of any extended portions of the globe. But, though man cannot direct the winds, nor change the order of the seasons, he is enabled, by altering the conditions under which the forces of nature operate, materially to modify the results produced; for example, removing the forests from an extended portion of country exposes the ground to the immediate radiation of the sun, and increases, in many cases, the amount of evaporation; in other places, it bakes the earth and allows the water to be carried off to the ocean, in freshets, and, in some instances, in destructive inundations.

Drying extensive marshes, or the introduction of a general system of drainage has a remarkable influence in modifying the temperature. The water, which would evaporate, and, by the latent heat thus absorbed, would cool the ground, is suffered to pass through it to the drain beneath, and is thus carried off without depriving the earth of a large amount of heat, which would otherwise be lost. Besides this, the removal of forests gives greater scope to the winds, which are hence subjected to less friction in their passage over the earth.

The whole subject of the removal of forests is one which deserves more attention than it has usually received. In the progress of settlement, it is evident that a great portion of the wooded land of a new country must give place to the cleared field, in order that man may reach the rich harvest of the cereals, which, in his civilized condition, are necessaries, as well as luxuries, of life; yet the indiscriminate destruction of the forests is of doubtful propriety. By the judicious reservation of trees, along the boundaries of certain portions of land in accordance with the known direction of the prevailing wind, the climate, both for the production of plants and animals, within a restricted portion of the earth, may be ameliorated. While, in some parts of the country, the clearing of nearly all the ground is absolutely necessary for agricultural purposes, in others, it may be profitable to allow forests of considerable extent to remain in their pristine condition. Cases of this kind, however, can only be determined by the particular climate of each district of country.

It is now an established truth, that certain locations are screened from miasmatic influence by the intervention of trees. A more general recognition of this fact might add much to the healthfulness of locations in other respects highly desirable.

The solar rays, in passing through the atmosphere, do not heat it in any considerable degree, but they heat the earth against which they impinge; therefore, the temperature of the lower stratum of air is derived, directly or indirectly, from the soil on which it rests; and this temperature as has been remarked will depend upon whether the surface be marshy or dry, clothed with herbage, or covered with sand, clay, or an exposed rock. From this fact it is evident, that man has, in this particular also considerable power in modifying the climate of portions of the earth; and history furnishes us with many examples in which great changes, within human control, have been produced in the course of ages. Ninevah and Babylon, once so celebrated for their advance in civilization and opulence, and Palmyra and Balbec, for their magnificence,

offer at this day to the traveller the site of ruins which attest their past greatness, in the midst of desolation. Canaan, described in the Bible as a fertile country, "flowing with milk and honey," is now nearly deprived of vegetation, and presents a scene of almost uninterrupted barrenness. The climate of these countries is undoubtedly modified by the present state of the surface, and might again be ameliorated by cultivation, and, were the encroachments of the sands of the desert stayed, by borders of vegetation of a proper character. Many, parts, even of our own country, which now exhibit a surface of uninterrupted sand, may be rendered productive, or covered with trees and herbage.

A series of observations on the progress of temperature below the surface, in different parts of the country, and even in different fields of the same plantation, would be of value in ascertaining the proper time to introduce the seed, in order that it might not be subjected to decay by premature planting, or lose too much of the necessary influence of summer, by tardy exposure in the ground. This may perhaps be most simply effected, by burying a number of bottles filled with water, at different depths in the ground, say one at the depth of 6 inches, another at 12, and a third at 18 inches. These, in the course of time, would take the temperature of the earth in which they were embedded, and would retain it sufficiently long unchanged, to admit of its measurement, by inserting a thermometer into the mouth of the bottles.

No improvement is more necessary, for rendering the art of agriculture precise, than the introduction into its processes of the two essential principles of science, namely, those of weight and of measure. All the processes in our manufactories, on a great scale, which were formerly conducted by mere guesses, as to heat and quantities, are now subjected to rules, in which the measure of temperature, and the weight of materials, are definitely ascertained by reliable instruments.

The foregoing are general views as to the great principles which govern the peculiarities of climate, and especially that of the United States, the truth of which, in reference to our continent, and the modifications to which they are to be subjected, are to be settled by observations in the future.

In order, however, that the science of meteorology may be founded on reliable data, and attain that rank which its importance demands, it is necessary that extended systems of coöperation should be established. In regard to climate, no part of the world is isolated; that of the smallest island in the Pacific is governed by the general currents of the air and the waters of the ocean. To fully understand, therefore, the causes which influence the climate of any one country, or any one place, it will be necessary to study the conditions, as to heat, moisture, and the movements of the air, of all others. It is evident, also, that, as far as possible, one method should be adopted, and that instruments affording the same indications, under the same conditions, should be employed.

It is true that, for determining the general changes of temperature, and the great movements of the atmosphere of the globe, comparatively few stations of observation, of the first class, are required; but, these should be properly distributed, well furnished with instruments, and supplied with a sufficient corps of observers, to record, at all periods of the day, the prominent fluctuations. Such stations, however, can only be established and supported by the coöperation of a combination of governments.

A general plan of this kind, for observing the meteorogical and magnetical changes, more extensively than had ever before been projected, was digested by the British Association, in 1838, in which the principal governments of Europe were induced to take an active part; and had that of the United States, and those of South America, joined in the enterprise, a series of watch-towers of nature would have been distributed over every part of the earth.

* * * *

These observatories were established to carry out a series of observations, at the same moment of absolute time, every two hours, day and night, (Sunday excepted,) during three years, together with observations once every month, continuing 24 hours, at intervals of five minutes each. * * * The comparisons of these observations are still in progress, and will occupy the attention of the student of magnetism and meteorology, for many years to come. The system was established more particularly to study the changes of the magnetic needle, and on this subject alone, it has afforded information of sufficient importance to repay all the labor and time expended on it. It

has shown that the magnetic force is scarcely constant from one moment to another, that the needle is almost incessantly in motion, that it is affected by the position of the sun and moon, and by perturbations, connected with meteorological phenomena, of a most extraordinary character.

In regard to meteorology, this system furnished reliable data for the great movements of the atmosphere, and the changes in its thermal and hygrometric condition. But, to obtain a more minute knowledge of the special climatology of different countries, it is necessary that a series of observations, at a great many places, should be continued through a number of years, and at stated periods of the day—not as frequent as those of the observations we have mentioned, but embracing as many elements, and even adding to these, as new facts may be developed, or new views entertained. In many countries, accordingly, provision has been made, by their respective governments, for continued though local systems of this kind. The government of Prussia appears to have taken the lead in this important labor, and its example has been followed by those of Great Britain, Russia, Austria, Bavaria, Belgium, Holland and France. In these countries, regular and continuous observations are made, with reliable instruments, on well-digested plans.

Though the government of the United States took no part with the other nations of the earth, in the great system before described, yet it has established and supported for a number of years a partial system of observation at the different military posts of the army. Among other duties assigned to the surgeons, at the suggestion of Surgeon General Lovell, was that of keeping a diary of the weather, and of the diseases prevalent in their vicinity. The earliest register received, under this regulation, was in January, 1819. The only instruments at first used were a thermometer and wind-vane, to which, in 1836, a rain-gauge was added. The observations were made at 7 A. M. and 9 P. M., and the winds and weather were observed morning, noon and evening It is to be regretted that, in 1841, the variable hour of sunrise was substituted for that of 7 A. M., since the latter admits of an hourly correction which cannot be applied to the former, except at the expense of too great an amount of labor.

* * * *

At the commencement of 1843, an extension of the system was made, by the introduction of new instruments, and an additional observation to the number which had previously been recorded, each day, and hourly observations for twenty-four hours were directed to be taken at the equinoxes and solstices.

During the past year, a quarto volume has been published, which contains the results of the observations of the thermometer, direction and force of winds, clearness of sky, and fall of rain and snow, during a period of twelve years, from the first of January, 1843, to January, 1855, arranged in monthly tables and annual summaries. To these are added consolidated tables of temperature and rain, for each separate station, comprising the results of all the thermometric observations made by medical officers since 1822, and of all measurements of rain and snow, since the introduction of the rain-gauge, in 1836.

The tabular part of this volume contains the most important results of the observations of the Army system of registration, and will be considered the most valuable contribution yet made toward a knowledge of the climatology of the United States. Truth, however, will not permit us to express the same opinion in reference to the isothermal charts which accompany this volume. These we consider as premature publications, constructed from insufficient data, and on a principle of projection by which it is not possible to represent correctly the relative temperatures in mountainous regions.

With the learning and zeal for science possessed by the officers of the United States Army, and the importance which they attach to meteorology, in its connection with engineering and topography, it is hoped that this system may be farther extended and improved, that each station may be supplied with a compared thermometer and psychrometer, and that, at a few stations, a series of hourly observations may be established, for at least a single year. The present Secretary of War, we are assured, would willingly sanction any proposition for the improvement of this system, and we doubt not the Surgeon General is desirous of rendering it as perfect as the means at his disposal will permit.

A local system of meteorological observations was established in the State of New York, in 1825, and has been uninterruptedly

continued from that time until the present. Each of the academies, which participated in the literature fund of the State, was furnished with a thermometer and rain-gauge, and directed to make three daily observations relative to the temperature, the direction of the wind, cloudiness, &c. The system was remodelled, in 1850, so as to conform to the directions of the Smithsonian Institution, and a considerable number of the academics were furnished with full sets of compared instruments, consisting of a barometer, thermometer, psychrometer, rain-gauge and wind-vane.

A summary of the results of the observations from 1826 to 1850, inclusive, has just been published by the State of New York, under the direction of the Regents of the University. They are presented in the form of a quarto volume, to which is prefixed a map of the State, showing the direction of the wind, and the position of each station. This volume, the computations for which were made by Dr. Franklin B. Hough, is also a valuable contribution te meteorology, and does much credit to the intelligence and perseverance of those who introduced and have advocated the continuance of this system, and to the liberality of the State which has so long and so generously supported it.

* * * *

A system of meteorological observations was established by the Smithsonian Institution, in 1849, the principal object of which was to study the storms that visit the United States, particularly during the winter months. This system, which has been continued up to the present time, was afterwards extended, with a view to collect the statistics necessary to ascertain the character of the climate of North America, to determine the average temperature of various portions of the country, and the variations from this at different periods of the year. It was intended to reduce, as far as possible, to one general plan, the several systems of observations which had previously been established, and to induce others to engage in the same enterprise. But it was, in the first place, desirable, in order that the results might be comparable with those obtained in other countries, that the instruments should be more accurate than those which might be requisite for the mere determination of the phenomena of storms. The institution, therefore, procured standard barometers and thermometers from London and Paris, and, with the aid of Professor Guyot, a distinguished meteorologist, copies of these were made, with improvements, by Mr. James Green, a scientific artist of New York. A large number of these instruments have been constructed and sold to observers. Full sets have been furnished by the Institution to parties in important positions, and, in some cases, half the cost has been paid at the expense of the Smithsonian fund.

A growing taste having been manifestly created for the study of practical meteorology, directions for observations, and a volume of tables for their reduction, have been prepared, and widely circulated at the expense of the Institution. It has also distributed blanks to all the observers of the different systems alluded to, except those of the Army, and has received, in turn, copies of all the observations which have been made. It has, in this way, accumulated a large amount of valuable material, relative to the climate of this country, and to the character of the storms to which it is subjected. The completeness and accuracy of the observations have also increased from year to year; and, by an arrangement which the Institution has now made with the Patent Office, it is hoped that the system will be extended, and its character improved.

It being manifest, from the foregoing statements, and from other evidences, that much interest is awakened in this country on the subject of meteorology, it is hoped that the means may be afforded for reducing and publishing the materials which have been and shall be accumulated, and that important results to agriculture, as well as to other arts, may be hence deduced.—*Abridged from Patent Office Report*, 1855.

Hair of Children.

It is a great mistake to plait the hair of children under eleven or twelve years of age. The process of plaiting more or less strains the hairs in their roots by pulling them tight; tends to deprive them of their requisite supply of nutriment, and checks their growth. The hair of girls should be cut rather short, and allowed to curl freely. When they are about eleven or twelve, the hair should be twisted into a coil not too tight, nor tied at the end with thin thread but with a piece of ribbon.

From the Conservatory Journal.

Adorn!

The law of progress is to adorn. No high state of civilization, moral or religious, has ever been achieved without a corresponding attention to the beautiful. While the world was without form and void, like most of our public places, it was not the abode of man. It was only when it was adorned with sun, moon, and stars, floods, fields, shrubs, and flowers, that he was placed here below, and then it was in a garden. We find nothing in Scripture or history to justify us in believing that man would have been created to this day, if our earth had remained in half the unformed and chaotic state that our public garden was left in for a long time, or, that he would have been created at all, if his eyes were to be greeted with no more beauties than limit the desires of half the people we meet.

Those people, in ancient times, who undertook to live without cultivating the beautiful, have left no name worth possessing behind them. Of Babylon, with its gates of brass and its hanging gardens; of Jerusalem, with its beautiful temple; of Thebes and Athens, and scores of other beautiful cities, conspicuous in the arts and sciences, we have heard and know; but what do we know of the thousand and one other places, alluded to in history, where no talent was cultivated, but the so-called useful? the pitch, tar, and turpentine cities, and hemp and herbs, grass countries, what do we know of them? Nothing, comparatively, nothing! There were Scythians, and Chaldeans, and Medes, and Guelfs, and Ghibelines, and Huns, and Picts, and all very matter-of-fact people, no doubt; quite indifferent to embellishments; who never built any very elaborate temples, nor spent their time on works of art, or laying out parks and promenades. Their works followed them—perished with them; and so will the works of every people who neglect the work of beautifying and embellishing.

There is life, and strength, and power in beauty. A beautiful statue or structure is immortal, because it is beautiful. Amid all the storms of war they are respected. A church or a cathedral, designed and embellished by the hand of a real artist, is a church or a cathedral forever. But how is it with one of our plain—entirely and hopelessly plain—meeting-houses? It is as evanescent as the morning mist. It is far less enduring than a dwelling-house. Now it is a church, now it is a dwelling, and by and by a hostlery, auction shop, or something else equally unsanctified. It wants the grace of dignity and beauty to sanctify and save it. The scholar and antiquary who has read all his days about the beautiful statues, temples, churches, and cathedrals of the old world, and who at last goes abroad to see them, finds the living record still there—memorials of the age of Pericles, of Charlemagne, and of Luther. But, how is it here? Why, the merest school boy can scarcely venture to stay from home a whole term, without danger of finding, when he returns, that his play-ground has been sold to speculators, and that the church of his fathers has been carted away to give place to the counting-house of the trader. Washington Irving, in one of his most humorous views, once gave as a reason why we now hear so little of ghosts, that the spirit of change is going on so incessantly in our villages, that if a poor uneasy ghost does return, and undertakes to walk about his old haunts, he finds everything so changed, that he slinks back to his resting place disgusted, never to attempt it again. If it is not true of ghosts, it is certainly true of those who have settled far away from their native village. One returns to it, to find all the old landmarks swept away, the church where you worshipped, the mall where you played cricket and foot-ball, the school-house—everything—gone, is generally enough for a sensitive mind. Unless you have left near and dear friends behind, there is generally very little to tempt the Yankee boy back to his native home. He cannot rely upon finding one old landmark of his youth respected and standing.

If we want to drive far from us, vice and crime; if we want to outbid the wine cup and the gaming table, we must adorn. We must have paintings and sculpture. We must have something to claim the attention, to mould the taste, and cultivate and elevate the minds and hearts of the people.

Few stop to think how much taste has to do with morals. But there is nothing better established than that slovenly habits beget slovenly morals. All those orders of men who have attempted to ignore taste,

and beauty, and eleganee, and to go through the world without regard to appearances—such as the Cynics, the mendicant friars, and the like, have all proved conclusively that immorality and ungodliness go hand in hand with habitual untidiness and uncleanliness. Tristam Shandy is by no means the only person who has felt the elevating tendency of a clean shirt. We have before us to-day, a very happy illustration of what taste, beauty, embellishment, and art can do in civilizing and humanizing a people. The steamers have just brought us news of the revolution in Tuscany—the very centre of all that is beautiful in nature and in art. The change of government is effected without tumult, without riot, and without bloodshed; and the deposed monarch is suffered to retire at his leisure, without insult, like any ordinary gentleman. The whole was in harmony with all the surroundings. It was just what ought and might be expected to flow from such humanizing instrumentalities.

CARL.

The First Silk Mill.

One hundred and fifty years ago—according to history—there were no silk mills in England, as there now are; and here I quote from an old book the account how it came:

"The Italians had been long in the exclusive possession of the art of silk-throwing, when about the year 1715, a young mechanic and draughtsman, named John Lombe, undertook the perilous task of visiting Italy, to procure drawings, or models, of the machinery necessary for the undertaking. He remained there some time, and obtained access to the silkworks, by corrupting two of the workmen, through whose assistance he inspected the machinery in private; and whatever parts he obtained a knowledge of in these clandestine visits, he recorded on paper before he slept. When his plan was just completed his intention was discovered, and he was compelled to seek the safety of his life by a precipitate flight into England, where he arrived in safety with the two Italians who had favoured his scheme. Fixing on Derby as a proper place for his design, he agreed with the corporation for an island or swamp in the river, on which he erected and established his mill, at an expense of nearly £30,000, ($150,000,) which charge he enabled himself to defray, by the erection and employment of temporary machines in the town hall and other places, before the completion of his great work. In 1781 he procured a patent for fourteen years, to secure the profits arising from his address and ingenuity. But his days verged to a close; for before half this period had elapsed, treachery and poison had brought him to his grave. The Italians, whose trade began rapidly to decrease, were exasperated to vengeance, and resolved on the destruction of the man whose ingenuity had thus turned the current of their business into another channel; this they accomplished through the machinations of an artful woman, sent from Italy for that purpose. But though suspicion was almost strengthened into certainty from the circumstances that transpired on her examination, yet, evidence being indecisive, she was discharged. The death of this lamented artist did not, however, prove fatal to his patriotic scheme; for the machinery was in full action, and the business became every day more successful. John Lombe was succeeded by his brother William, who committed suicide; on which the property devolved to his cousin, Sir Thomas Lombe, who, previous to the expiration of the patent, petitioned Parliament for its renewal; but the legislature, wishing to reward the promoters of national benefit, and, at the same time, to spread the knowledge of so useful an invention, granted him £14,000, ($70,000,) in lieu of a new patent, on condition that he would suffer a complete model of the work to be taken and deposited in the tower for public inspection, which was accordingly done. The extensive fabric occupied by the machinery stands upon high piles of oak doubly planked, and covered with stone work, on which are turned thirteen arches, that sustain the walls. Its whole length is one hundred and ten feet, its breadth thirty-nine feet, and its height fifty-five and a half feet; it contains five stories, besides the under-works, and is lighted by four hundred and sixty-eight windows. The whole of this elaborate machine, comprising about 14,000 wheels, is put in motion by a water-wheel, thirty-three feet in diameter."

Such was the first silk mill in England, and the circumstances under which it was erected.—*Wes. Chr. Advocate.*

From the Southern Rural Gentleman.

Less Land and Better Culture.

Large farms appear to be the planters highest ambition. "More land, more land is the perpetual cry." And every farmer seems to be stretching his arms for a larger area. As a consequence the lands of the smaller farmer are sold to his richer neighbor, and he goes farther West, where lands are cheap, to acquire larger farms. Now what is the effect of all this craving of more land. It certainly leads to a great waste of the soil, and a great diminution of the crops. Buy land and wear it out, buy more land and strip it of all its fertility and turn it out, and thus the process of exhaustion goes on from year to year. Without a great change and a great improvement, our lands will soon be stripped of their fertility, our country become sterile and barren, and much of our best population driven towards the setting sun.

Belgium has the reputation of the best farming in the world. It is more highly cultivated, and sustains a more dense population than any other country in Europe—there fifteen acres is called a respectable farm. "The poorest in America, when the average for the whole country exceeds one hundred and twenty-five!" What makes the difference? The Belgian improves his soil by constant manuring—he husbands his resources—saves his manure and makes his soil richer every year, so that to day it produces twice or thrice as much as when reclaimed from its native forest. But with us the land is *scraped over* until it has lost its fertility, and then we must push westward in pursuit of new lands. *The process of skinning our lands*, and getting miserably poor crops should be abandoned, and planters should content themselves with farms of such size as they can thoroughly cultivate and improve. We have only to look to the older States to see the effect of this process of *skinning* the land—it has caused them to loose much of their best population, and, in some of them, more than half the increase of the slave population goes off annually to the new States. They have scraped and impoverished their lands, until the slave labor cannot be profitbly employed on their worn out fields, and they are sent to the Southwest. More than ten thousand slaves have been sold in the Charleston market alone! Why? prices are good and the improvement of the soil has not kept pace with the increase of the slave population—they have no new lands to bring into cultivation, and the labor cannot all be profitably employed. Hence they must be sent Southwest where lands are cheap and plenty. Over one Railroad more than fifty thousand slaves passed in the last six or eight months to the Southwest in search of better lands, or to supply the demand for labor by those who wish to increase their farms. How long will it take the constantly increasing slave labor of the Southwest to clear up and reduce much of our rich land to sterility and barrenness? We might just as well expect our horses and mules to live without food to supply the waste of their physical strength and vital energies, as to expect that our lands will continue to produce good crops without manure, to supply the exhausted fertility of the soil, produced by constant cultivation. Besides, this miserable plowing and shilly-shally cultivation is a great waste of labor and *never pays*. If we would turn our attention to manures, and the improvement of our soil, and carefully husband every source of fertility to increase the productiveness of our lands, and give them more thorough cultivation, we should be rewarded with more abundant crops. The successful experience of Mr. McCloud, of Alabama, shows what may be done—that each acre of our land by manures and judicious cultivation may be made to double its production, and that if our farmers would turn their attention to the improvement of their lands, they would be rewarded and well paid for their labour. On many farms what unsightly, worn-out fields are seen—fields washed into gullies and ruined by bad cultivation. It is time for us to abandon this ruinous system and to save our lands and enrich them, and this can be done only by cultivating less land and improving it. But all argument on this subject is unnecessary—it is plain and apparent to all, and we now reiterate our caption, *let us have less land and better cultivation.* *

It you don't want to spoil your children, you may have to spoil a good many rods in raising them.

It is said that corn is so sensitive that it is *shocked* at the approach of Jack Frost.

God had rather see his children humble for sin, than proud of grace.

The Robin.

At a meeting of the Massachusetts Horticultural Society, early in 1858, a resolution was introduced, authorizing the President of that Society to petition the Legislature for a repeal of the laws prohibiting the killing and destroying of the robin. This motion was laid on the table, but a committee was appointed to investigate and learn the habits of the robin, and report. This committee reported March 5th, 1859.

We give in brief the result of the committee's investigations, as reported by its chairman, Prof. J. W. P. Jenks, and found in the Society Journal :

1. Early in March numbers of this bird made their appearance in this vicinity; but until the second week in April, only the male birds.

2. The gizzards of those killed in the morning were, as a general rule, either entirely empty, or but partially distended with food, well macerated, while those killed in the latter part of the day were as uniformly filled with food freshly taken.

3. From the almost daily examination of their gizzards, from the early part of March to the first of May, not a particle of vegetable matter was found in the gizzard of a single bird. On the contrary, insects in great variety, both as to number and kind, as well as in every variety of condition as to growth and development, were the sole food.

But nine-tenths of the aggregate mass of food thus collected during this period consisted of one kind of larva, which, through the aid of Baron Ostensacken, Secretary of the Russian Legation at Washington, I was enabled to identify as the Bibio Albipennis, whose history and habits, by the aid of Dr. Asa Fitch, entomologist of the New York State Agricultural Society, I was enabled to make out quite satisfactorily.

From one to two hundred of this larva were frequently taken from a single gizzard, all in fresh, unmacerated condition; and usually, when this larva was found, it was the only food in the stomach.

4. During the month of May, the Bibio larva entirely disappeared from the gizzards, but up to the 21st of June, was replaced by a variety of insects or worms only, including spiders, caterpillars, and beetles of the family Elateridæ, the parents of the well-known wire-worms, so destructive to corn and various other seeds when committed to the ground.

The earth worm I found to be a favorite food for the young bird, but sparingly employed by the adult for its own use.

5. From the date of June 21st, I began to find strawberries, cherries, and pulpy fruit generally, but in a majority of the examinations intermingled with insects, which led me to conclude that they were not fond of an exclusively vegetable diet, but rather adopted it as a dessert, and from the ease of procuring it, particularly during the enervating season of moulting. At this season of the year, I discovered a marked difference in the food of the birds killed in or near the village and those killed in the country at a distance from gardens and fruit trees, the latter having less of stone fruit and more of insects in their gizzards, which led me to conclude that the robin is not an extensive forager.

6. The mixed diet of the robin seems to continue from the ripening of the strawberries and cherries to October, the vegetable portion consisting during August and September, in great part, of elderberries (Sambucus canadensis) and pokeberries (Phytolacca decandra.)

7. During the month of October the vegetable diet is wholly discarded, and its place supplied by grasshoppers and orthopterous insects generally.

8. Early in November the robin migrates southward—the few remaining eking out a miserable existence during the winter months on bay berries (Myrica ceritera,) privet berries (Ligustrum vulgare,) and juniper berries (Juniperus communis.)

From the Cotton Planter and Soil.

Hill-Side Ditching.

Dr. Cloud—*Dear Sir :* You could not have made a more valuable contribution to the pages of your Journal than the essay of of Mr. Hardwick, on the subject of hill-side ditches. No one in Georgia has done so much to check our wasteful and reckless system of culture. He was among the first to introduce hill-side ditches and horizontal plowing, and we are indebted to his enlightened experience for much of our knowledge on this subject.

Our mode of adjusting the level with the veiw of obtaining the desired grade, differs from Mr. Hardwick's plan, and I will en-

deavor to explain it to you. It is not original with me, and may be familiar to many of your readers.

The spirit level is attached to the cross bar of the common rafter level by means of a screw, so that when the top or upper surface of the spirit level is even with the top of the cross bar, and the bubble settles in the centre, a perfect level is obtained. Thus adjusted, the level is ready for laying off horizontal guide rows. To obtain the grade you wish your ditches to have, obtain first the true level and place an inch block under it, press one end of the spirit level below the top surface of the cross bar, until the bubble settles in the centre, and make a puncture or mark *on the side bar*, exactly even with the top surface of the depressed end of the spirit level. If your grade is two inches, place a two inch block under one foot and press down the spirit level until the bubble again stands in the centre, and make a puncture or mark on the cross bar. And in the same way make your marks on the cross bar to correspond with a grade of three, four or five inches. Your level is now ready for laying off your ditches. If you wish to give them a grade of three inches, which I believe is usual in a twelve feet stride of a rafter level, you have nothing to do, but to press down one end of the spirit level as low as mark number 3, screw it tight, and when the bubble stands in the centre you have the desired grade, or as near an approximation to it as is necessary for your purpose. This plan dispenses with Mr. Hardwick's grade blocks which are fastened by screws to one of the side pieces of his rafter level. You can, without any inconvenience or delay, change your grade so as to adapt it to different ditches or the same ditch, if the diversity of the soil or any other cause should render a change of grade necessary. I do not present this mode of adjusting the level as a new or an original design, but because I consider it more simple and convenient than any which I have seen suggested. A PLANTER.

From the Ohio Farmer.

The Law of Sex.

Mr. Editor.—Occasionally there has appeared in the columns of your paper, articles and paragraphs relating to the law which determines the sex of animals, though I believe nothing very definite or satisfactory has been written.

It seems to be a question which a majority of persons consider a mystery which cannot be fathomed; while those who do speculate upon the subject generally arrive at conclusions that are as unreasonable as to attribute it to the result of chance alone.—There is no reason, however, why this function of the animal economy is not governed by laws as well as any other function of the body, nor any reason why the law should not be discovered.

I have lately been looking over a work by a German author, which contains some views on this subject not generally known. He claims to have demonstrated the truth of his propositions by numerous experiments.—With your permission, I will give a synopsis of the law as laid down by him.

His theory is that each testicle or gland yields a peculiar fluid, the right one the male, and the left one the female. Also that the ovaries contain their peculiar ovum; the right ovary forming the ovum for the male, and the left one for the female. And, further, that the ovum from the right ovary can only be impregnated by the seminal fluid from the right gland and *vice versa*.—His experiments seem to verify the theory. A sow, bred to a boar with the right gland removed, bore only female pigs, though the experiment was several times repeated.—Several dogs had their right glands removed, and they invariably begat females. The same was true of rabbits when the left one was removed, the results were opposite, without exception.

On the other hand, he several times removed the right or left ovary from the female, and though bred to perfect animals, the results were the same. No female became pregnant, if bred to a male, the loss of whose gland did not correspond to that of the missing ovary.

If these things are true they can easily be demonstrated by farmers who have any curiosity to gratify, or any interest in the matter, by a few *carefully conducted* experiments.

Let the experiments be made and the results given. The theory certainly looks much more plausible than anything which has hitherto been given to the public upon the subject. M. L. H.

JUDGE thyself with a judgment of sincerity, and thou wilt judge others with a judgment of charity.

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.

[CONCLUDED FROM PAGE 333.]

The census of 1840 did not ascertain the number of acres of improved land in the United States, so that there are no data showing the increase during the last decade. But looking at the produce of American agriculture, we find in the report of the Secretary of State, for 1856, the following:

Statement, exhibiting the number of acres employed in the production of the different crops in the States and Territories, their total product and value, together with the product and value per acre, for the year 1850.

Products.	Number of acres.	Product of each crop.	Description.	Value of Crop	Product per Acre.	Value of Products per Acre.
INDIAN CORN	31,000,000	592,071,104	bush'ls	$296,035,552	19 1-10 bush.	$9 55
Meadow or pasture lands—that proportion which is regarded improved and exclusive of hay crop	20,000,000	....	....	....	....	....
HAY	13,000,000	13,838,242	tons	138,382,420	1 1-16 tons	10 62½
WHEAT	11,000,000	100,485,844	bush'ls	90,437,260	9 1-8 bush.	8 21
OATS	7,500,000	146,584,179	..do..	51,304,463	19 1-2 bush.	6 82
COTTON	5,000,000	978,319,200	pounds	78,265,376	195 1-2 lbs.	15 64
Rye	1,200,000	14,188,813	bush'ls	9,932,169	11 4-5 bush.	8 26
Peas and Beans	1,000,000	9,219,901	do	6,914,925	9 1-5 bush.	6 90
Irish Potatoes	1,000,000	65,797,895	do	26,319,158	65 3-4 bush.	26 30
Sweet Potatoes	750,000	38,268,148	do	19,134,074	51 bush.	25 50
Buckwheat	600,000	8,956,912	do	5,374,147	15 bush.	9 00
Tobacco	400,000	199,752,655	pounds	11,985,159	499 3-8 lbs.	29 96
Sugar	400,000	237,133,000	do	9,485,320	592 4-5 lbs.	23 71
Barley	300,000	5,167,015	bush'ls	3,875,261	17 1-5 bush.	12 92
Rice	175,000	215,313,497	pounds	4,306,270	1,230 2-5 lbs.	24 61
Hemp	110,000	34,871	tons	4,184,520	634 lbs.	38 04
Flax	100,000	7,809,676	pounds	624,774	78 lbs.	6 25
Orchards	500,000	....	....	7,723,186	....	15 45
Gardens	500,000	....	....	5,280,030	....	10 56
Vineyards	250,000	221,249	gallons	442,498	3 1-2 quarts.	1 77
Other Products	1,000,000					
Improved, but not in actual cultivation	17,247,614					
	113,032,614					

Another Table, from the Compendium of the Census, page 176, giving more fully the values of the Agricultural products of the United States, for 1850, including the annual products of live stock, &c., makes the total for that year thirteen hundred millions, and Mr. De Bow estimated the total for 1854, at sixteen hundred millions.

This table shows us that in 1850 the four largest staples of our country, ranking them according to their annual value, were—

Indian Corn, - - -	$296,000,000
Hay, - - - - - -	138,000,000
Wheat, - - - - -	90,000,000
Cotton, - - - - -	78,000,000

Before proceeding to note some further statistics in regard to Indian Corn, or as it is sometimes called, *Maize*, let me briefly mention the doubt expressed at a recent meeting of the British Association, whether this grain is strictly a plant of the New World, and allow me to refer to the evidence that proves it, as we think conclusively, to be a native grain.

Stress was laid in the British Association on the fact of its occurrence in the floral decorations of Rome in the time of Rafaelle; but it was said in reply, that botanists had always regarded it as a plant of the New World, and the evidence on this point, adduced by Alfonse De Caudolle in his great work on the geographical distribution of plants, was quite complete; and it was sensibly suggested that if it had been a plant of the Old World they could scarcely have failed to raise it, and that Rafaelle's painting it might be accounted for by the interest with which all the products of the New World were then regarded. It is referred to by the most ancient Peruvian historians; it was cultivated by the Aborigines in the time of Columbus, and is still found growing in a wild state from our Rocky Mountains to the forests of Paraguay. The venerable Baron Humboldt, whose eminent authority may be regarded as settling the question, says: "It is no longer doubted among botanists that *Maize*, or Turkish corn, is a true American grain, and that the old continent received it from the new."*

Indian Corn is pre-eminently the great staple of the country, surpassing all others in the area of its cultivation, and in the amount and value of the crop, yielding in 1850, within a fraction of three hundred millions of dollars, being all but equal to the united values of the three next staples in their order, Wheat, Hay and Cotton; and as Indian Corn is not only the most important, but the most universal crop, extending from the northern to the southern limit of the United States; its cultivation would seem to afford a better test than that offered by any other of the progress of American tillage.

In the production of Indian Corn no state has retrograded. The crop in 1840 was nearly four hundred millions of bushels; in 1850 it was within a fraction of six hundred millions, being a gain of 56 per cent., while the increase of the population, during the same time, was only 35 per cent. The estimated crop for 1855, according to the Secretary of the Treasury, was between seven and eight hundred millions, or nearly double the crop for 1840, and the crop for 1856 was estimated at fully eight hundred millions of bushels.

One of our distinguished agriculturists, Prof. Mapes, in an interesting lecture on Indian Corn before the American Institute, has remarked that it may be said of our corn crop, as Mr. Webster said of the turnip crop of England, that its failure for three successive years would nearly bankrupt the nation.

It is with us a staple food of men and of animals. To it we are indebted in part for our beef and in a very large proportion for our pork. In the far West it is fed largely to cattle and pigs for the more convenient exportation of the produce of the country. The number of hogs fattened on it nearly equals the number of inhabitants, and their lard has become a staple article of export. The sugar estates in the West Indies are reported to be mainly supported by American Indian Meal, and its use is extending in Ireland, England, and throughout the world. In 1850, somewhat more than eleven millions of bushels were consumed in the manufacture of malt and spirituous liquors.

While the value of the corn crop has increased so rapidly, the WHEAT crop, from 1840 to 1850, according to the census, had increased only 15 per cent. It was suggested in the report of the Patent Office for 1852 and '53, that this crop would have shown an equal advance with that of Indian Corn, had it not been badly damaged, especially in the North-Western States, before the harvest from which the census was taken; but the statistics of subsequent harvests in particular States seem to render this supposition improbable.

* Those persons who may wish to examine the authorities on both sides of this question, which has been much discussed, will find them arrayed in a learned essay on Indian Corn, by Charles Louis Flint, of Roxbury, Mass., printed in the Transactions of the N. Y. State Agricultural Society, 1849, page 81.

The breadth of land in the United States, uited to the wheat crop, is comparatively mall, and in the older States would appear o be diminishing.

In New England the culture of wheat is apidly declining; in the Middle States it s nearly stationary, the increase for the ten ears previous to 1850 being only about 15 er cent. In the North-Western States its ulture has rapidly increased; and it is from his district that the largest supplies for ex-ort are derived.

Chicago, which, twenty years ago im-orted flour and meal for her own consump-ion, has established brands of flour, which re now recognised throughout Europe; and he is shown by recent statistics to be the argest primary grain depot in the world, ivaling Odessa and Galatz, Dantziz and St. Petersburg, while she leads all other ports f the world also in the quantity and quality f her exports.

The population of Chicago, which, in 850, was 29,000, in 1856 had increased to 04,000.*

The Census of New York, for 1855, hows that her wheat crop, once so famous, s actually decreasing, owing, as it is sup-osed, in part to the ravages of insects, and n part to diseases of the plant, assisted, per-aps, by a gradual deterioration of the soil.

The wheat crop in New York was twelve illions (12,286,418) in 1840, and only ine millions (9,092,402) in 1855, a de-rease of twenty-five per cent., while the rop of INDIAN CORN, in the same State, ncreased during the same period from about en (10,972,286) to twenty millions (19,-99,691), or nearly one hundred per cent., howing, when taken together, not a dimi-ution in the bread crop of the State, for he joint increase is five millions of bushels, but simply a partial substitution of Indian corn for wheat.

In no country can a bread crop be raised with less labor than Indian corn generally throughout the United States, and it has been estimated that the same amount of toil of a man and horse which will raise a bushel of wheat in England, will raise ten bushels of corn on favorable soil in this country.

The Patent Office Report for 1855, in an interesting paper, by Mr. D. J. Browne,* shows that a comparison of the nutritious values of corn and wheat, ranging at from two to three times the price of a bushel of corn, gives a decided preference to the corn; and this fact has, doubtless, had its influence in extending its consumption among our people.

But as yet neither this fact nor the other excellencies of corn meal are appreciated in Europe; and the exports of this grain are very much less than those of wheat. In 1854 the proportions were $40,000,000 worth of wheat to $7,000,000 worth of corn. Experiments in the preparation of corn are being made by the Government of Prussia, and elsewhere in Europe, which will probably result in its more rapid introduction as a staple article of food.

Looking at the aggregate EXPORTS of the country for the past year, 1857, to learn the proportion due to the culture of the soil, we find them to be as follows:

The Sea - - -	$3,739,644
" Forest - -	14,699,711
Agriculture - -	75,722,096
Tobacco - - -	20,260,772
Cotton - - -	131,575,859
Raw Produce - -	2,103,105
Manufactures - -	30,805,126
Specie and Bullion -	60,078,352

Total value of Exports $338,785,065

of which there was due to the culture of the soil (agriculture, tobacco and cotton,) two hundred and thirty millions (229,661,-832), or more than two-thirds of the sum total.

Comparing this amount with the exports due to the culture of the soil in 1847, we

* The shipment of grain in 1855, was 2,200,-00 quarters, (of 8 bushels each,) being the argest quantity ever shipped from any one port the world; 77.000 barrels of pork; 56,000 bar-els of beef. A direct trade between Chicago nd Liverpool, *via* the St. Lawrence, without ranshipment, was successfully opened in 1856. y the Dean Richmond, a schooner of 380 tons egister, drawing 9½ feet, with 400 tons of wheat; he was the largest sized vessel that could come hrough the canal, but it is said that a moderate utlay would admit ships of 1000 tons.

The freight and charges were less than *via* ew York, or from the Black Sea. *Mark Lane azette.* Letter of Mr. W. Kernaghan, of Dub-n, copied VIII. Vol. *Working Farmer*, page 234.

* (See page 456.) The analyses relied upon were those of Sir Humphrey Davy, assigning 95 per cent. of nutritious matter to wheat, and 77 per cent. to corn, determining the intrinsic value of the two grains to be in this proportion; so that $1 being the price of corn, wheat would in reality seem to be worth no more than $1.23.

find that they were in that year one hundred and thirty-one millions, the increase for the ten years being more than seventy per cent.

The exports of breadstuffs for the last fifteen years have singularly fluctuated, and, although their large increase from twenty-seven millions (27,701,121), in 1846, to sixty-eight millions (68,701,921), in 1847, and their fall again, in 1848, to thirty-seven millions (37,472,751) may be accounted for by the Irish famine of 1847, arising from the potato rot and short crops generally; it seems less easy to account for the differences in the exports of the last five years. They were in

1852, twenty-five millions	(25,857,027)
1853, thirty-two millions	(32,985,322)
Rising, in 1854, to sixty-five millions - - -	(65,941,323)
Sinking, in 1855, to thirty-eight millions - -	(38,895,348)
And rising, in 1857, to seventy-seven millions -	(77,187,301)

They must be owing, however, to fluctuations in the home supply, as well as in the foreign demand, affected as the latter has recently been by European and Eastern wars, and in the consequent suspension of trade with the Baltic, as the average export price of flour from the country, as ascertained by the Treasury Department for the years in question, throws little light upon it.

That price was as follows:

1852 - - -	$4.24
1853 - - -	5.60
1854 - - -	7.88
1855 - - -	10.10

A statement showing the actual average export price of flour at New York from the year 1800, has been published by the Department.

It is desirable that the causes of such fluctuations should be ascertained as nearly as possible, for, while unexplained, they are calculated to excite doubts in regard to the certainty of agricultural profits, and the element of uncertainty, wherever found, is calculated to discourage and to deter.*

Passing from the great staples of wheat and Indian corn to the other agricultural products of the country, a comparison of the Census of 1840 with that of 1850 gives us these general results,

And, first, as regards Stock:

The number of HORSES, asses and mules, had increased in number something more than half a million (560,381), the total in 1850 being about five millions (4,896,650). The number of horses had not increased as rapidly as other stock, in consequence of the extension of railroads lessening their demand for the purposes of travel; but, in the newly-settled States, where railroads were but commencing, the increase of horses had kept pace with the population. There is about one horse to every five persons in the United States. The 500,000 asses and mules returned are almost confined to the Southern States, where the climate is regarded as better adapted to this animal than the horse.

The NEAT CATTLE had increased nearly three and a half millions, and numbered over eighteen millions (18,378,907), of which six millions (6,385,094) were milch cows, about two millions (1,700,744) working oxen, and ten millions (10,293,069) other cattle.

The rate of increase of neat cattle for the ten years, was about twenty per cent. The amount of butter produced in 1850, was three hundred and thirteen millions of pounds (313,266,962), and of cheese, one hundred and five millions of pounds (105,535,129). The average value of the exports of these two articles, from 1845 to 1850, was about one million and a half of dollars.

SWINE had increased four millions, numbering in 1850 over thirty millions (30,354,213).

SHEEP had increased two and a half millions, and numbered nearly twenty-two millions (21,723,220).

In New England there was a remarkable decrease in their number, from 3,811,307, in 1840, to 2,164,452, in 1850, a decrease of forty-five per cent. In the five Atlantic or Middle States, New York, New Jersey, Pennsylvania, Delaware, and Maryland taken together, there was a decrease of twenty-two per cent. The augmentation has chiefly been in the States south of Maryland, and west of New York.

The returns of Wool were as follows:

1840 - 35,802,114	pounds -	$11,345,318
1850 - 52,516,959	" -	15,755,088
1855 - 61,560,379	" -	23,392,944

* See a paper by J. J. Dawson, Esq., on current price and cost of corn in England, during the last ten years, as illustrating the value of Agricultural Statistics.---*London Statistical Journal, for March* 1855.

an increase of about forty-six per cent. The average weight of the fleece yielded by each sheep was, in 1840, 1.84 pound, and in 1850, 2.43, indicating a great improvement in the breed. This improvement is chiefly shown in the returns relative to Vermont, Massachusetts, and New York.*

The total value of live stock in the United States in 1855, was about five hundred and fifty millions (544,189,516,), and the value of animals slaughtered, about one hundred and twelve millions ($111,703,142).

The grain, root and other crops, from 1840 *to* 1850:

Rye had *decreased* from eighteen millions (18,645,567) of bushels to fourteen millions (14,188,813).

Oats had increased from one hundred and twenty-three millions (123,071,341) to one hundred and forty-six millions (146,584,179).

Potatoes (Irish and sweet) had decreased from one hundred and eight millions of bushels (108,298,060) to one hundred and four millions (104,066,044).

Hay had increased from ten millions of tons (10,248,108) to thirteen millions (13,838,642).

Hops from one million (1,238,502) of pounds to three millions (3,497,029) in 1850, and, as estimated by the Secretary of the Treasury, to nearly five millions (4,820,752) in 1855, indicating a rapid increase in the consumption of Lager-beer.

Cotton had increased from eight hundred millions of pounds (799,479,275) in 1840 to nine hundred and eighty millions (978,317,200) in 1850, and to one billion and eighty-eight millions (1,089,409,908) in 1855.

Rice from eighty millions of pounds (80,841,422) to two hundred and fifteen millions (215,313,497), while

Tobacco has *decreased* from two hundred and nineteen millions of pounds (219,163,319) to one hundred and ninety-nine millions (199,752, 655).

Wool had increased from thirty-five millions of pounds (35,802,114) to fifty-two millions (52,516,959).

Silk Cocoons had *decreased* from sixty-one thousand pounds (61,652) to ten thousand (10,843).

Wine had increased from one hundred and twenty-four thousand gallons (124,734) to two hundred and twenty-one thousand (221,249).

From a table of the actual crops per acre in the different States,* it would seem that there is a diversity so great as to confirm the doubts in regard to its correctness frankly intimated by the compiler, who states that nothing better can be framed from the returns, which, in general, were very carelessly made, or entirely neglected.

In Wheat we find the average number of bushels to the acre to be 5 in Alabama and Georgia, 7 in North Carolina, Virginia and Tennessee, ranging upwards in the other States until it reaches 12 in New York, Ohio and Indiana, 13 in Maryland and Vermont, 14 in Iowa and Wisconsin, 15 in Florida, Pennsylvania and Texas, and 16, the highest average, in Massachusetts, being three times the average of the lowest.

In Rye we find the average of bushels to the acre to be 5 in Virginia, 7 in Georgia and Tennessee, 8 in New Jersey, 17 in New York, and 25 in Ohio, or five times the lowest average.

In Indian Corn we find the lowest average to be 11 bushels to the acre in South Carolina, 15 in Alabama, 16 in Georgia and Louisiana, 17 in North Carolina, 18 in Mississippi and Virginia, and so rising upwards until it reaches 27 in New York and Maine, 32 in Vermont and Iowa, 33 in Indiana, Illinois and New Jersey, 34 in Missouri, 26 in Ohio, and 40 in Connecticut, some three and a half times the lowest average.

* The consumption of foreign wool in the United States, it may be remarked, appears within the last five years to be diminishing slightly in quantity, although not in value; but the importation of woolen manufactures is increasing. The importation of foreign wool was,

in 1840....	9.813.312 pounds....	$819.830
" 1850...	18.669.794 "	1.681.690
" 1855...	17.805.511 "	1.940.000

The importation of woolen manufactures was,

in 1840.....	$9.970.868
" 1850.....	18.614.589
" 1855.....	23.603.223

The total consumption of foreign wool in England, in 1855, was 66 millions of pounds. Total production of woolens, $180.000.000, and exports of woolens, $18.000.000.

The total consumption of foreign wool in France, in 1855, was 77.300.000 pounds. Total production of woolens $200.000.000, and exports of woolens $38.000.000. The total production of woolens in the United States, in 1854 and 5, was $48.000.000.

* Given in the Compendium of the Census, page 178.

In Oats we find the lowest average, 10 bushels to the acre in North Carolina, 12 in Mississippi and South Carolina and Alabama, 13 in Virginia, 18 in Arkansas, Georgia and Kentucky, 20 in Delaware, Indiana and Maine, 21 in Connecticut, Maryland and Ohio, 22 in Pennsylvania, 25 in New York, 26 in Vermont, New Jersey, Missouri, Michigan, and Massachusetts, 29 in Illinois, 35 in Wisconsin, and 36 in Iowa.

Of Rice we have returns only from three States, Louisiana giving 1,400 pounds to the acre, South Carolina 1,750, and Florida 1,850 pounds.

Sweet Potatoes vary in quantity from 65 bushels to the acre in Texas to 175 in Louisiana, 200 in Alabama, and 400 in Georgia.

Irish Potatoes yield from 65 bushels to the acre in North Carolina, 75 in Maryland, New Jersey, Ohio and Pennsylvania, 100 in Indiana, Iowa, New York and Rhode Island, 120 in Maine and Tennessee, 100 in Georgia and Wisconsin, 130 in Kentucky, 140 in Michigan, 170 in Massachusetts, 175 in Florida, 178 in Vermont, to 230 in New Hampshire, and 250 in Texas.

In this table particularly it is difficult to account, except on the supposition of error, for so large a difference in the average yield per acre between States so alike in character, as Alabama (60) and Georgia (125), or between Connecticut (85), Vermont (178) and New Hampshire, (230).

No question, perhaps, connected with American Agriculture is of more general interest and importance than the measure of profit which may reasonably be expected from capital invested in farms, and managed with that degree of skill and industry, which are the recognized requisites to success, in the various branches of commerce and manufactures, in the trades, and learned professions.

It has been truly remarked, that "mankind have a habit of graduating the rank of labor by the recompense it receives; and it is undoubtedly the conviction that agricultural labor is less profitable than many other employments pursued in cities and large towns, that induces so many thousands of our ambitious and energetic youths, especially in New England and the Atlantic States, to forsake their rural homes, and the half-cultivated farms of their fathers, in the hope of more rapidly achieving independence, and perhaps fortune, in communities where every branch of trade is already overcrowded with anxious competitors.

The same idea is not unfrequently entertained by capitalists. The common belief seems to be, and it is, doubtless, founded upon common experience, that the profits of farming operations are very moderate, and that it is idle to expect more than a small per centage from capital thus invested. A contrary belief is usually attributed to an undue enthusiasm with no basis of fact, and occasional instances of large profits are regarded as extraordinary exceptions, that are to be attributed to local and special causes, and are not, therefore, to be allowed any weight in the support of a general theory.

It is most desirable that accurate statistics in regard to the fair profits of capital invested in agriculture, after just allowance for the industry required for its development, should be gathered from all sections of the country, and it would be well if some inquiries to this end were embodied in the Agricultural schedules for the approaching Census.

The fact is as yet but imperfectly appreciated among us, that Agriculture, which, in its origin was but an art, has been gradually raised to the dignity of a science; and now thanks to the discoveries of the great practical and analytical chemists in Europe and America, of whom Liebig is the chief, stimulated and aided by the mechanical invention, for which our age and country are so remarkable, it occupies a position of pre-eminence unknown during the last century.

"There is, I believe," says Mr. Everett, "no exaggeration in stating that as great an amount and variety of scientific, physical and mechanical knowledge, is required for the most successful conduct of the various operations of husbandry, as for any of the arts, trades or professions."

Assuming this position to be correct, it is clear that no amount of evidence in regard to the profits of farms conducted by men wanting in this wide range of scientific, physical and mechanical knowledge, can determine the profits that may be reasonably expected from farms of the like capability, where that varied knowledge institutes and guides every operation.

But there is reason to believe, that while the limit of Agricultural profits generally throughout the country is as much below

the line it is capable of reaching, as the present standard of Agricultural education is below that high standard to which Mr. Everett directs the ambition of the American farmer, there are good grounds for the opinion, that with the increase of an Agricultural literature, the diffusion of books and newspapers, of farmers' clubs, of State, county, and town, Agricultural Societies, of national and local fairs and exhibitions, there is a perceptible and repaid improvement in the rural economy of the country, in the intelligent culture of the soil, and in the profits of Agricultural capital.

So long ago as 1795, Mr. Burke placed the proper profits of a proprietor of 1,200 acres at 12 per cent. Sir John Sinclair a quarter of a century later, declared the proper profits at 10 to 15 per cent. Mr. Rives, of Virginia, by whom these facts were mentioned in a very interesting Agricultural address, stated the profit of the model farm at Gignon, near Versailles, at 14 per cent. The "*Revue des deux Mondes*" for February 15th, 1858, in an article entitled, "Les Questions Agricoles en 1848," mentions that the net profits of the farm at Bresles, in the department of the Oise, rose in 1856, to 246,000 francs upon a capital of 800,000 being more than 30 per cent.

Occasional accounts in our Agricultural papers indicate a rate of interest, which if verified as one that could be reasonably anticipated with a due share of skill and industry, would immediately induce the investment of millions of capital in Agricultural operations, to the benefit of the country at large, as well as to the individuals making the advances.

One point that should not be lost sight of in a consideration of the advantages attendant upon agricultural operations is the safety of the capital invested, compared with the chances of loss attendant upon commercial or manufacturing investments. The Hon. Emory Washburne, of Massachusetts, in an address before the Worcester Agricultural Society, in 1854, stated some facts bearing upon the question, which a statistical inquiry, if one could be accurately made, into the successes or reverses of the various pursuits in which our countrymen engage, might probably multiply to an extent, that, without proof, would hardly be credited. Of the merchants in Boston doing business at a certain wharf during forty years, only six became independent, the remainder failed or died destitute of property. Of one thousand merchants, having accounts at a principal Boston bank during the same year, only six had become independent.

Another investigation led to the startling result, that of every hundred traders, but seven succeed in acquiring wealth. From such reverses the farmer is comparatively free. Of eleven hundred and twelve bankrupts who took the benefit of the bankrupt law in Massachusetts only fourteen were farmers; and of twenty-five hundred and fifty bankrupts in New York, only forty-six were farmers. Less than two per cent. of the bankrupts belonged to the Agricultural population, although that population so largely exceeds all the rest of the people however classified.

At the present moment, when the leading manufacturing interests of the country are in a languishing condition from their recent reverses, and the conviction is generally felt, of the precariousness of their profits for the future, dependent as those profits are upon the varying policy of opposing parties; the claims of Agriculture upon the attention of capitalists, as well as statesmen, are likely to be more fairly scrutinized than when commerce and manufactures were in the full tide of success. Should the schedule for the approaching Census include the question of Agricultural profit in such a form that the returns may afford reliable data for prudent calculation, the next decade may perhaps see an investment of capital from the Atlantic States, in the cultivation of wheat and corn in our western valleys, to an extent that shall materially swell our exports of breadstuffs, and constitute them the chief element in our foreign exchanges

Much has been said of late years of a gradual deterioration of the soil in the older States, as evidenced in part by the decreasing ratio of crops to the acre, as compared with the ratio in former years and with the usual ratio in other countries.

Mr. Morrill, M. C., of Vermont, by whom a bill has been introduced into the House of Representatives designed to grant to the several States some ten millions of acres to be divided amongst them in proportion to the number of senators and representatives they send to Washington, with the view of promoting Agricultural education and Agricultural science, by the establishment of an Agricultural college in each State, has made some startling statements upon this subject.

He affirms that Agriculture is rapidly declining in every State of the Union, that the quantity of food produced bears each year a smaller proportion to the number of acres under cultivation, and that over a very wide area some of the most useful crops bid fair to become extinct.

A writer in the "Year Book of Agriculture for 1855," on the "Alarming Deterioration of the soil," referred to various statistics of great significance in connection with this subject. Some of them regarded Massachusetts, where the hay crop declined 12 per cent. from 1840 to 1850, notwithstanding the addition of 90,000 acres to its mowing lands, and the grain crop absolutely depreciated 6,000 bushels, although the tillage lands had been increased by the addition of 60,000 acres.

In Indiana the river bottoms which used to produce an average crop of sixty bushels of corn to the acre, now produce but forty. In Wisconsin, which is younger still, it is estimated that only one-half the bushels of wheat are now raised to the acre that were raised twleve years ago; and the writer declares as the conclusion of the whole matter, "that the soils of New England, after all the admonitions we have received, are annually growing poorer, and that *even the lands of the great West* are rapidly becoming exhausted of their fertility."

He refers to the large falling off of the wheat and potato crops in New England, which have however been replaced by Indian corn, and also to the falling off of wheat in Tennessee, Kentucky, Georgia and Alabama, to the extent of 60 per cent. from 1840 to 1850, and assumes that the Agricultural statistics of each State tell the same sad story.*

As regards falling off in the production of the country, I think it is clear from a comparison, not of wheat and potatoes alone, but of the total products of the soil, especially of Indian corn, in 1840, with that of the same crops in 1850, that Mr. Morrell is mistaken; but as productiveness of crops and distructiveness of soil are saidto be the two most prominent features of American Agriculture, the large harvests in our young States ought not to blind us to the fact that the fertility of those parts of the older States which once yielded as abundantly, seems to have been steadily diminishing for a course of years.

This fact is exhibited, not only in the wheat lands of New England and other parts of the North, but on the tobacco fields of Virginia, and the cotton plantations of the South;* and the subject undoubtedly deserves the most careful investigation.†

The deterioration of our soil is doubtless owing, in a great part, to a careless system of cultivation, common to new countries where land is cheap and labor is dear, and the soil is naturally productive, and the individual cultivator is intent upon large immediate returns, thoughtless of the permanent fertility of his farm, careless of the interests of his successors, and regardless of the prosperity of the community at large. It has been suggested that every agricultural people runs the same race of exhausting culture, shallow plowing, a continuous course of impoverishing, with neither rest, rotation nor sufficient manure; and that necessity alone can convince them that duty and interest both demand, that land shall be so tilled as to increase rather than diminish in fruitfulness. Such a necessity in the lessening crops of the Atlantic States, and westward emigration in search of more fertile territories, already presents itself to the intelligent American agriculturist: and the reasonable belief that the same exhaustive system will soon begin to tell upon the most productive regions of the West, has led to the discussion in agricultural newspapers, and at farmers' clubs, of the philosophical causes of the exhaustion, and the best means of renovation.

In some sections of the country efforts to restore exhausted lands have been attended

* I gather this account of Mr. Morrell's statements from an editorial in the N. Y. Evening Post.

* Progress of Agriculture in the United States, by Daniel Lee, M. D., Patent Office Reports for 1853, p. 2, and "Southern Agricultural Exhaustion and its Remedy," by Edmund Ruffin, Esq., of Virginia: read before the South Carolina Institute at Charleston, same volume, page 373.

† Prof. Liebig mentions the fact, that the value of tobacco depends upon the quantity of potash contained in the ashes; and that accurate analyses of the various sorts of tobacco have been executed by the Administration at Paris, as furnishing a mode of distinguishing the different soils on which tobacco was raised, as well as the peculiar class to which it belonged. The Professor then says: "Another striking fact was disclosed through these analyses. *Certain celebrated kinds of American tobacco were found gradually to yield a smaller quantity of ashes, and their value diminished in proportion.*"

with the most marked pecuniary success. Mr. Ruffin, of Virginia, estimates the increased value of reclaimed lands in Eastern Virginia, by marling and liming, from 1838 to 1850, at some thirty millions of dollars. In the well known case of a similar success from claying a light soil by the celebrated Coke of Norfolk, afterwards Earl Leicester, that gentleman doubled the value of his estates in Norfolkshire: and among numerous instances of immense improvement simply from drainage and deep plowing, with but little aid from fertilizers, may be mentioned one cited by Prof. Johnston of the Home farm at Yestees, belonging to the Marquis of Tweedale, where the land, by these means, was raised in value eight times —from 5 shillings to 40 shillings rent per acre.

There are no reliable data from which we can now gather the progress of deterioration in productive lands in the United States, or the reclamation of exhausted lands; but the rapid increase in the use of *guano*, the most powerful of restoratives, indicates to some extent the increasing attention paid to fertilizing.

The consumption of *guano* for 1855, as stated by Prof. Mapes, was about 140,000 tons. The amount sold in England, during the year 1855, was stated by Mr. Nesbitt at 210,000 tons being an increase of twenty per cent. on the consumption of 1854, which was also an increase of twenty per cent. over that of 1853; this increase has taken place in the face of a rise in the price, from forty-five to about eighty dollars per ton.

It would seem proper that the schedules for the new Census, should embrace inquiries in regard to the deterioration or improvement of the soil, which may be shown, not only by the ratio of crops to the acre at successive periods, but by the market value of the same lands at the stated intervals; and that the schedules should also exhibit generally the quantity and prices of the various fertilizers in use—barn-yard manure firstly and chiefly, then guano, poudrette, lime, gypsum, marl, muck, and so forth, that are yearly devoted to the enrichment of our soils. Upon this item of manure insignificant as it might seem to the unreflecting mind, depends the continuous prosperity of our country. This is the secret of England's Agricultural wealth. Mr. Webster, in his sketch of English Agriculture, quoted the extraordinary fact stated by M'Queen, "that the value of the animal manure annually applied to the crops in England, at current prices, surpasses in value the whole amount of its foreign commerce," and he added, 'there is no doubt that it greatly exceeds it.'*

The schedules might also advantageously give us, not simply the amount of new lands brought into cultivation, but of the worthless lands that have been reclaimed by drainage.

In almost all the States extensive tracts of swamp lands are found, not only unfit for cultivation, but frequently inducive of that fearful scourge of health and happiness, fever and ague, that year after year prostrates the energies, and shortens the lives of tens of thousands of our countrymen.

Large grants of these swamp lands have been gratuitously made by the Federal Government to the States, in the hope of their reclamation through measures to be adopted by the State Governments. Since 1849 nearly sixty millions of acres have been thus granted.† In the drainage of large tracts of land we have the benefit of the experience of Europe, especially Holland, where the Harlem Lake, thirty-three miles in circumference, and thirteen feet deep below the tide, has, since 1839, been converted into a most fertile tract, occupied by some two thousand inhabitants, and exhibiting fields of verdure, dotted with numerous cottages, and enlivened by cattle, horses and sheep, grazing on the fruitful meadows. The lands thus reclaimed from the ocean are of extraordinary fertility, and are estimated as capable of supporting seventy thousand persons.

Of the pecuniary results of drainage in this country Gov. Wright, of Indiana, quoted an example in a public address touching the marshy lands of that State embracing three thousand acres. He mentioned a farm of 160 acres which had been sold at five hundred dollars, and after an expenditure of two hundred dollars in drainage, was worth upwards of three thousand dollars, or an advance of more than 500 per cent.

But, apart from these large tracts of overflowed lands, scarcely a farm in the country but would be improved by thorough drainage, and it would not be difficult to ascertain the number of acres under-drained in each year of the Census, nor the estimated

* Webster's Works, Vol. I., p. 448.

† See an interesting paper on drainage by Henry F. French, of Exeter, New Hampshire, in the Patent Office Reports for 1856, page 160.

additional value which they thereby received.*

Looking at the acreage now devoted to Indian corn, to say nothing of our other crops, it has been estimated that by the adoption of an improved system of Agriculture, embracing drainage, deep ploughing and skilful manuring, the entire crop now yielding 400 millions of dollars, might, upon the same breadth of land, be trebled if not quadrupled. At present, with occasional exceptions, our average crops per acre are even less in our most fertile and almost virgin States than in the soil of Europe, that has been cultivated for centuries.

Take Wheat, for instance. The average crop per acre in New York, Ohio and Indiana, is 12 bushels; in France it is 13; in England, 21;† in Flanders, 23; in Scotland, 30 (on the authority of Professor Johnston); and in New Brunswick, 19.

How the average might be increased throughout this country by careful culture, we may, in part, learn fron the returns of occasional crops in England of seventy bushels, in New York of sixty, on the prairies of forty-four, and at San Jose, as is reported, of eighty-seven.

Yet another topic closely connected with the interests of American Agriculture is the recent diminution of the proportion of the male population engaged in Agricultural pursuits, as compared with the number engaged in commercial and other pursuits. The precise ratio of that diminution cannot be ascertained from the Census, for the reason that the tables of 1850, on the leading occupations of the people, were based upon the whole number of male inhabitants over fifteen years of age, including all the free males, and three-fifths of the male slaves; whereas the former tables of occupation, made in 1840 and 1830, were based upon the entire population. The Census of 1840 made the portion engaged in Agriculture 77.4 per cent. for both sexes, that of 1840 only 44.69.

There is, therefore, reason for believing that the proportion of the population devoted to Agricultural pursuits is decreasing: and it is important that the schedules of the next Census should be drawn with reference to the determination of this point with entire accuracy, and should develop whatever facts may be essential, to enable us to discover, and if possible to correct, the causes that may be diverting an undue proportion of American industry from the culture of the soil.

The attractiveness of town and city life for the labouring classes may be lessened by a study of the tables of mortality, showing that the average duration of life is much larger in the rural districts.

In England the average duration of life is forty-five years in Surrey, but only twenty-five in Manchester and Liverpool.*

A paper, by Mr. Edward Jarvis, on vital statistics at Dorchester, in Massachusetts, red before the British Association in January, 1840, showed that, out of 1,700 persons,

The average life of Farmers was	45	years
" Merchants	33	"
" Mechanics	29	"
" Labourers	27	"

Looking from the average years of life to the increase of the male population, we find it stated that in Massachusetts, among the cities and towns it is six per cent., while among the Agricultural population it is 8 per cent., a difference of male births in favour of the rural districts of 33 1-3 per cent.

These facts, if verified by the national statistics, and brought home to the consciousness of the people, are certainly calculated to restrain a preference for the crowded streets and impure atmosphere of our cities, over the broad fields and bracing air of the country; and the feverish anxiety for rapid gains in mercantile pursuits, may be advantageously checked by statistics showing the uncertain gains of commercial speculations, and the certain profit of enlightened Agricultural toil.

The leading facts at which we have glanced, of an increasing foreign demand for breadstuffs, the limited breadth of our

* The committee on drainage, in their report to the State Agricultural Society of New York, in 1848, assert, that "there is not one farm out of every seventy-five in this State, but needs draining—much draining—to bring it into high cultivation. May we venture to say that every wheat-field would produce a larger and finer crop if properly drained."

† Prof. J. F. Johnston, 1849.

* John Yates', Esq., Paper on our National Strength, tested by the numbers, the age, and the industrial qualities of the people, read before the British Association at Glasgow, September, 1855.

arable land, which thousands of our citizens have been taught to regard as inexhaustible, the gradual deterioration of the soil from a wasteful system by which the constituents of fertility are removed with each successive crop, without being restored by appropriate manures—a system based upon the desire for immediate gains, without thought of the sacred duty that devolves upon us to transmit the soil to our posterity, with undiminished productiveness, that it may sustain in comfort and happiness the unnumbered millions that are presently to occupy our land; these and similar consideratians connected with the present and future prosperity of our country, appealing at once to the interest and the patriotism of the nation, may be so elaborated and diversified, and verified by the tables of the Census, that its returns shall teach us not simply lessons in political economy but lessons of daily duty, the benefits of which shall be reaped alike by the present and future generations.

There are various topics connected with American Agriculture on which I would like to touch, did time permit me. One, the recent and rapid introduction of improved agricultural machinery soon probably to be followed by the use of steam plows and other machinery worked by the same motor, overcoming, to a great extent, the chief difficulty of the American farmer in the high price of labour; that feature of our agriculture which constitutes so marked and essential a difference between the practical agriculture of America and Europe.

Another is the spread of agricultural science, through the efforts of the patent office distributing their reports and seeds gathered from Europe; through the multiplication of books and papers devoted to the subject, and by county, state and national societies and farmers' clubs, in their frequent meetings, addresses, and exhibitions of agricultural implements and products.

What the country now most requires in reference to its agriculture, is, that its condition should be faithfully photographed in the returns to each Federal Census, and it will be for the Agricultural Section of this body to prepare well considered suggestions for the new schedule and submit them to the Federal Government. Such suggestions will appropriately come from the American Geographican and Statistical Society, in view of its national character and the scope of its labours; and such suggestions, judging from the past, the Federal Government, will cheerfully receive and carefully consider.

Among the additional items which might advantageously be included in the schedules, I would suggest the following:

As regards persons employed in farming.—The proportion of the population thus employed of both sexes. Their average life, as compared with that of persons living in towns, and of other trades.

As regards capital employed in agriculture.—Not only the proportion invested in land, stock and implements, but the profit thereon received during the year immediately preceding the Census.

As regards the farms.—Not only the improved and unimproved lands, and the proportion in meadow, pasture or tillage, but the number of acres of each farm that have been drained; the number requiring drainage; the number drained during the last year; the cost of draining, and the value of the land before and after.

In regard to the improvement or deterioration of the soil.—The average of each crop and cost of each per acre; the average of bushels or tons to the acre, and the cash value of each on the spot.

In regard to manures.—The amount, variety, and cost of those applied during the last year, and the rate of cost per acre.

Other suggestions will doubtless, be made, a collation of which, by the Bureau of the Census, may afford us in future years, the means of tracing the progress of American agriculture, and reading its actual condition at each decade, with the same facility with which a prudent merchant reads the past and present of his business in the carefully prepared balance sheet; and if the future of America shall continue to exhibit the same steadily progressive advance that we find in her past, the tabular results of each succeeding Census, dry and uninteresting as they may seem to those who shall see in them but columns of figures, will in fact develop the fulfilment of some of those prophesies of the coming wealth and splendour of the Western Continent, that when occasionally uttered by our far-seeing economists, are apt to be regarded as the careless dreams of visionary enthusiasts.

Mr. President and Gentlemen, I cannot close this address without remark-

ing, that the increasing application of natural science to rural economy, will closely connect the Agricultural with the other Sections of your body, and that our Agriculture is the National interest which is to be chiefly benefitted by their learned researches.

The late Prof. Johnston, of Edinboro', whom I was so happy as to know during his visit to this country, and whose admirable lectures in the United States have connected his name with American as it was already identified with British Agriculture, on one occasion dwelt upon the aid which the art of culture receives from every branch of science, and this association is, I trust, destined to verify the correctness of his remarks.

The Section of TOPOGRAPHY,* embracing the physical geography of the Continent, and the topography of the several States and Territories in detail, concerns, among much else that is interesting, the extent and character of our arable soil, or mountain elevations and depressions; our table-lands and low plains, and in connection with the section on HYDROLOGY,† will exhibit the influence of the ocean and the gulf, of our lakes and rivers, of tides, gulf-streams, prevailing winds and storms on the capabilities of the country, and the practices and profits of its cultivators.

The Sections on GEOLOGY‡ and METEOROLOGY,‖ have an equally direct bearing upon Agriculture, in explaining the nature of the rocks and of the soil, the fall of rain, the necessity for irrigation and for drainage.

The Section on BOTANY,§ may materially aid the farmer, by teaching him the nature of the weeds that check his progress; of the rust, smut, and mildew which attack his cereals; of the cause yet to be discovered, of the rot in the potato; of the mutual adaptation of plants to the soil; of their special habits and natural structure, their increase and decrease in various localities.

The Section on ZOOLOGY and ANIMAL PHYSIOLOGY, embraces by your classification, domestic animals and their commercial value, their various breeds, the rearing of stock, and it perhaps properly includes the agency of animal life in fertilizing the soil. That on COMMERCE relates to the transport and exports of breadstuffs, and their relation to our foreign exchanges; that on MANUFACTURES to our Agricultural implements, enlarging our production by diminishing the necessity for human labour; and that on FINANCE, to our national wealth, of which Agriculture is the most prominent feature.

We began, gentlemen, by recognizing in Agriculture the largest material interest of our country, constituting the bulk of her wealth, and indicating, in no small degree, the physical comfort, the prosperity, and the civilization of our people.

We next consider its relation to less favoured foreign lands, whose children look to us for food:—a relation that invests the quiet labours of our farmers with an interest beyond the seas, not simply in shaping commercial speculation, and regulating among merchants the price of bread, but in gladdening distant homes, in staying the march of famine and starvation, in allaying popular discontent, and even averting national revolutions.

After a survey at the area, the population, the products, and the statistics of our great American farm, of its home resources, its foreign markets, and its probable future, we close with the thought, that for the advancement of this great interest, which supplies millions with healthful and profitable employment, and other millions with their daily bread; canals and railroads intersect our continent, extending westward towards the far Pacific; ships whiten the ocean, and steam labours in a thousand forms. That to supply its workmen with fitting implements, inventive genius is ever wakeful, and mechanical skill unceasingly active. That in their behalf chemistry, by the crucible and analysis, is extorting from nature her hidden secrets; and science, in all her forms, is leading her skillful aid to perfect, in this advanced and advancing age, the art that was born with the creation, in the garden that was given to man to dress and to keep it.

We close with the thought, suggestive of thankfulness and good will, that all these agencies are at work for the benefit of our universal brotherhood, to lighten

* Mr. H. V. Poor, Chairman.
† Rev. Dr. Hawks, Chairman.
‡ Lieut. E. L. Viele, Chairman.
‖ Henry E. Pierrepont, Esq., Chairman.
§ Rev. Joseph P. Thompson, Chairman.

the primeval curse, and to compel from our common mother, for the benefit of the children of a common Father, more varied and abundant harvests, with greater certainty and with lessened toil.

Let us also reverently remember, gentlemen, in our study of the laws of Political Economy by the guiding light of statistics, that the truths which we seek to discover, are a part of that universal law whose seat is the bosom of God, and whose voice the harmony of the world.

Nor let us ever forget, in the contemplation of our unparalleled blessings, that the happiness and prosperity of a nation depends infinitely less on their material wealth, than upon the observance of those great rights and duties which our fathers solemnly recognized when we took our place in the family of nations.

From the Working Farmer.

Increase in the Cost of Food.

It may be considered as one of the most serious questions in the political economy of the United States that, notwithstanding the infancy of the nation compared with the venerable empires of the old continent, and the newness and natural fertility of its soil, the price of human food, particularly that of animal products, has been gradually increasing for a long series of years. In other words, the miner of gold, silver, copper, iron, lead or coal, or the worker in any natural products, must give a larger quantity of them now for his necessary supply of meat, than he ever gave before, taking the average of any decade of years since America began to be a civilized nation.

With the exception of occasional spasmodic advances, or depressions below the line, the upward tendency of the price of food-producing animals in the United States is just as regular and certain as the inclined plane of any railway from the sea-board to the interior. * * * * *

Now, that the present prices are not spasmodic, nor attributable to the ordinary fluctuations of trade, nor to the short crops of any year, nor to the increased foreign demand, nor to the diversion of trade in cattle in any unusual direction, nor to an unusual short supply for this year, nor to an increase of circulating medium, we think we shall be able to show. According to the opinion of good judges and men of long experience, the general average price of beeves, sheep and swine, in November and December, has never ranged so high throughout the country as it has this year. The general quality has never ranged higher in this city, while the number weekly reported will prove a most abundant supply. What is the cause of the continued and gradual advancement of the price of food, producing animals in the United States? and is it likely to be permanent? or will the day come when we shall return to the "good old time" of cheap roast beef, and when the ordinary fluctuations in trade shall establish corresponding prices with those we have stated? These are important questions; and we know that many persons consider the present prices of meats exorbitant and unreasonable, simply because they are so much higher than they have been accustomed to, without even thinking they are so only as the work of "speculators," and so only as that work ceases the price will run down the scale to the old standard.

In that they will be disappointed. Meats in the United States will never again be sold, as a general thing, at the prices we have noticed in this article; and the reason which we shall give is one that no merchant or political economist will dispute, because it is based upon that fundamental rule—the existing relation of demand and supply. The demand in any market town in the country cannot remain a single month in such relation to the supply as materially to increase the price, without bringing from the remotest districts such a supply—and it is astonishing how rapidly the animals slide down the inclined plane from the mountains and plains of the interior—that the price becomes equalized, less the cost of transit, all over the country. "Then why don't we get our beef, and pork, and mutton cheaper?" is the question naturally arising in every mind which does not trace effect to its *cause*.

The law of demand and supply is not an arbitrary one; and the supply of beef-cattle, mutton-sheep, and fatted swine, is beyond the reach and control of any speculator or company of speculators; and certainly none exist which has produced the present prices.

Why, then, has the price for a series of years continued in one general, regular progression up the scale? It can only be accounted for by the fact that there has been a regular diminution in the supply,

until the natural law has increased the price; and the next question of any importance is, whether that diminution is permanent, and if so, why?

We do not mean to be understood that there is a real diminution of food-producing animals, but only a relative one to the consumers. The case is just this: A man and his wife, in commencing life, fatted and killed one hog every fall for their supply of winter meat, and the supply was sufficient for the demand. But in due course of time there was an increase of mouths, till the number to be filled was quadrupled, and then the one hog was insufficient for them all; and if they had not been contented to continue to make an equitable division of the flesh between all the mouths, it is probable that one would have outbid the other, and so enhanced the price in money to those who did not consume it. Now, is this the case with the people of the United States? Has the family become too large for the national pig-pen?

We lay it down as an axiom, that domestic animals decrease as human beings increase. China is a witness of this fact; and so is our own country, though it has not generally been supposed that this relative diminution had taken place in the United States to a degree sufficient to permanently affect the supply and price of the three great feed-producing class of animals. Facts derived from figures, which, it is said, though somewhat figuratively, cannot lie, prove that the diminution has commenced; and the increase of prices further prove that the supply is insufficient for the demand; so that the high prices are a legitimate result; and that they will not recede permanently, becomes a moral certainty. The increase of population relative to the increase of animals, particularly the non-producing class of persons, such as reside in cities, or are engaged in other employments than farming, is much greater than we would believe possible, but for the proof of the figures found in the census returns. Again, another reason of short supply for home consumption, is the increased exportation of all animal products, and that is more likely to grow larger than it is to decrease.

We have been for years endeavouring to encourage farmers to increase the supply of meat in this great emporium, constantly assuring them that good beef cattle would always sell at prices equivalent to the ten cents a pound for the meat, and that they could better afford to make beef at that than to grow grain at the general average price. We were asked last spring, by one farmer, if we really believed that beef cattle would be worth this price the present fall; and assured us if he could think so, that he would buy and feed a hundred bullocks; but his opinion was that the Great West was so full of cattle, that prices must come down. On the contrary, with much less packing, the price has advanced beyond the anticipations of the most shrewd men engaged in the business of feeding, and buying and selling beef cattle. It is highly important for producers and consumers and dealers to inquire for the cause, and see if they can think, as we do, that the present rates will continue so, as to base their operations upon the new truths they may discover. In proof of our proposition, we offer the following tables, which we find ready prepared to our use in the *Cincinnati Gazette*, in an article taking the same view we do, that the general production of the country is insufficient for the consumption the people have accustomed themselves to during a long period of low prices—that is comparatively low with the present, as the present here are with prices in the older countries of Europe.

The first table shows the United States census at two decades, of animals, and the per cent. increase of each, and comparative per cent. increase of population.

NUMBER AND INCREASE OF CATTLE IN THE UNITED STATES.

Animals.	1840.	1850.	Ratio of in.
Horses and Mules,	4,385,399	4,896,060	13 pr ct.
Neat Cattle,	14,971,586	18,378,907	24 pr ct.
Swine,	26,201,293	30,854,213	16 pr ct.
Sheep,	19,111,374	21,723,290	13 pr ct.
Increase of population,			35 pr ct.

It will strike every one with force that population has increased so much faster than cattle. The bullocks have increased only two-thirds as fast as the people, and the swine only half as fast, in all the country, while in twelve of the oldest States the following table shows just what we have alleged, that an increase of population, and more extensive subjugation of wild lands to domestic purposes has a tendency to decrease the number of domestic animals, and produce the necessity for the people to

cease, in some measure, their meat-eating habits, and adopt a diet of roots, cereals, legumens, and culinary vegetables. Even butter and cheese must be given up, in a great measure, or continue to grow more and more expensive to the consumer, as the great pasturage of these old States are converted into grain fields or gardens to produce vegetables for the use of the cities and the constantly increasing, densely populated rural and manufacturing districts, or to furnish the immense demand for milk, which the growing cities create, and which the railways have extended in a radius of a hundred miles inland, so that farmers cannot afford to manufacture their milk which was formerly otherwise worthless, into butter and cheese, at the old, or even the present prices. This milk business also has another important effect upon the production of animal food, because it induces an almost entire destruction of calves throughout all the region devoted to the production of milk for city use. A great portion of these calves, too, are destroyed while so young that they are absolutely unfit for human food, though largely consumed by a low grade of the foreign population of cities; but the amount of sustenance in a calf only two or three days old is of course very small, as the weight is light and the meat innutritious. This destruction of the very seed of cows as well as beeves, in the very extensive regions furnishing milk to the inhabitants of towns and cities, necessitates a continual and annually increasing draft upon the newer lands of the Northwest.

Let us first look at the actual decrease of animals in New England, New York, New Jersey, Delaware, Maryland, and Virginia.

DOMESTIC ANIMALS IN THE OLD STATES.

	1840.	1850.	Decrease.
Horses and Mules,	1,612,883	1,529,189	83,694
Neat Cattle,	6,172,569	6,033,841	89,728
Swine,	6,897,396	4,909,334	1,988,012
Sheep,	11,872,622	5,450,678	6,221,950

This shows a very large decrease, but nothing to be compared with what will be shown at the next census; while the population in the whole of those States is increasing every day, and becoming more and more concentrated in cities, and consequently dependent upon the immediately surrounding county for milk and vegetables, and upon the Great West for a supply of butter, cheese, and meat, and all other animal products.

As the west is populating with almost fabulous rapidity, and towns, and cities, and manufacturing villages are growing there as well as here; and as a large number of persons are, and will continue to be, engaged in railway building, mining, and other non-agricultural employments, it is a matter of interest to cattle-raisers and consumers to know whether this increase of population carries with it such a corresponding increase of food-producing animals as will enable the West to continue to supply the great demand of the East, even at the present prices. This may be guessed at by the guessing population of the Eastern States, and "reekoned" over by the producers of the West. The table embraces Ohio, Indiana, Illinois, Kentucky, Tennessee, and Missouri:

DOMESTIC ANIMALS IN THE NEW STATES.

	1840.	1850.	Increase.
Horses and Mules,	1,804,092	2,116,160	312,068
Neat Cattle,	4,307,952	5,280,433	972,481
Swine,	11,726,209	13,843,041	2,116,832
Sheep,	5,197,906	8,435,658	3,237,752

Now, to make up the decrease of animals in the old States, these new ones ought to show an increase very considerably in excess of the increase of population; instead of which, the population appears to have increased 35 per cent, while the increase in these two great food-producing classes, the bovine race and swine, does not exceed 20 per cent.

Now, if we look at one more table, which shows the exports of animal products, and how they have gradually increased during the last twenty years, we think that no one can fail to see the cause of an increased price of meats.

Exports of animal products and breadstuffs:

Period of	Amount.
1836--'40 inclusive,	$ 63,050,000
1842--'46 "	110,521,000
1847--'51 "	194,330,000
1852--'56 "	233,679,000

The exports have trebled in this period, while the production of meat has decreased, and thus the demand has exceeded the supply, while, from long acquired habits of consuming large quantities of meat, butter, and cheese, our population are unwilling to

forego their use for vegetable food, notwithstanding the increase of price; and consequently, there has been a very large increase in the price of all food-producing animals; and that increase will be permanent; and hence the producers are perfectly safe in basing their calculations upon this fact, and in enlarging their operations.

Nothing but a rise of prices of animal food to a point that will induce a decrease of consumption can now effect the present condition of the cattle-market of the country. The prices of butcher's meats in New York are still so far below those of London that exportation would take place if the meats could be transported in their fresh state; but the difference in price does allow shipments of salted provisions, and that will, as it already has done, continue to affect the price of cattle to the remotest farm of the great North-western region of the Mississippi Valley; and, while it enhances the profits of the producing class, will continue to raise the price to all the non-producers who rush into the vortex of cities, or in any way cease to raise the food they consume.

If our facts shall have a tendency to assure producers that the demand will not abate, and therefore induce them to increase the supply, we shall be content, for that is the object of this article.

The Coffee and Sugar Plantations of Cuba.

BY RICHARD H. DANA, JR.

[From "A Vacation Voyage to Cuba and Back."]

The change from coffee plantations to sugar plantations—from the cafetal to the ingenio, has seriously affected the social, as it has the economic condition of Cuba.

Coffee must grow under shade. Consequently the coffee estate was, in the first place, a plantation of trees, and by the hundred acres. Economy and taste led the planters, who were chiefly the French refugees from St. Domingo, to select fruit-trees, and trees valuable for their wood, as well as pleasing for their beauty and shade. Under these plantations of trees, grew the coffee plant, an evergreen, and almost an ever-flowing plant, with berries of changing hues, and, twice a year, brought its fruit to maturity. That the coffee might be tended and gathered, avenues wide enough for wagons must be carried through the plantations at frequent intervals. The plantation was, therefore, laid out like a garden, with avenues and foot-paths, all under the shade of the finest trees, and the spaces between the avenues were groves of fruit-trees and shade-trees, under which grew, trimmed down to the height of five or six feet, the coffee plant. The labor of the plantation was in tending, picking, drying, and shelling the coffee, and gathering the fresh fruits of trees for use and for the market, and for preserves and sweet meats, and in raising vegetables and poultry, and in rearing sheep and horned cattle and horses. It was a beautiful and simple horticulture, on a very large scale. Time was required to perfect this garden—the Cubans call it paradise—of a cafetal; but when matured, it was a cherished home. It required and admitted of no extraordinary mechanical power, or of the application of steam, or of science, beyond the knowledge of soils, of simple culture, and of plants and trees.

For twenty years and more it has been forced upon the knowledge of the reluctant Cubans, that Brazil, the West India Islands to the southward of Cuba, and the Spanish Main, can exceed them in coffee-raising. The successive disastrous hurricanes of 1843 and 1845, which destroyed many and damaged most of the coffee estates, added to the colonial system of the mother-country, which did not give extraordinary protection to this product, are commonly said to have put an end to the coffee plantations. Probably they only hastened a change which must at some time have come. But the same causes of soil and climate which made Cuba inferior in coffee-growing, gave her a marked superiority in the cultivation of sugar. The damaged plantations were not restored as coffee estates, but were laid down to the sugar-cane; and gradually, first in the western and northern parts, and daily extending easterly and southerly over the entire island, the exquisite cafetals have been prostrated and dismantled, the groves of shade and fruit trees cut down, the avenues and foot-paths plowed up, and the denuded land laid down to wastes of sugar-cane.

The sugar-cane allows of no shade. Therefore the groves and avenues must fall. To make its culture profitable, it must be raised in the largest possible quantities that

the extent of land will permit. To attempt the raising of fruit, or of the ornamental woods, is bad economy for the sugar planter. Most of the fruits, especially the orange, which is the chief export, ripen in the midst of the sugar season, and no hands can be spared to attend to them. The sugar planter often buys the fruits he needs for daily use and for making preserves, from the neighboring cafetals. The cane ripens but once a year. Between the time when enough of it is ripe to justify beginning to work the mill, and the time when the heat and rains spoil its qualities, all the sugar making of the year must be done. In Louisiana this period does not exceed eight weeks. In Cuba it is full four months. This gives Cuba a great advantago. Yet these four months are short enough; and during that time the steam engine plies and the furnace fires burn night and day.

Sugar making brings with it steam, fire, smoke, and a drive of labor, and admits of and requires the application of science. Managed with skill and energy it is extremely productive. Indifferently managed, it may be a loss. The sugar estate is not valuable, like the coffee estate, for what the land will produce, aided by ordinary and quiet manual labor only. Its value is in the skill and the character of the labor. The land is there, and the negroes are there; but the result is loss or gain, according to the amount of labor that can be obtained, and the skill with which the manual labor and the mechanical powers are applied. It is said that at the present time, in the present state of the market, a well-managed sugar estate yields from 15 to 25 per cent on the investment. This is true, I am inclined to think, if by the investment be meant only the land, the machinery and the slaves. But the land is not a large element in the investment. The machinery is costly, yet its value depends on the science applied to its construction and operation. The chief item in the investment is the slave labor. Taking all the slaves together, men, women and children, the young and the old, the sick and the well, the good and the bad, their market value averages above $1,000 a head. Yet of these, allowing for those too young or too old, for the sick and for those who must tend the young, the old and the sick, and for those whose labor, like that of the cooks, only sustains the others, not more than one-half are able-bodied, productive laborers. The value of this chief item in the investment depends largely on moral and intellectual considerations. How unsatisfactory is it, then, to calculate the profits of the investment, when you leave out of the calculation the value of the controlling power, the power that extorts the contributions of labor from the steam and the engine and the fire, and from the more difficult human will. This is the "plus x" of the formula, which, unascertained, gives us little light as to the result.

But, to turn to the changes wrought by this substitution of sugar for coffee. The sugar-plantation is no grove, or garden, or orchard. It is not the home of the pride and affections of the planter's family. It is not a coveted, indeed, hardly a desirable residence. Such families as would like to remain on these plantations, are driven off for want of neighboring society. Thus the estates, largely abandoned by the families of the planters, suffer the evils of absenteeism, while the owners live in the suburbs of Havana and Matanzas, and in the Fifth Avenue of New York. The slave system loses its patriarchal character. The master is not the head of a great family, its judge, its governor, its physician, its priest and its father, as the fond dream of the advocates of slavery, and sometimes, doubtless, the reality, made him. Middlemen, in the shape of administradores, stand between the owner and the slaves. The slave is little else than an item of labor raised or bought. The sympathies of common home, common childhood, long and intimate relations and many kind offices, common attachments to house, to cats, to dogs, to cattle, to trees, to birds—the knowledge of births, sicknesses and deaths, and the duties and sympathies of a common religion—all those things that may ameliorate the legal relations of the master and slave, and often give to the face of servitude itself precarious but interesting features of beauty and strength—these they must not look to have.

This change has had some effect already, and will produce much more on the social system of Cuba.

There are still plantations on which the families of the wealthy and educated planters reside. And in some cases the administrador is a younger member or a relative of the family, holding the same social position; and the permanent administrador will have his family with him. Yet, it is enough

to say that the same causes which render the ingenio no longer a desirable residence for the owner, make it probable that the administrador will be either a dependent or an adventurer; a person from whom the owner will expect a great deal, and the slaves but little, and from whom none will get all they expect, and perhaps none all they are entitled to.

In the afternoon we went to the sugar-house, and I was initiated into the mysteries of the work. There are four agents; steam, fire, cane-juice and negroes. The results are sugar and molasses. At the ingenio, they make only the Muscovado, or brown sugar. The processes are easily described, but it is difficult to give an idea to the scene. It is one of condensed and determined labor.

To begin at the beginning. The cane is cut from the fields by companies of men and women, working together, who use an instrument called a machete, which is something between a sword and a cleaver. Two blows with this, slash off the long leaves, and a third blow cuts off the stalk, near to the ground. At this work, the laborers move like reapers, in even lines, at stated distances. Before them is a field of dense, high-waving cane; and behind them, strewn wrecks of stalks and leaves. Near, and in charge of the party, stands a driver, or more grandiloquently, a contra-mayoral, with the short, limber plantation whip, the badge of his office, under his arm.

Ox-carts pass over the field, and are loaded with the cane, which they carry to the mill. The oxen are worked in the Spanish fashion, the yoke being strapped upon the head, close to the horns, instead of being hung round the neck, as with us, and are guided by goads, and by a rope attached to a ring through the nostrils. At the mill, the cane is tipped from the cart into large piles, by the side of the platform. From these piles, it is placed carefully, by hand, lengthwise, in a long trough. This trough is made of slats, and moved by the power of the endless chain, connected with the engine. In this trough, it is carried between heavy, horizontal, cylindrical rollers, where it is crushed, its juice falling into receivers below, and the crushed cane passing off and falling into a pile on the other side.

This crushed cane (bagazo), falling from between the rollers, is gathered into baskets by men and women, who carry it on their heads into the fields and spread it for drying. There it is watched and tended as carefully as new mown grass in hay-making, and raked into cocks or winrows on an alarm of rain. When dry, it is placed under sheds for protection from wet. From the sheds and from the fields, it is loaded into carts and drawn to the furnace doors, into which it is thrown by negroes, who crowd it in by the armful, and rake it about with long poles. Here it feeds the perpetual fires by which the steam is made, the machinery moved, and the cane-juice boiled. The care of the bagazo is an important part of the system; for if that becomes wet and fails, the fires must stop, or resort be had to wood, which is scarce and expensive.

Thus, on the one side of the rollers is the ceaseless current of fresh, full, juicy cane-stalks, just cut from the open field; and on the other side, is the crushed, mangled, juiceless mass, drifting out at the draught, and fit only to be cast into the oven and burned. This is the way of the world, as it is the course of art. The cane is made to destroy itself. The ruined and corrupted furnish the fuel and fan the flame that lures on and draws in and crushes the fresh and wholesome; and the operation seems about as mechanical and unceasing in the one case as in the other.

From the rollers, the juice falls below into a large receiver, from which it flows into great, open vats, called defecators. These defecators are heated by the exhaust steam of the engine, led through them in pipes. All the steam condensed forms water, which is returned warm into the boiler of the engine. In the defecators, as their name denotes, the scum of the juice is purged off, so far as heat alone will do it. From the last defecator, the juice is passed through a trough into the first caldron. Of the caldrons there is a series, or, as they call it, a train, through all which the juice must go. Each caldron is a large, deep, copper vat, heated very hot, in which the juice seethes and boils. At each, stands a strong negro, with long, heavy skimmer in hand, stirring the juice and skimming off the surface. This scum is collected and given to the hogs, or thrown upon the muck heap, and is said to be very fructifying. The juice is ladled from one caldron to the next, as fast as the office of each is finished. From the last caldron, where its complete

crystallization is effected, it is transferred to coolers, which are large, shallow pans. When fully cooled, it looks like brown sugar and molasses mixed. It is then shoveled from the coolers into hogsheads. These hogsheads have holes bored in their bottoms; and, to facilitate the drainage, strips of cane are placed in the hogsheads, with their ends in these holes, and the hogshead is filled. The hogsheads are set on open frames, under which are copper receivers, on an inclined plane, to catch and carry off the drippings from the hogsheads. These drippings are the molasses, which is collected and put into tight casks.

I believe I have given the entire process. When it is remembered that all this, in every stage, is going on at once, within the limits of the mill, it may well be supposed to present a busy scene. The smell of juice and of sugar vapor, in all its stages, is intense. The negroes fatten on it. The clank of the engine, the steady grind of the machines, and the high, wild cry of the negroes at the caldrons to the stokers at the furnace doors, as they chant out their directions or wants—now for more fire, and now to scatter the fire—which must be heard above the din, "A-a-b'la! A-a-b'la!" "E-e-ha candela!" "Pu-er-ta!" and the barbaric African chant and chorus of the gang at work filling the cane-troughs—all these make the first visit at the sugar-house a strange experience. But after one to two visits, the monotony is as tiresome as the first view is exciting. There is, literally, no change in the work. There are the same noises of the machines, the same cries from negroes at the same spots, the same intense sweet smell, the same state of the work in all its stages, at whatever hour you visit it, whether in the morning, or evening, at midnight, or at the dawn of the day. If you wake up at night, you hear the "A-a-la! A-a-b'la!" "E-e-cha! E-e-cha!" of the caldron—men crying to the stokers, and the high, monotonous chant of the gangs filling the wagons or the trough, a short, improvisated stave, and then the chorus—not a tune, like the song of sailors at the tackles and falls, but a barbaric, tuneless intonation.

FLORIDA GRASS.—Dr. S. S. Mills, of Charleston, S. C., has invented and patented a machine which prepares the grass of the Florida Keys for rope-making.

From Quarterly Journal of Agriculture.

Country and City Life.

(*From an Address delivered at the Tennessee State Exhibition*, 1858.)

BY THE LATE POSTMASTER GEN. BROWN.

In this country the farmer generally holds an indefeasible title to the broad acres he cultivates. He moves proudly over his fields, and surveys with satisfaction the crops which are upon them. But he will not stop in his money making career to build his neat cottage, or his more costly mansion, according to his circumstances. He will not adorn his grounds, nor plant his orchards of delicious fruits. He will waste no time on shrubbery and flowers. He will prepare no healthful cistern, nor lead the gushing fountain to his door. All is left rude, inconvenient and uncomfortable around him, with nothing to lure either himself or his family away from the blandishments of some neighboring town or city. Every farmer and planter should make his home to himself and his household the dearest and loveliest spot on earth. Though he may have no marble palace, no rich and costly furniture, no liveried servants, still, there is his homestead beautified and adorned with every embellishment of taste and fancy. Who would be willing to leave such a home, with its Arcadian bowers and its pure and sparkling waters, for the dust and smoke of the crowded city?

And how strange is this passion for city over country life which we so often encounter! It cannot spring from any inordinate desire to grow rich, for agriculture rewards her followers more bountifully than any other pursuit. It is a passion for pleasure and display more than for riches. Some men desire to live in palaces built in the city, that they may be seen and admired. They desire costly equipages, but they must glitter in the city, attracting the admiration of thousands who would never behold them in the solitude of the country. The theatre, the ball, and the masquerade present their nightly attractions, whilst they are seldom heard of in rural life. The devotee of more questionable pleasures finds in the city ready facilities of indulgence, which are entirely removed in the plain and virtuous organization of country society. Whatever the motive, this preference given by so many to city life, is productive of some of the greatest evils of the present age. In

the fondness of hope that something may chance to turn up in their favor, hundreds and thousands precipitate themselves into towns and cities without preconcerted arrangements for regular and permanent employment. It is the great law of our being, that if we would be either happy or prosperous, we must have employment, physical or intellectual. This is emphatically true of city life. But this disproportionate rush to the city renders such employment impossible; no demands of commerce, manufactures, or the mechanic arts can furnish it to the redundant crowds that pour themselves into our cities. Hence, that mass of poverty and suffering—for shelter, for fuel, for raiment, for bread—which no ordinances can relieve. Hence, also, those great mobs and processions through the streets in times of scarcity, demanding employment and subsistence, which oftentime nothing but martial law can subdue; and hence, too, that foul and festering mass of corruption and vice, which too often afflict and disgrace our over-crowded cities.

How delightful it is to turn from the contemplation of these scenes to the calm, contented, and virtuous life of the country, with its comfortable, and sometimes its magnificent mansions; with its outstretched lawns and landscapes, its churches and school-houses, its abundant supply of raiment, and almost boundless store of subsistence for man and all the animals that minister to either his necessities or pleasures!

Still, I must remind you that the great law of employment and labor applies equally to country and city life. It is by labor that man must work out the great problem of his existence—labor of the head, labor of the heart, and labor of the hand.

Wherever man has failed to labour he has remained a savage; where he has laboured most he has risen highest in the scale of his physical, moral, and intellectual being. If one Angel with his flaming sword drove Adam from his Eden, another Angel, though disguised in the humble form of Labour, will gently lead his descendants back to their native paradise. Look at the progress they have already made in that celestial and glorious direction. Look backward to the dark ages of man's existence, when he was a mere barbarian. Look at him now, how noble and majestic he stands, with all his temples dedicated to learning and piety, and good government around him. Once a savage, now almost a God.

Be not startled at the boldness of these words. The grandeur of what man has already done and is now achieving, must plead apologetic for the apparent impiety. He has scanned the Heavens, and almost numbered the stars; he has gently stolen away its lightnings and sent them over the land and through the deep waters, to convey his thoughts and wishes around the world; he has laid hold on another of the elements, and dispatched his huge ships in a few days over the widest oceans; he has levelled the mountains of the earth that impeded his pathway, and brought forth from their deep and hidden recesses the rich treasures they contained.

In the majesty of man's civilization and progress, the earth, the seas, and the winds, all stand subdued and conquered by his presence and power; and how animating is the reflection, my countrymen, that in all this improvement and progress, America, our young and vigorous America, holds so proud a pre-eminence. Her glorious form of government, stretching like the rainbow of hope and promise from ocean to ocean gives shelter and protection to nearly thirty millions of the sons and daughters of freedom. Her luxuriant valleys, reposing in every climate, yield in superabundance every fruit and grain suited to the subsistence of man. Her mountains, teeming with ores and the precious metals, give employment to millions of artisans, and can furnish the long desired currency of gold and silver, the most stable and unerring standard of values and exchanges ever devised by the wit of man.

These great advantages of good government—of climate and soil—of mineral production—have stimulated the zeal and quickened the capacities of the American people, until they stand unsurpassed in agriculture, in manufactures, in the mechanic arts, in scientific pursuits, in the learned professions, and, indeed, unsurpassed in all the elements of national greatness.

But what avails our national greatness if we have not national and individual virtue to inspire us with obedience to law and reverence for the glorious Constitution and Union under which we live! These are the sources of our unexampled growth and prosperity, and with his last breat

every true patriot should fervently pray that they might last and endure forever:

"Our union of lakes and union of lands,
Our union of States, none shall sever,
Our union of hearts and union of hands,
And the Flag of our Union forever."

Wearing out Land.

"Our land does not produce two-thirds as much now as it did fifteen years ago."

So writes a farmer from a region which cannot have been settled more than from twenty to thirty years.

Our reflection is, that the farmers there cannot be worth more than two-thirds as much as they would have been if they had so managed their lands as to increase instead of diminishing its productiveness.

There may be exceptions—some men may be keen enough to make money and wear out their land by the same operation. But the general rule is the reverse of this—that the most profitable husbandry improves the land, and that the husbandry which deteriorates the land is not profitable. We hold that a farmer of only ordinary means cannot afford to make his own land poorer; and that even if he were cultivating another man's land for a succession of years, he could not possibly afford to leave it much worse than he found it.

American Farmers' Magazine.

LESS LAND OR MORE LABOUR—WHICH?

We are not one of those who indiscriminately recommend small farms. We fear there is a tendency in small farms to make small men; and we deprecate the idea that the farmer is to be a man to be looked down upon by men in other callings. There has been enough of that in the history of this world, and we want to see the tables turned. Nevertheless it would be better to get a good living from ten acres than to fail of a living from a hundred.

In another place we have intimated that it is cheaper to make land more productive than to wear it out, as the phrase is; that if we enrich the land, it enriches us; and that if we impoverish it, it impoverishes us. Something like a demonstration of this would gratify some of our readers. This we will attempt; and what we have to say shall be in close connection with our motto, *Less land or more labour.*

That it is cheaper to raise a farm to a higher than to sink to a lower productiveness is our proposition; and what we mean by it is, not that it costs more labour to diminish than to increase the productive power of the soil, but that it does require more *unpaid* labour to wear out a soil by a ten years' cultivation than to enhance its productiveness in the same time.

To simplify as much as may be, we will suppose here are three acres, arable land, now in turf, and of a fair quality, to be cultivated respectively by A, B, and C, for the next ten years. A is a calculating, thinking farmer, in no way extravagant, but willing to expend money and labour where he sees a reasonable prospect of a return with profit. B is a careful soul, willing to labour, but as shy of all other expenses for crops as of the itch. C takes it easy, and will reap what his land will give, without giving it back much of either labour or manure.

Indian corn, we will suppose, to be the crop the first year. A turns over the turf in November to a good depth; harrows in fifty loads of compost in the spring, made, it may be, of twenty loads of barn manure and thirty loads of something which his industry and integrity have gathered up at a cheap rate for the purpose; plants the best variety of corn that he can get any certain knowledge of, about the middle of March; tends the crop well, and gets eighty bushels to the acre.

B wants all his manure for other crops, and thinks the turf land will do pretty well without manure. He plows in March, five or six inches deep, but very nicely. His team is not strong enough to plow much deeper; and as for paying for extra team work and manure to warm the deep soil that would be plowed up, he cannot think of it. Farming, in his opinion, is not a business to spend money in, but to get money by. But he plants in good season, tends the corn well all summer, and gets thirty bushels.

C takes it easy; plows when it is most convenient; plants and hoes when nothing hinders; does the work shabbily, according to his wont; and more by providential favour, than by his skill or industry, gets sixteen bushels of decent corn and plenty of *pig ears.*

Now B has done more work than C; A has expended more labour than either, be-

sides costly manuring; and if the race ended here they might not come out so very unequally.

But suppose all three to follow the corn crop with rye, and seed with clover, herdsgrass and redtop in April. It is not unreasonable to suppose that A will get twenty-five bushels. B will have nothing to complain of if he gets fifteen bushels. If C gets more than ten he ought to be thankful. But these crops cost one no more than the other. And now A is fairly ahead—has been better paid for his outlay. But this is only the beginning.

The third year A gets two and a half tons of hay; B one and three-fourths, and C not more than one and a half at best; besides that, A's acre will pasture a cow well from the middle of July to winter, whereas the feed on B's and C's is of but little worth. Next year the disparity will be still greater, if all three acres are kept to graze without further manure. A's acre will produce more value, though perhaps less quantity, both of hay and fall feed, than the previous year. B's grass will have nearly, and C's quite run out. Neither will be much more than worth cutting; and as for fall feed, cows that are condemned to it will give little milk and make less butter; and if they have much pluck, will be apt to break fence and seek better fare, especially those on C's premises, where the fences cannot be expected to be over and above good. We suppose our readers have noticed that poor fences generally keep company with shallow culture and poor feed, on the principle that "Birds of a feather will flock together."

By this time the expenses of B's and C's cultivation will have been more than half as much as that of A, but A's return will have more than doubled theirs. Nor is this all. A's land has now a deeper, richer turf than theirs—is in far better condition for another round of crops.

We intended to have gone through with the remaining six years, but it is unnecessary. Our readers will understand that if calculating A, and careful B, and careless C were going on in their respective ways to the end of ten years, there would be a wide difference in the value of their acres for after cultivation. C's land would be pretty thoroughly worn out; B's would be ditto; and A's would be a great deal better than when he began. Is it not so? Has not A been better paid for what he has done and expended than the others?—and does it not follow that it is cheaper to enhance the productiveness of land than to diminish it?

Some will say it is all talk; there is nothing practical in it; let him try it, and he will find farming one thing and writing about it another. But our reply is, that we know the truthfulness of all this by actual trial, and we know it by the widest observation. If you cheat the land it will cheat you. "As a man soweth, so shall he reap." In a higher sense we have indubitable authority for this. In our application of it to soil culture, we appeal to the very best and most successful farmers, if it is not so. It follows that the farmer wants less land or more labour. The latter is our remedy. The farmer, it seems to us, should not ask how little help he can skim along with, but how much he can employ profitably.

And remember, farmers, that the more help you can employ, and yet secure a fair return to yourself, the better for the country; for you thereby afford encouragement to men to escape from the filth and wretchedness of our cities, and to seek an employment more favourable to whatever is virtuous, elevating, and patriotic.

It would be too much to ask the farmer to employ men to keep them out of idleness and vice, without a reasonable prospect of remuneration. But when such a prospect is presented, the farmer who rejects the opportunity sins against his own interest, and fails of being a benefactor where he might be one.

Agricultural Science----Mechanical Texture of Soils.

At a late meeting of the Farmers' Club, held at the American Institute, New York, Professor S. W. Johnson, of Yale College, furnished an able essay on soils, in which certain views were presented, which together with some facts, connected with our own observation upon the mechanical treatment of certain sandy and gravelly soils, seem to require the light of science to explain. We copy from the essay, the following remarks:

"The labors of chemists to discover positively all the causes of the fertility of the soils, have not yet met with conclusive success. The mechanical structure of soil is of primary importance. Naked rock grows

lichen—the same rock crushed into coarse grains, grows a much higher order of vegetable—pulverized fine, the cereals grow in it. Geology, chemistry, botany, physiology, meteorology, mechanics, hydrodynamics, heat, light and electricity, are all intimately combined in the grand process of vegetation. There are sandy soils in our Eastern States, which, without manure, yield meagre crops of rye and buckwheat; but there are sandy soils in Ohio, which without manure, yield on an average, eighty bushels of Indian corn an acre, and have yielded it for twenty to fifty years in unbroken succession; the ingredients of these soils being, by chemical analysis, the same. At present no difference is known between them, except the coarseness of the particles,; the first being coarse, while the Ohio sand is an exceedingly fine powder. The power of soils to attract and imbibe moisture and oxygen, was well shown by Schubler, and Hoffen, forty years ago. Of thirteen different soils, quartz sand absorbed in thirty days over 1-1000 parts of oxygen and no moisture, while humus absorbed 13 of oxygen and 120 of moisture."

There is a piece of land, embracing sixty or eighty acres, within three miles of where we now write of the character of the fine sandy land of Ohio, as referred to by Professor Johnson. While in pursuit of land some years ago, we became acquainted with this piece, and from a knowledge of the character of the sandy land in some of the Eastern States, we were induced to place a very low estimate upon our neighbor's land. This land has since been sold and converted into a vegetable and fruit farm, and has proved to be one of the most sure and productive pieces of land with which we are acquainted. Of course, it is extremely warm and brings to maturity vegetables and fruit, some days earlier than any other land in the neighbourhood of the city; and for the growth of grapes, the fruit is almost invariably sound, while that grown in any other character of soil is subject to rot; and the capacity of this soil to retain moisture, is not surpassed by any other soil combining any portion of loam that we have seen. Probably the great secret of the fertility of this soil, lies in its capacity to absorb and retain heat, moisture and various gases essential to vegetable growth; and this is in consequence of the finely divided character of its particles, which renders it one of the most perfect and desirable soils to cultivate.

Last summer, while exploring certain portions of Long Island, in the State of New York, which is noted for its light, sandy and gravelly soil, we visited a gentleman's garden and nursery, to witness the effect of trenching a light, open, porous soil—purely sand, coarse gravel and stones, with a thin surface soil. This ground had been trenched, and entirely inverted to the depth of three and a half feet. Upon the surface a moderate dressing of manure had been cast and spaded in. On the trenched portion were growing various nursery plants, grape-vines, roses, &c., of great luxuriance; but the most remarkable feature was a few rows of cabbage, upon the same prepared ground, no head of which was less than ten inches in diameter, up to a much larger size, all firm and solid, while in the adjoining rows, planted the same time upon precisely the same soil, manured in the same manner, and spaded to the ordinary depth, but not trenched, not one cabbage had headed, but still remained large, loose plants.

In another fruit garden and vineyard of some magnitude, a mile distant, upon similar soil, but more sandy and less gravelly, resting upon a kind of marl or hard-pan bottom four feet below the surface, this ground had been trenched in a similar manner, with an incorporation of a compost of peat, stable manure, lime, ashes, &c.; and during three months' travel among gardens, we saw no more vigorous grape-vines, dwarf pear trees, or other fruit-trees, even upon the richest soils of Western New York.

We had supposed that trenching such light thin soils, was worse than labor lost. But these instances prove to the contrary, and afford conclusive evidence that without this preparation of that kind of soil, gardening and fruit growing would not pay the cost. It also establishes the most important fact in agriculture, that the more perfectly the mechanical disintegration of the soil is effected, whether light or heavy, the more perfectly it is adapted to vegetable growth; and if such results are the effects of the deep culture of light soils, how much more important is it that more tenacious soils be deeply and thoroughly pulverized! The more perfect and free the circulation of heat, moisture, and the atmosphere, and gases in the surface soil, and in contact with

the roots of growing crops, the more perfect will be their development.

The largest crops of corn we have on record, were grown upon the light sandy soils of the South; although upon thin, poor soils; but owing to their open, porous texture, with moderate dressings of manure and timely rains, these soils produced heavy crops. But such loose, sandy soils cannot be depended on, because of the uncertainty of a due degree of moisture in all seasons. Heavy soils are more retentive of moisture, and are more sure to afford regular crops; but the crops upon these soils would be greatly augmented by a thoroughly broken and pulverized surface. A deep and thorough breaking up in the spring is not sufficient for summer crops, but the surface must be kept loose and porous, during the growing season, or until the time of "laying by." In this lies the great secret of large crops.

[*Valley Farmer.*

Seed Saving.

It is a frequent "bone of contention" between gardeners and their employers, whether the former should grow and collect the necessary seeds for cropping the garden—most gardeners of experience preferring to purchase from a reliable source, rather than trust to their own savings; and most employers hold an opinion quite the reverse.

So far as regards economy the subject is not difficult to understand, as it can only refer to the collecting of such seeds as are the common produce of gardens, and provided and sold at all respectable seed stores. The trouble of watching and collecting these, as they accidentally ripen, will greatly depend upon circumstances. If economy is the only object, the matter will be easily determined, for if the amount of time, according to the estimated value of time and labor, is greater than the price of the same articles in the seed store, or otherwise, can readily be settled as the evidence preponderates. It is a fallacy to suppose, in such cases, that if the seeds are saved, there is just the saving of so much money effected. This is a great mistake. If the gardener takes time to gather seeds, he must necessarily be neglecting something else. My experience convinces me, that every six cents worth of seed saved in this way, costs the employer twelve cents. Seed growing is a branch of trade which competition has forced into a high state of perfection; and not only are the seeds sold at the lowest remunerative point to the grower, but the quality of the articles is in most cases infinitely better and truer to kind than the miscellaneous gathering to which I have referred can possibly be. No saving will recompense the use of inferior seeds; a spurious article requires the same amount of labor upon it as that of the highest excellence. Nothing can be a greater mistake, in ordinary garden management, than to suppose that a trifle saved in the price of seeds, or anything short of what will produce the best article of its kind, can deserve the name of economy. Of course exceptions are to be made, as in the case of a new variety of vegetable, superior to others of its kind, which it would be important to preserve; but this is a different affair to making a promiscuous collection of all kinds of common garden seeds to grow from year to year. The inevitable tendency of such a practice would be to hasten the degeneracy of three-fourths of ordinary vegetables to their primitive condition, as weeds of the wayside, or the sea shore.

With flower seeds the case is different. Many of these may be perpetuated in the same place, so long as it is only desirable to preserve the natural or original condition of the plant. But most garden esculent plants, such as peas, cabbages, broccoli, cauliflower, radishes, turnips, parsnips, &c., are in an artificial state, and to maintain them in their excellence, requires particular conditions, one of the most indispensable of which seems to be frequent change both of soil and climate—advantages which are not often possible to be secured in the same garden.

Even in the general saving of flower seeds, there are broad exceptions to the rule. Who would care to grow single Chinaasters, or single balsams? Yet although these produce seed freely, the plants from home-grown seeds soon deteriorate, and in countries where the production of these is made a special business, a special course of culture is resorted to in order to preserve their purity and excellence.

Looking at this subject in its proper light, it seems obvious that neither on the score of economy nor with a view to obtain superior stock, can it be desirable for gar-

deners to collect their own seeds, with the exception of some ornamental or rare botanical plants.—*Germantown Telegraph.*

From the American Agriculturist.

Enlarging a Farm Without Buying Land.

If a man does not know how much land he actually owns, and gets no benefit out of that part with which he is unacquainted, and then is informed that he has more, and is told how to use it, why is not this equivalent to the purchase of more acres? Farmers are often heard to exclaim: "Oh that I were rich enough to buy a little more land, then I could fatten more cattle and sheep, and I could carry more grain to market!" Now, to such men, at least to some of them, we beg leave to say, your farms are already larger than you suppose. You seem to think that your ownership extends only six inches deep into the earth; but this is a misapprehension. It is not very strange, however, since all the former owners of the soil had the same idea, and the Indians from whom your ancestors bought or stole the land, were content with only the surface, just enough to hunt upon and to grub a few roots out of. But this is all a mistake, as you will see on reflection. Examine the title deeds to your land and see if there is any limit to your rights in a downward direction. You will not find any; we know you won't.

Now, therefore, do not fear to go at once and take possession of the rest of your farm. It is virgin soil, covered over with only a few inches of partly worn land; and it will return you fine crops if you will only lay it open to the sun and air, or mix it with the soil you have long cultivated. Perhaps it will not be wise for you to try to use it all the first year; use a little moderation in entering upon your new property, for your own sake and for the farm's sake. [In connection with the advice here given, it may be well for the reader to turn back to page 71 (March No.,) and study what is said about plowing deep and plowing shallow.—Ed.]

Here is what some writer has said on the subject—not strictly correct perhaps, but highly suggestive: "At the present time, the average crop of wheat per acre in Great Britain on a soil cultivated for centuries, is about double that produced on the comparatively new soil of Ohio. Why is this? Simply because the leading British farmers are educated men, and apply their work wisely. They pay back to the earth what they borrow from her; they endeavor by every means in their power to enrich their ground, and in return it enriches them. If American farmers, instead of laboring to double the number of their acres, would endeavor to double their crops, they would find it a saving of time and toil, and an increase of profit. . . . Many men never think of digging ten inches into the soil, unless they have dreamed about a crock of gold, hid in the earth; but if they would set about the work of digging in earnest, every man would find his crock of gold without the aid of dreams or devination."

We once heard of some remarkable strawberries raised in a neighboring town, and called the "Washington Excelsior" strawberry. Rumor said that the leaves were large, vividly green all summer, the fruit large and abundant for a long time, and not diminished by the severest droughts. The plants were sold at a half a dollar apiece, and were considered cheap at that price. Attracted by these wonderful stories of the new fruit, we went to see it and learn all about it. The plants were indeed beautiful, and the fruit very fine. But our eyes were opened, when Mr. Smith, the owner, told us frankly, that the plants were some common sort, the name of which he had forgotten, but that they were grown on a bed in the corner of his garden, which was *made ground for at least six feet deep.* Why did this not account for the persistent verdure of the foliage and the size and abundance of the fruit? Yet, the superior beauty of the plants and berries had attracted much attention in the neighborhood, and seemed to call for a high sounding name; and so Mr. Smith dubbed them the Washington Excelsior. Plainly, this man's strawberry bed was enlarged without fencing in more land.

Mental Labor.

The injurious effects of mental labor are in a great measure owing to extensive forcing in early youth, to sudden or misdirected study; to the co-operation of depressing emotions or passions, to the neglect of the hints of the body; or to the presence of the seeds of disease, degeneration and decay in the system. The man of healthy

palegmetic or choleric temperament is less likely to be injured by application than one of sanguine or melancholic type; yet these latter, with allowance for the original constitution, may be capable of vast efforts. The extended and deep culture of the mind exerts a directly conservative influence upon the body. Fellow laborer! one word to you. Fear not to do manfully the work for which your gifts qualify you, but do it as one who must give an account of both soul and body. Work, and work hard while it is day; the night cometh soon enough—do not hasten it. Use your faculties—use them to the utmost, but do not abuse them; make not the mortal do the work of the immortal. The body has its claims—it is a servant; treat it well and it will do your work; it knows its own business; do not attempt to teach or force if, attend to its wants and requirements, listen kindly and patiently to all its hints, occasionally forestall its necessities by a little indulgence, and your consideration will be paid with interest. But task it and pine it, and suffocate it—make it a slave instead of a servant, it may not complain much, but like the weary camel in the desert, it will lie down and die.—*Journal of Physiology.*

Effect of Bones and other Manures on Plants.

"That certain manures produce very powerful effect on various plants, was an early remark of the cultivators of the soil." An article exemplifying this statement, by C. W. Johnson, Esq., appears in the *Mark Lane Express*, from which we propose to condense a few paragraphs for our readers.

Phosphate of lime promotes in a remarkable degree the growth of clover. An instance showing this is related by Mr. Dixon, in his prize essay on the Manuring of Grass Land. A pasture of 20 acres was heavily dressed with broken bones nearly 70 years ago, and kept in grass without plowing.—The dry portions of the field was remarkably fertile, but such parts of the ground as were wet, had scarcely any other covering than carex and the coarsest grasses. Mr. D. on becoming tenant, set about draining the wet parts. In regard to this, he says:

"In the operation we found, at from five to eight inches from the surface, much bone, in various states of decomposition; the large pieces, when broken, appeared fresh inside. I felt at the time some regret that much value must have been lost for many years, and, as I then supposed, forever lost, on account of the manure having been in a soil saturated with water ever since it had been laid on. However, before my draining operations had been completed twelve months, the coarse herbage began to disappear, and in its place appeared white clover, marl clover, and others of the best pasture grasses; and in the second summer after being drained, the soil was equally luxuriant with the natural dry parts of the land."

Of another case it is said:

"Previous to boning, the herbage on these pastures were of the poorest kind imaginable—there being few of any plants except the small carex. In the second summer, after boning, the carex had disappeared, and the pasture had become long and thick-set with white clover, cow grass, or marl clover, and trefoil."

Messrs. Lawes and Gilbert, in the last half volume of the Royal Agricultural Society, report a course of experiments with different manures in permanent grass land. They sum up the result as follows:

"That the effect of a mixed, but purely *mineral manure* upon the complex herbage of permanent meadow land was chiefly to develope the growth of the *leguminous* plants (clover, &c.) it contained, and scarcely to increase at all the produce of the *graminaceous* plants, or commonly called *natural grasses.* That the action of purely nitrogenous manures upon the permanent meadow, was to discourage the growth of the *leguminous* herbage, and to increase the produce of the *graminaceous* hay. * . * * That peculiar *carbonaceous* manures had little or no beneficial effect on the amount of produce of the hay."

We may see at home the change vegetation produces either by breaking up, or clearing land, by burning off the turf of mucky swamps, etc., and sometimes by turning up a lower strata of earth by deep plowing. Forests burned over, send up a thick growth of fire weed, followed soon by brambles of different kinds of trees and plants often introduced by occurrences which bring their appropriate food before them. They are not "spontaneously" generated, but grow from seeds lying dormant in the soil, or carried there by the wind, birds, or animals, and the subject is worthy of closer investigation, but we can devote no more space to it to-day.—*Country Gentleman.*

From the Conservatory Journal.

Relations of Air, Water, and Light, to Animal and Vegetable Life.

BY CHARLES T. JACKSON, M.D., STATE ASSAYER.

When an animal draws air into its lungs, and then exhales it, the expired air no longer will support flame, but the lighted taper, inserted in a receiver filled with it, is instantly extinguished.

If we now bring a branch of a living plant, having foliage, into this receiver, and expose the whole to sunlight, in a few minutes the air is restored to its original state and will support combustion.

On analysis, we find that the air which has been breathed by an animal, has lost the chief part of its oxygen, which is converted into carbonic acid gas. This gas is the respiratory food of plants, and the leaves, which are their lungs, absorb the carbonic acid, and by aid of the sun's rays decompose it, converting its carbon into its carbonaceous juices, fibre and cells; while pure oxygen is exhaled and the air is again rendered fit for the respiration of animals.

The same relations also exist in the action of the respiration of fishes, which draw from the air, dissolved in water, their respiratory element, while sub-aqueous vegetation absorbs their exhaled carbonic acid, and replace it by pure oxygen. The gills of fishes act in the same physiological manner as the lungs of air-breathing animals. They cannot decompose water, rich as it is in combined oxygen, but they depend on the small proportion of free oxygen which is dissolved in all water that has been properly ventilated.

These facts have now come to be popularly apprehended, since the aqua-vivarium has become so common in many households.—We shall proceed now to some details and generalizations on this and related subjects, to which we invite the reader's attention.

We live at the bottom of a great atmospheric ocean, between forty-five and fifty miles deep.* This ocean consists of nitrogen and oxygen gases, commingled, but not chemically combined. In addition to these two great components, there is a small proportion of carbonic acid gas, and variable proportions of aqueous vapor, also dissolved and intimately commingled with them. By the law of diffusion, gases become, in a short time, intimately and uniformly mixed, so that, though of different densities, they do not separate by gravitation. Were it not for this law, animals at the surface of the earth would soon be drowned in a stratum of carbonic acid gas, it being much heavier than air. Aqueous vapor is held in solution in the air, at a certain tension in ratio to the temperature of the air. When the air is cooled to a certain point, a portion of the water is condensed in the form of rain, snow, or hail; and when the earth, by radiation of heat, has its temperature lowered below the dew point, a deposition of moisture takes place on its surface.

The atmosphere consists of

	By weight.	*By bulk or measure.*
Oxygen,	23.10	20.90
Nitrogen,	76.90	79.10
	100.00	100.00

In addition, we have in bulk, on the average, 4-10,000, four ten thousandths of carbonic acid, and occasionally a little carburetted hydrogen, and ammonia; but these two last are accidental and irregular in their presence, depending chiefly on the abodes of men for their production.

Carbonic acid, in proportion of from three to six ten thousandths of the atmosphere's bulk, is essential to vegetable life, but much more of it would prove injurious to animals. Hence, Nature has nicely adjusted the powers of animal and vegetable life, so as to keep the atmosphere always exactly balanced with its due proportions of these gases, and by the winds, or atmospheric currents, prevents an undue accumulation of injurious gases from taking place in any portion of the globe. Simple and beautiful as these laws are, we should not neglect to contemplate and admire them.

If we now look to the composition of water, we shall find that it consists of,

	By weight.	*By measure of gases.*
Oxygen,	88.91	1
Hydrogen,	11.09	2
	100.00	condensed and combined chemically.

Rain water contains, dissolved in it, on the average, about 2½ per cent. of its bulk of air, in which the proportions of oxygen are, according to Guy Lussac and Humboldt,

* Recent researches seem to indicate that the height of the atmosphere is between seventy and ninety-nine miles. See Kaemtz' Meteorology, note by Charles Martins.

from 32 to 34.8 per cent., while the oxygen in the atmosphere is but 21 per cent. as before stated, oxygen being more soluble in water than nitrogen.

This dissolved, but not chemically combined oxygen, is essentially necessary for the life of fishes, and of all sub-aqueous animals, and the rain supplies it in part; while sub-aqueous vegetation, under influence of sun-light, also contributes to furnish oxygen; and at the same time, the plant withdraws carbonic acid from the water.

After a long season of drought, water in our small lakes and pools, becomes stagnant, as happened a few years since to Cochituate Lake, which supplies Boston with water by its aqueduct. Then immense quantities of microscopic confervæ, of a bright green color, appeared in the water, and it had then a peculiar disagreeable taste and smell, which was compared to that of cucumbers, and by some to that of fishes, but which really was nothing more than the odor of this microscopic plant. It seems that this low order of vegetation is favored by the diminished supply of oxygen from rain, and the prevalence of carbonic acid in the water. Whether the subsequent rains, or the sudden increase of minute Crustacea, Cyclops, Daphnea, etc., caused the disappearance of these confervæ, we do not know; but it is certain that a large increase of these minute creatures suddenly accompanied the clearing of the water from the peculiar taste and smell, which for some months so annoyed our citizens, and that the microscopic confervæ gradually diminished in quantities, if it has not wholly disappeared. The Cyclops certainly is quite abundant, when the water is the sweetest and considered most pure. We wish to discharge these animalculæ from any imputation of having tainted the waters of Cochituate Lake, for we believe that they were not guilty. Pray, reader, excuse this digression, for this matter was once a subject of animated dispute in this city, and the public generally do not know how the question was finally disposed of. We give our opinion, for what it may be worth, observing at the same time, that for years this subject has been one of frequent researches in our laboratory; and has also been duly investigated, with the same results, in the scientific school of Cambridge; Prof. Horsford having first noticed the microscopic confervæ in the water, and mentioned them in his Report to the water board.

The sun's rays have the power of aiding in the formation of organic matters. By their aid the foliage of plants, whether sub-ærial or sub-aquatic, decompose the carbonic acid gas of the air, or that dissolved in water. Only the lowest orders of vegetable life can grow in darkness, namely, the Fungi, (mushrooms, etc.) which it is well known will grow in the darkness of the catacombs, Paris, or in the galleries of mines, where no light enters.

The higher orders of vegetable life require sun-light for their growth, and their power of abstracting carbon from this gas is truly wonderful, especially when we know, from chemical experiments, that the most powerful of our electro-positive elements—potassium, is required, and that, too, at a red heat, to decompose carbonic acid, so as to set free its carbon while the oxygen combines with potassium to form potash. Now the plant takes the carbon, and liberates the oxygen from this gas; two atoms of oxygen for every atom of carbon which it absorbs. Dumas says, if we place a branch of a tree, in full foliage, in a globe, and blow a blast of air over the confined foliage, while the sun shines on it, all the carbonic acid will be taken from the air by the plant, during this momentary contact with the leaves of the plant. It is a certain fact of science, and not a mere figure of speech, when we say, we draw the air into our lungs, and throw it forth unfit for animal respiration; the leaves of the trees catch this foul air and return it to us in the form of fruit, flowers and fuel.

Enterprise and Obstacles.

No higher eulogy, aside from considerations of a religious nature, can be pronounced upon any man, than that he was one possessed of energy of character commensurate with every undertaking—an ardor vigorous enough to surmount all difficulties, especially such as came inadvertently in his way.—That he could sever the gordion knot of difficulty by one masterly blow; and that he was one of those fearless, resolute, and enterprising men, who, when thrown upon the world without friends and without resources, could make his progress through it smooth and triumphant, and could even gather grapes of thorns, and figs of thistles.

Under any circumstances, no matter how unfavorable, to rise from an humble station in life to places of eminence and usefulness,

and to retain these places without any particularly favorable external circumstances, but solely by the energy of his own character, and the fertility of his personal resources, argue a truly great man. Strength, bravery, dexterity, and unfaltering nerve and resolution, must be the portion and attributes of those who pursue their fortune amidst the stormy waves of life. It is a crowning triumph or a disastrous defeat; garlands or chains; a prison or a prize.—We need the eloquence of Demosthenes to plead in our behalf—the arrows of Hercules to fight upon our side.

The severe trials and hardships of life call into exercise the latent faculties of the soul of man. Incentives to virtue and superiority, they are prepared and predestinated for him, to put his manhood to the test, and to inculcate in him strength, hardihood, and valor. Pusillanimous and feeble *without* great exertions, he is only what he was designed to be when he makes them; and forms a commendable and heroic resolution not to let life pass away in trifles, but to accomplish something even in spite of obstacles, but more especially if they do not exist. At slight difficulties he will not be dismayed, nor magnify them by weakness and despondency, but boldly meet them and put them to flight.

There are cobble-stones in every road, and pebbles in every path. All have cares, disappointments, and stumbling-blocks. Sobs and sighs, groans and regrets avail not. All have need of heart and mind, wit, wisdom, address, management, patience, and perseverance. Besides, most difficulties are merely imaginary. In the Homeric ages virtue and glory were identified, but always implied greatness of soul, great exploits, and great honors.

"Twined with the wreath Parnassian laurels yield,
Or reaped in iron harvests of the field."

It is indolence and deficiency of spirit which produce torpor and stagnation; for both in the daily difficulties of life, and in the arduous career of moral greatness, dangers and impediments abound, as well as in the perilous triumphs of heroism; but we perceive them not. The contest reveals them, and shows how difficult and onerous is the task of zealous and active goodness—of resolute and determined virtue—of patient and consistent fortitude—of useful and laudable exertion and enterprise.

Pressing emergencies are to be met with which demand talents, wealth, power, energy, character—in short, every possible help and advantage to extricate ourselves with honor and success from the straits and difficulties in which we are placed. "He," says one, "who weakly shrinks from the struggle, who will endure no labor, nor fatigue, can neither fulfil his own vocation, nor contribute aught to the general welfare of mankind."

The difficulties of life teach us wisdom, its vanities humility, its calumnies pity, its hopes resignation, its sufferings charity, its afflictions fortitude, its necessities prudence, its brevity the value of time, and its dangers and uncertainties a constant dependence upon a higher and All-protecting Power.—*Waverley Magazine.*

Francis Gillet on Gravel-Wall Houses.

Having been often asked my opinion of the concrete or gravel-wall style of building, whether it is equal or superior to other styles, and its relative cost—I take this mode of answering the inquiry, for the information of all persons, who may feel interested on the subject.

I am every way pleased with the *gravel wall*, and think it superior, in all respects, to any other. It is now nearly three years since I built a large square-walled dwelling house of this material, and I have found it to combine every quality desirable in the walls of such a structure. It is *permanent*, not having settled or cracked. It is *warm* in winter, and *cool* in summer. It is entirely *free from dampness*, even in the dampest dog-days, no moisture having at any time been detected on the interior surface, though plastered directly upon the wall, without furring out, as is customary in stone or brick walls. Having formerly occupied a stone house, which was at times damp, though furred out with great care, the contrast in this respect is very noticeable. Being thus plastered directly upon the wall *it affords no harbor or race course for vermin*, to chase up and down at all hours, day and night, more to their own amusement than the entertainment of the helpless occupants within. *It holds the stucco perfectly*, the stucco being rough and admirably suited to this style of finish.

It is cheap, costing in this vicinity, where gravel and filling-stone are easily obtained, about one-third the price of brick. Indeed,

with my present experience, I could build at a less comparative cost, perhaps one-quarter.

All things considered, I am so well satisfied with the concrete or gravel wall that should I build again, I should prefer it to any other material with which I am acquainted even at the same cost.

In conclusion, I will volunteer one suggestion as to the manner of constructing the wall. I pursued the common mode and used "flasks," or boxes in laying the wall. Were I to build again, I should cast the material beforehand, in rough boxes of the width of the wall and of any convenient length, and lay the blocks thus cast into mortar, this mode has many advantages.—All danger from rain while the walls are still green and liable to washing is thus obviated; the walls can be made perfectly true and perpendicular without the constant trouble of moving and adjusting the flasks, which are very liable to be moved out of place; juts and angles can easily be accommodated to the shape of the wall, and the builder's taste can be gratified in this respect as readily as by other material. Instead of the square or octagon form, best suited to the flask mode of construction, he can adopt the cottage, or any other style, however irregular and angular.

I shall be pleased to communicate any information which my experience may have afforded me, in relation to the details of this mode of building, believing it to be highly conducive to the promotion of domestic economy and comfort.—*Homestead.*

FRANCIS GILLETTE, *Hartford.*

For the Southern Planter.

Mr. Baker's Apples.

LOUDON CO., VA., 5th Mo. 18th, 1859.

In the issue of the Planter for this month is a communication from H. M. Baker of Winchester, on fruit growing, and speaking highly of a native fruit of that section as a valuable keeper. The description corresponds to an apple that is a native of that county, and known as Ross' Green. It was brought into notice by the late Abraham Branson, under these circumstances: he was at the house of a neighbor of the name of Ross, when he was opening a hole of buried apples in the Spring, and observing one variety less rotten than the others, he asked to be shown the tree from which these were taken, when he took some grafts and put them in his own trees. The trees thus grafted have been very profitable since, and now belong to his son, Joseph Branson; but as the trees became old they seem to be more addicted to the bitter rot than formerly. I introduced them here in this county, some years ago, but they seem more inclined to rot while the trees are young than in the limestone soils near Winchester. We now do not cultivate them. My own opinion is, that in a strong limestone soil, while the trees are young they do well and are good bearers, but in lighter soils are not so good. The apples are of fine size, green in the fall, becoming yellowish green in the spring; very fine, brittle and juicy.

If this apple of H. M. Baker's is different from the Ross Green, and he can ascertain the fact by enquiry of Joseph Branson of Frederick county, I shall be pleased to exchange grafts with him, and as the promulgator of a fruit is, by the common consent of pomologists, entitled to christen it, he may himself give it a name.

YARDLEY TAYLOR.

From the U. S. Patent Office Report.

Investigation of the Sugar-Bearing capacity of the Chinese Sugar-Cane.

BY PROF. J. L. SMITH, OF LOUISVILLE, KENTUCKY.

On investigating the sugar-bearing capacity of the Chinese sugar cane, the first step required was to ascertain the true chemical constitution of the juice extracted from the plant. From various conflicting statements on the subject, nothing satisfactory could be gleaned, some of the best authorities insisting that there was not any crystallizable sugar in the juice, or but a very small portion, while others, equally as strong, held the contrary opinion.

There are two kinds of sugar of common occurrence, namely, glucose, or grape sugar, (a sugar moderately sweet and difficult of crystallization,) and cane sugar, with a very sweet taste and easily crystallized. The first form of sugar occurs most abundantly in fruits—the latter in the sugar cane, the beat-root, maple, melon, &c. I would remark, in addition, that cane sugar is easily convertible into grape sugar, and, in all processes for extracting the former, one important aim is to prevent the transforma-

tion. For instance, were we to take the juice of the sugar cane, (containing about 20 per cent. of crystallizable sugar,) and concentrate it without subjecting it to the action of lime or some other defecating agent, fully half of the sugar would be rendered uncrystallizable, and there would be only a small yield of sugar but a large amount of molasses. For this reason in regarding the sugar-yielding capacity of any vegetable, the two facts to be considered are, first, the quantity of cane sugar it contains, and secondly, the amount and character of the impurities associated with the sugar—for the latter, during the concentration of the juice, may give rise to the alteration already mentioned, or they may prevent the sugar from crystallizing without altering it.

The juices of the sugar cane, beet-root, and maple, present about the best conditions of any of the vegetable juices for furnishing sugar, and according to the care and skill exercised in the working of them so is the yield of sugar.

Without further preliminaries, I will proceed to state the results of the investigation of the *Sorgho sucre*, as far as possible to make it at the present time. Owing to the season being far advanced when the experiment was commenced, it was impossible to undertake anything more than a chemical examination of the juice, as the frost had already affected most of the cane which was not cut. Here I would remark that it is of the utmost importance to examine plants perfectly fresh and unaltered, if we expect correct results in relation to the crystallizable sugar they will produce; and it is a well known fact that even the broken and bruised canes of a field will deteriorate the juices, if passed through the mill with the perfect canes. Even on the surface which is cut, an alteration commences, at once the sugar is changed, and this alteration gradually creeps from the cut extremity into all joints of the stalk. I have verified this fact in relation to the sorgho. By examining different joints, after it had been cut two or three weeks, the results were as follows, the joints being numbered from the extremity next to the root:

Juice from joints.	Crystallizable sugar.	Uncrystallizable sugar.
1st jt. contained	6 per cent.	7 per cent.
3d jt. contained	8 per cent.	4½ pr. cent.
5th jt. contained	9½ pr. cent.	4 pr. cent.

Hence it is evident that no time is to be lost, after cutting it, in expressing the juice.

Not being able to supply myself with the fresh cane as needed for examination, the structure of the plant, with reference to its sugar-bearing cells, was not investigated. My inquiries, therefore, were directed to the more important study of the composition of the juice.

Some of the sorgho, perfectly matured and recently cut, was compressed, and the juice submitted immediately to analysis. The process adopted for ascertaining the quality and character of sugar is the only one that can be relied on for anything like accurate results. It is known as the process by polarized light, in which the juice to be examined is first made in a few moments as transparent and colourless as water, and that without the agency of heat. The juice as compressed is of a light green colour, opaque, and largely mixed with cellulous tissue from the plant. It is readily clarified by acetate of lead, and when thus submitted to examination by Soliel's polarizing saccharometer, three specimens gave the following results:

No. of specimens.	Crystallizable sugar.	Non-Crystallizable sugar.
1st.	10 per cent.	1½ per cent.
2d.	9½ per cent.	2 per cent.
3d.	10 per cent.	2 per cent.

The result settles the question that the great bulk of the sugar contained in the sorgho is crystallizable or cane sugar proper.

The difference of opinion which has existed on this subject, doubtless arose from the fact that different degrees of care had been taken in the concentration of the juice, or that a more or less perfect process of defecation was resorted to, sometimes rendering the juice altogether crystallizable, while at others it furnished a reasonable quantity of sugar.

The results obtained in the analysis of liquids containing sugar by polarized light are especially valuable, as the impurities which may be associated with the sugar in no way affect the accuracy of the analysis, the only requisite being to render it perfectly transparent. Besides the sugar and water contained in the sorgho, the following constituents are found: Cellulose, woody fibre, pectine, pectic acid, albuminous mat-

ter, phosphates, sulphates, oxalates, potash, soda and lime salts, starch, and aromatic matter, (probably a volatile oil.) Owing to the complex nature of the juice, and the difficulty of its examination, some of the constituents (existing in small quantities) may have been overlooked, but the prominent ones are those recorded in the above list.

Further examination made upon pieces of the stalk showed it to be constituted as follows:

	Per cent.
Water, ...	75.6
Sugar, ...	12.0
Woody fibre, salts, &c. . .	12.4

So were it possible to compress all the juice from the cane, there would be a yield of 87.6 per cent. In some operations, by compression, I have obtained a yield of 66 per cent., but I do not think that the ordinary method of passing the cane between the rollers furnishes over 50 per cent. of juice.

The following table gives at a glance, the composition of the Sorgho sucre, the sugar-cane, and the beet-root:

	Sorgho.	Sugar-cane.	Beet-root.
Water.....	75.6	72.1	83.5
Sugars.....	12.0	18.0	10.5
Woody fibre and salts.....	12.4	9.9	6.0
	100.0	100.0	100.0

Satisfied as to the composition of the sorgho juice, the next step was to examine into some process of separating the sugar. The first method tried was the one transmitted from the Patent Office, and proposed by Leonard Wray. It consisted in treating the cold juice with lime, filtering, then treating with a solution of nut-galls, filtering, again treating with lime, filtering and evaporating to proper consistency, and allowing it to crystalize. This method did not succeed in my hands, the juice becoming very much blackened. All subsequent experiments were made with those methods already successfully practised on the juices of the sugar-cane and beet-root.

The first of these methods is to take the fresh juice, heat quickly to 130 deg. Fahr., add sufficient lime to enable the solution to act on reddened litmus paper, filter, evaporate about a third of the liquid, filter through well-washed animal charcoal; evaporate at a temperature not exceeding 220°, and when sufficiently concentrated, set aside to crystalize.

A second method, which I prefer to the one last mentioned, is to warm the fresh juice rapidly to 120°; then add to each gallon of juice three ounces of lime, first slaking it with five or six times its weight of water, then bringing the temperature up to 200°. It is then filtered, and carbonic acid passed through the juice, afterwards filtered and evaporated to a proper consistency for crystallization. Each time that the juice is filtered, if it be allowed to pass through well-washed animal charcoal, the syrup may be made very clear, and the sugar prepared from it will be perfectly white. During the evaporation the temperature should at no time exceed 215 degrees.

It often happens that we have to wait days and even weeks for the crystallization to take place; but it may always be hastened by adding to the thick syrup, when cool, a few grains of brown sugar, or a little pulverized white sugar.

I do not profess to give the methods described as those best adapted to the extraction of sugar from the sorgho, but there are others not yet experimented with, which may succeed better. Although much of the sorgho syrup which I have tasted is far from being agreeable, yet, when properly prepared, it cannot be readily distinguished from that of the sugar-cane of the tropics.

It must not be forgotten that sugar making is an art that cannot be practised by every one with a mill and a set of kettles; and, moreover, that the sugar making at present is a vast improvement on that of former days, and where those improvements are not employed, the process is carried on to a disadvantage. Also, in extracting sugar from one vegetable, we are not to expect to apply successfully those methods practised on other vegetables. It was not by applying to the beet root the method of extracting sugar from the cane that France is now able to produce 120,000,000 pounds of sugar from that root, a quantity equal to one-half of what is consumed by her entire population of 30,000,000. Beside, it was not in a year or two that the beautiful and economical processes now employed were brought to their present degree of perfection. What was necessary for the beet root is doubtless required for the sorgho, namely, thorough study of its nature, with a process of extracting the sugar specially adapted to it.

In regard to the economical results to arise from the cultivation of the Chinese sugar cane, I have no data upon which to form a correct opinion, as it would require an entire season, at least, to go over the subject, and to examine the plant in its different stages; also to examine its fixed principles, and ascertain its exhausting effects on the soil. As already stated, the cane examined was in a perfectly matured state, but I have been informed that in the earlier stages there is more sugar in the plant. If this be true, an investigation should be made of its sugar bearing qualities in the different periods of its growth.

The economical value of this plant in regard to its sugar or syrup, is far from being settled, even should the syrup be readily converted into sugar. It grows in a temperate climate, it is true, but so does the beet root, which, under skilful cultivation and a well directed manufacturing process, will yield from 1,300 to 2,000 pounds of sugar to an acre.

The following are the most important facts established by the present inquiry:

1. The sorgho contains about 10 per ct. of crystallizable sugar.

2. The sugar can be obtained by processes analagous to those employed for extracting sugar from other plants.

3. The uncrystallizable sugar forms rapidly after the cane is fully ripe and recently cut.

The present investigation I regard only as a preliminary to the proper study of the plant in question. Some of the points yet remaining for investigation are:

First, the composition of its ash, compared with that of the sugar cane, in order to learn its requirements of soil, when compared with those of the latter.

Secondly, the analysis of the plant in certain stages of its growth, and from different localities, to learn when it contains the largest amount of sugar, and what latitude is most favorable to its development.

Accompanying this report are specimens of syrup and sugar; the former transparent and of a light wine color, the sugar perfectly white and fine flavored.

☞ The violet grows low and covers itself with its own tears, and of all flowers yields the sweetest fragrance—such is humility.

The Southern Planter.

RICHMOND, VIRGINIA.

The War in Europe.

In calculating the advantages likely to accrue to the agricultural interests of this country from an increased demand,—at enhanced prices,—for breadstuff, for exportation, we are too prone to overlook, or forget, the many drawbacks upon our otherwise prosperous condition, arising from the obvious effects of a foreign war upon *the currency* of the country. Among these we notice the first—after the fitful agitation of the Food Market—to be, a largely increased demand for gold, and *a decline* in most other commodities, proportionate *to its rise in value*,—a stringency in the money market consequent upon its abstraction, and a curtailment of that part of the circulating medium based upon it, and purporting to represent it,—consisting of credit, and composed *primarily* of the promissory notes of banks, and *secondarily* of those of merchants and other classes and corporations. A medium so sensitive, that like an Æolian Harp, in all but its melody, gives forth notes of alarm and distress at the touch of every breeze that blows, and like the atmosphere, all the lighter for its expansion, losing power in proportion to its attenuation, but very unlike it in this: *that it is least to be relied upon when most needed*—an inflated balloon in the flush times of prosperity—a millstone about the neck in the time of adversity. Yet, unstable and fluctuating as the currency is, for that reason it is the better fitted to subserve the purpose of a barometer, to note the perturbations and changes constantly occurring in the monetary atmosphere, and by which to foresee the storms and calms, and clouds and sunshine which alternately darken or brighten the horizon. We shall, from time to time, notice the operations in the money market, as affording to our readers the means of judging for themselves of the course which may seem best for them to pursue in the sale of their productions,

and in the purchase of property for permanent investment, or commodities for their consumption.

As germain to our purpose, we now call attention to the following article, extracted from the United States Economist:

RATES OF INTEREST IN EUROPE.

The occurrence of the war produced an immense derangement in the money markets of Europe, as well as fall in prices. The first shock caused a depreciation in stock values which has been estimated at $1,000,000,000, and over 300 failures of banking and commercial firms have been reported, whose liabilities are not short of 300 millions, and the effects of which are now corrupting the standing of those still existing. The demand is only for gold, and values of all kinds sink in comparison with that; at the same time there is no demand for capital for any business or commercial enterprises. There are few merchants of England, or Western Europe, who will project ventures to other countries when the course of war is so uncertain, and the demand for all sorts of merchandise is so much diminished that no one demands capital to embark in it, hence, although gold is actively running out from the great reservoirs, the supply of capital at the leading centres is increasing, seeking employment at lower rates, but this only on the most undoubted securities. The first panic of the war caused a demand to extinguish obligations, and the rate of interest rose. That accomplished, the rates are again falling for investments where the security is undoubted. The following are the rates of interest at the leading centres:

	Hamburg.	Bremen.	Frankfort.	Berlin.	Antwerp.	Amsterdam.	Leipzic.	Vienna. gold.	Paris.	London.
Dec. 23	2¼@2¾	3	4	4	3	3	5	5—101½	3	2½
April 1	3½@3¾	3	3½	5	3	3	5	5—108	3¼	2½
April 15	3½@—	3½	3½	5	3	3	5	5—112	3¼	2½
April 27	5½@—	7	3½	5	4	3	5	5—120	3¼	3½
May 3	5 @—	6	3½	5	4	3	6	5—143	4	4½
May 17	4 @—	6	4½	5	4	3	6	5—145	4	4½
May 23	2½@—								4	4½

The rate was first to rise at Hamburg, and it declines there the first, after the pressure to meet obligations has passed. The demand for gold is, however, everywhere active, and the degree in which it rises is apparent in its agio at Vienna, where the bank is suspending payments and emitting paper money, and maintaining its rate of interest. The agio has risen with the Exchange on London from par to 145, and the demand for the metals is everywhere met with its concealment and export. The reservoirs subject to the demand for the metals are more chary of those demands, which have for an object the obtaining of it for export. In New York the outward current of the metals has been very large. The amount of specie in the city has been reduced during the month of May about $4,700,000. In the same period last year there was an increase. The export from Boston and New York, together, for May, has been $12,632,511. The diminution in the banks of four cities has been as follows:

	Loans.		Specie.	
	May 1.	June 5.	May 1.	June 5.
Boston	$58,178,264	57,328,243	6,726,647	6,700,975
New York	128,706,705	125,006,766	32,898,400	28,055,400
Philadelphia	27,747,339	26,406,458	6,689,591	5,521,759
New Orleans	19,926,487	18,594,556	15,650,736	14,784,944
	$234,538,795	227,326,023	61,985,374	55,063,078

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ology; Selection and Preparation of Food; Selection and Care of Stock.

Lindsay & Blakiston, Publishers, Philadelphia.

Having enjoyed the opportunity of examining the manuscript of the above work, (which though ready for delivery, has not yet reached us in print,) we can, with great confidence, recommend it as eminently worthy of general circulation among farmers, as a concise, accurate and systematic treatise, calculated to impart the most valuable instruction in respect to the science and practice of agriculture, and "reduced to such a form that it may be applied to the daily business" of the farm. It is truly "A Book for every Farmer and every Farmer's Son."

Southern Field and Fireside.

We have received the two first numbers of the above paper, published weekly in Augusta, Georgia, by James Gardner, at $2 per annum, always in advance, and edited by Dr. Lee in the Agricultural, W. W. Mann in the Literary, and Wm. N. White in the Horticultural department.

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For the best Poem, less than 60 lines,....	25

Natural Agriculturist.

A new paper, published at Pittsburg, and edited by J. T. F. Wright, proprietor, at $1 per annum---a quarto of 8 pages, well filled with original and selected matter. We wish it a useful and prosperous career.

Acknowledgment.

We received from H. J. Smith, Esq.,---who is already distinguished for the superiority of his fruits and vegetables,---specimens of six varieties of Raspberries---Allen's Hardy, Antwerp Red, Pringle's Orange, Pringle's Red, Cattawassa, and Fastolf---all of which are very fine,---the two varieties first named superb. We also received, while they were in season, several remarkably fine samples of the varieties of the Strawberry cultivated by him. He intends to enlarge the allotment of land for the growth of these luscious fruits.

Scientific American.

There is no one paper to which we are more indebted for valuable articles, with which to enrich our own pages, than to the SCIENTIFIC AMERICAN, and there is none, therefore, that can have higher claims to courtesy at our hands, or in whose prosperity we take a deeper interest. It gives us pleasure to insert its prospectus below, by which it will be seen that important improvements and considerable enlargement are in contemplation. Now is the time for new subscribers to enter their names:

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OF THE

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From the British Farmer's Magazine.

The Principles that should Guide the Farmer in Breeding Stock, with more especial reference to Horses.

A quarterly meeting of the members of the Wenlock Farmers' Club was recently held, at the Raven Hotel, Much Wenlock, to hear Mr. Griffith Evans, of Bridgnorth, deliver a lecture upon "The principles that should guide the farmers in breeding stock, with more especial reference to horses."

In the absence of the President, the Rev. H. R. Smythies was called to the chair.

The lecturer began by contrasting the present Shropshire-down sheep with their ancestors thirty years ago, and he showed how that the great improvement had been made by breeding upon some scientific principles. Yet he was persuaded that many follow the new system who are not acquainted with the principles. They do it because it is the fashion, and answers the purpose better—not knowing the why and the wherefore it should answer better. He should therefore draw their attention to Nature's laws of breeding. The same law is applicable to all animals, only, of course, requiring certain modifications which their good sense might easily direct. It is a lamentable fact that horse-breeding is very much neglected throughout the country, especially hunters and carriage horses; nor has the draught horse had the attention he deserves. He (Mr. Evans) should, therefore, more especially point out how to apply the principles of breeding to horses than to other animals. Mr. Robert Smith, in his excellent "Report on the Exhibition of Live Stock at Chester," published in the last volume of the *Royal Agricultural Society's Journal*, says that "The breeding of the horse is a national subject, but as yet has not been treated as such. There is a want of system in our arrangement and management." He quite agreed with Mr. Smith. Our fairs are overstocked with horses, but so shapeless that it is difficult to say for what purpose most of them are adapted. He thought he might safely say that the average value of four-fifths of our four-year-old horses, of all sorts that we see in the fairs, is hardly £20 to £25, and it is difficult to sell many of them at any price. Now, taking into consideration their cost of breeding and rearing, with all risks and so on, no wonder, then, breeders say they do not pay. The average value of the remaining one-fifth it is difficult to say; but they sell readily for from £40 up to almost any amount you can reasonably conceive. Now, I ask those breeders who complain, why do they breed horses at all? "Oh," they say, "to consume the grass properly we must have cattle, sheep, and horses, too, —they all differ in their bite so." Very well, then, if you breed horses of some sort, why don't you breed good ones? Does an ill-shaped horse consume less food than a good one? Is it cheaper to breed poor than good horses? My motto is this always: "If it is worth my while to do a thing at all, it is worth my while to do it as well as I possibly can;" and I have no hesitation at all in saying that it would pay you as well as anything to breed real good horses. Some of you may perhaps say, as I have heard others say, that in breeding cattle and sheep you are seldom disappointed; the progeny is always what you expected; while in breeding horses you have no idea what the colour or shape of the colt will be until you see it, it is quite a lottery. It may be this: it may be that. You hope the best, and the worst will disappoint you; for you do not believe in horse-flesh. Thank you, my dear friend, that is a candid confession at any rate, which goes so far as to prove that you have never practised horse-breeding upon right principles. Before I came here I lived in Lincolnshire. There, good horses are comparatively plentiful; much better than those bred in Shropshire, taking all together. You excel in sheep; I wish you to excel in horses, too; I wish to see dealers flocking from all parts of the world to Shropshire for horses. I wish to see the tide turned from Lincoln and Horncastle fairs to Shrewsberry and Bridgnorth; or, at any rate, to see the trade as strong here as there. It is not impossible; the country is naturally well adapted for breeding purposes; you only want the system. Don't despair, a patient perseverance will overcome all difficulties. Let us all, then, this evening, enter into the subject in good earnest, determined to sift the matter thoroughly, and to profit by the investigation. He went on to notice that the first great law of nature in breeding is, that like should produce like; if it was not for this law, which is constant and without exception, a mare might produce a calf, a sow

produce a dog, a bitch produce a lamb, &c.; but it must be accompanied in our mind with another law, the law of variation. The child is not always like its parent in every respect, and sometimes not like its species, as when a lamb has two heads or six legs, &c., as we often find. Then we call it a monster. This diversity forms the problem of hereditary influence, and it is for the causes of, and reasons for, the variation that the breeder must enquire, and make himself acquainted with, so that he may, as far as possible, modify them. One of the causes of variation is what is called "breeding back." It is often a source of disappointment to the breeder that when he puts a well-formed female and a well-formed male, he gets an ill-formed colt or calf, and of quite a different colour to what he expected. If you enquire into the pedigree of the parents you will find the child answering in every respect to the description of an ancestor. This is the law of atavism. It is this that makes many say that horse-breeding is a lottery. However, if you breed properly you have little to fear. Pure and thoroughbred animals comparatively seldom breed back, or disappoint their owners in doing so. By thorough-bred is meant those whose ancestors were for a long time of the same shape, and adapted for the same purpose as themselves. The more the animals have been crossed the more subject are they to breed back, and more the difference in shape in crossing the more likely is breeding back to prove a disappointment. A case was related to illustrate this law. How is it to be explained? The "Westminster Review" very properly says, "It is to be explained on the supposition that the qualities were transmitted from the grandfather to the father (the other sex may convey it equally well,) in whom they remain latent or were marked by the presence of some antagonistic or controlling influence, and thence transmitted to the son, in whom the antagonistic influence being withdrawn they manifest themselves. Mr. Singer, let us say, has a remarkable aptitude for music, but the influence of Mrs. Singer is such that the children, inheriting her imperfect ear, manifest no musical talent whatever. These children, however, have inherited the disposition of their father in spite of its non-manifestation; and if, when they transmit what in them is latent, the influence of their wives is favourable, the grand-children may turn out musically gifted. In the same way consumption or insanity and other hereditary diseases seem to lie dormant for a generation or more, and in the next flashes out with the same fury as of old." This should make you very careful in breeding stock, and to ascertain that not only the sire and dam are free from spavin, curbs, &c., but that their ancestors were not subject to any hereditary affection, and not only that they were free from hereditary evils, but that they possess the same good qualities, and are adapted for the same purpose as themselves. Several very beautiful, instructive, and interesting illustrations were produced to prove that diseases arising from accident, as well as constitutional idiosyncracy, curious tricks, acquired habits, vicious and peevish tempers, as well as good tempers, &c., were hereditary, or transmissible from parent to offspring. Now comes the vexed question, "Which has the predominating influence on the progeny, the male or the female parent? If both parents join to form the child, does the parent give one group of organs and the other parent another group; or do both give all?" This subject is so very interesting, and it is so important, that the breeder should come to some definite conclusion upon it, that he felt justified in occupying a considerable part of their time in its investigation. Several great men were mentioned who maintain that the male parent furnishes the external configuration, or, in other words, the locomotive organs; while the female parent gives the internal or vital organs, each absolutely independent of the other. Other equally celebrated observers declare that it is quite the reverse, the female preponderates always in the locomotive organs, and the male in the vital organs. Others again, equally as eminent, assert that both theories are wrong; that the male always gives external configuration or locomotive organs, and the female the internal or vital organs, but do not mean it to be inferred that either parent gives either set of organs uninfluenced by the other parent, but merely that the leading characteristics and qualities of both sets of qualities are due to the male on the one side and to the female on the other, the opposite parent modifying them only. He (Mr. Evans) believed they were all wrong—that the truth lies between them. He

related many very beautiful and interesting facts in support of each theory, which seemed conclusive in themselves; but he maintained it was not fair to look at one set of facts alone, and shut our eyes to others. It was by an impartial survey of them all that we get the truth. There was an able article upon this subject in the *Westminster Review*, with which he fully agreed, which says, "That both parents are always represented in the offspring; and although the male influence is sometimes seen to predominate in one direction, and the female influence in another, yet this direction is by no means constant, is often reversed, and admits of no absolute reduction to a known formula. We cannot say absolutely, the male give such organs; we cannot even say the male always predominates in such or such a direction. Both give all organs. Sometimes one predominates, sometimes the other. In one family we see children resembling the father, children resembling the mother, and children resembling both." He (Mr. Evans) knew many breeders who had suffered great disappointments and losses by practising upon the theory that the female does not give the external configuration, nor has any part in the locomotive organs. One of the greatest curses in horse-breeding is that there are but few good brood mares kept. He had no hesitation in saying that, as a general rule, and the only safe one to go by, the female has as much influence on the configuration of the progeny as the male has. The successful breeder never uses a middling female to breed from, trusting to the excellency of the male to make amends. If he has not a good female he will not attempt to breed. Seeing, then, that there is a diversity, that sometimes the influence of the male parent predominates, and sometimes the females, in each system of organs, let us inquire into the causes. Several illustrations were brought forward to prove that it depended upon potency of race, upon the vigour, health, and age of the parents at the time of copulation. The most potent or vigorous parent will have the greatest influence upon the offspring. The lecturer said, I shall now pass on to notice more particularly the practical application of these laws. It is a common but silly question, "Which breed of animals is the best for the farmer?" Some advocate short-horns, others advocate the long-horns, others the medium-horns, and others will have no horns at all. A particular kind is sometimes advocated under all circumstances to the exclusion of all others. Such persons remind me of those disputants about the true colour of the chamelion; all are right, and all are wrong, depending upon the point from which the object is examined. That breed of animals is the most profitable which is best adapted to that particular locality. One class does better on upland, others on lowland; some do better grassing, others do better housed. It also depends upon the demand of the neighbouring markets. In some parts cheese-making pays best; in other parts milk; in other parts meat, &c. In some districts it pays better to breed draught horses, in others hackneys and hunters, in others race-horses, in others ponies, &c. What I wish to impress deeply upon your mind is this: Every breed has its own peculiar conformation, and that conformation you will find, upon close investigation, to be peculiarly well adapted for a particular purpose; and when you adopt and cultivate a certain breed, you must always keep that purpose and that conformation steadily in view. If you lose the conformation, you will soon lose the purpose. For instance, we may divide cattle into two primary classes: 1, For fattening and arriving at early maturity; 2, For dairy purposes. For illustration, take two cows, one from each class, and you will find their shape or conformation diametrically opposed. Go to any herd you please, and you will find that just in proportion as the animals represent the shape of class 1 so are they disposed to fatten; and in the proportion they represent class 2 are they fit for dairy purposes. These classes may again each be divided into different divisions: A is better adapted for high land; B is better adapted to low land; C is better adapted for out-door living; D is better adapted for living in-doors, and so on. Each division has its own distinct peculiarity of external conformation. That enables us to say at once which will do here, and which will do there. It is all-important that the breeder should be thoroughly acquainted with these "points," or proper shape of his stock; but I should depart from my subject if I discussed them this evening. However, I know many farmers who think that there is only one proper shape for the horse—draught horses, hack-

neys, hunters, racers, all should be the same outline. They take the hunter as a standard of comparison, and the only proper difference they allow between him and others is not in the shape, but in the weight and bulk of bone and muscle within the same height and length. The race-horse should be more slender and finer, and the cart-horse stouter and more hairy. As I know that such a notion exists, you will permit me to say a few words, to show its absurdity. It is surprising how few farmers know the proper points of a horse; and many of the "knowing ones," in fact, know less than nothing. In that excellent journal, the *Farmers' Magazine*, for October, 1836, there is an article upon the cart-horse, advocating the same oblique shoulder, for the draught and for the hackney-horse, which is certainly a most ignorantly absurd and grossly fallacious doctrine. We may also divide horses into two primary classes: to carry weights on their back, and go fast; and to draw weights after them. It is evident that they are destined for very different purposes, and must set to work in a very different manner. The first-class has to carry the rider safe at a fast rate. For this purpose the fore-legs ought to reach over much ground when in motion, and the saddle should be so set that it will not interfere with the motion of the shoulders; and the weight should be so carried that it will not balance over the fore-legs, and make him tumble forward. The chief points to attain this are, that the withers and forehand should be high and thin. The shoulders should have much obliquity from the top to the point, and a line drawn vertically from this point should drop at the toe when the animal stands in his natural position. The second-class has to pull heavy weights at a slow rate, therefore, its shape should be quite the contrary to the first-class. The animal should be able to throw its whole weight into the collar, and to overbalance its centre of gravity, so that it has to step forward to avoid coming down. When the hackney or saddle-horse is in the collar he cannot pull a weight beyond the power of its hind-quarters. The shape of its fore-quarters rather prevents than help him to pull; while the draught-horse, by the peculiar shape of his fore-parts, is able to throw his whole weight into the collar to assist the muscles of the hinder-parts. It is common with waggoners, when a horse is not able to pull or start a load, to jump on his neck or withers, and by the weight overbalancing him, the load starts easily. The proper shape of the draught-horse, in contradistinction to the saddle-horse, then, should be a low and thick fore-hand and withers. The shoulder should be *comparatively* upright, and consequently the line drawn vertically from the point of the shoulder will fall considerably in front of the toe. The draught-horse should, as the saying is, "stand over his legs," and you now see that what is an excellent point in one horse is the worst that can be for another. Class 1 may be divided into—A, the race-horse for galloping; B, hunters, for galloping across country, and jumping, &c.; C, hackneys, for trotting and cantering on the road. Class 2 may also be divided into—A, the town dray-horse; B, the farm dranght-horse, (both pull heavy weights and go comparatively slow;) C, the carriage-horse, (he goes on the road, pulls heavy weight, and must go fast, therefore in many respects his shape should approach the saddle-horse.) I have already said that I should be out of place in dwelling upon the proper shape of animals—it would form a subject for an interesting lecture of itself. I now merely draw your attention to the fact that there is a peculiar shape adapted to perform any particular work, and it is essential that the young man should make himself thoroughly acquainted with those before he can expect to be a successful breeder. Starting, then, upon the great law of nature, that like produces like, and being prepared to guard against variations by breeding from animals of the same sort, &c., breeding good stock becomes a simple matter of course. First ascertain what animals your land is best adapted for. Secondly, what have the readiest sale in your markets. Thirdly, having decided upon the purpose of your animal, study the best shape and conformation calculated to attain your object in a most perfect manner; if you wish to breed fat stock, study the shape most disposed to lay on fat with the least food, and to arrive at early maturity; if you wish to breed milk cows, study the proper shapes for them; if you breed horses, study the proper shape to perform their various duties. Fourthly, don't breed from an animal, whether male or female, whose shape is not well-adapted to perform the work it is intended

for: let them be of the most perfect shape you can get of their kind. Fifthly, being acquainted with the law of attavism, or breeding back, you will not be satisfied unless their ancestors were also of the same sort, and equally good; in fact, thoroughbred, and free from hereditary evils. Remember that I do not confine the term thorough-bred to the race-horse. It may be equally well applied to the cart-horse, or hunter, or pony, or carriage-horse, &c. It means those whose pedigrees for a considerable time back were of the same class, and adapted for the same purpose as themselves. Unless you commence to establish a new breed you should never breed from a half-bred animal. Let them all be castrated, and treat all such mares and geldings. There is two much risk connected with it; it is based upon a wrong principle; you should carry the right principle out thoroughly. Why should you breed from a half-bred mare more than from a half-bred cow? I know many excellent horses bred from half-bred mares, but there are many more failures. Some of you may say that you have no pure or thorough breeds except racers; therefore, you ask how can you avoid crossing. Well, "it is never too late to mend." Suppose Messrs. Bakewell, Adney, Smith, and other eminent breeders, had listened to such an excuse? We never should have had the improved Leicester sheep, nor the improved Shropshire down. Though you may not have good distinct breeds of coach-horses, hackneys, &c., now, you may soon have by following the directions I lay down. Unless breeders will reform, that useful animal the hackney will soon become extinct. The present system of breeding hunters and coach-horses is a bad one; because by putting a race-horse to a half-bred mare you may get a good hunter, and you often fail; you may get a hack, you may get a useless one. By putting a hunting-horse to a Cleveland mare, you may get a carriage-horse, or you may often get one good-for-nothing. You have no law to depend upon. By breeding exclusively from animals of the same shape, and, therefore, adapted for the same purpose with careful attention to pedigree, you may easily establish a breed for any purpose whatever. At first, when originating the breed of hunters and carriage horses, of course we cannot avoid using crosses or half-bred animals, and such was the origin of the race-horse. They will soon bear the name thorough; and when, in after generations, a progeny will show the original cross, by breeding back, it must not on any account be used for breeding purposes. I should recommend you to breed from your own stock exclusively, only as long as you cannot find a better male than your own, and your stock improves. I do not object to a cautious admixture of blood, but you must not cross the breed. I do not object crossing two families, but those families must be of the same breed. That word "breed" is very comprehensive, and has many different meanings. By those of the same breed I wish it to be understood those of the same shape and adapted for the same work, with good pedigree. They may or may not be related. For example, you must not breed between a thorough-bred draught-horse and a thorough-bred hunter or racer. You would get a good-for-nothing mongrel, too weak for draught, too ugly for harness, and not the shape for saddle; yet our fairs are overstocked with such animals, which prove that the present system of breeding is a wrong one. I can countenance no crossing of the breeds. Keep them distinct. Have thorough-bred draught-horses, thorough-bred hackneys, thorough-bred hunters, as well as thorough-bred racers. Each has its own peculiar shape, suitable for its particular purpose. Why should they be mixed? As to the qualities of the brood-mare, there are some peculiarities essential for all breeds. She must be what is called roomy, allowing sufficient space to carry a foal, and for its passage into the world. For this purpose the carcase should be long, and the back ribs deep, the pelvis or hips should be wide and deep. The forehand is usually lower in the mare than in horses of the same kind. This, as Stonehenge observes, "gives the whole framework of the trunk a larger proportion than is always desirable in the race-horse, which may easily be overtopped; and here many good runners have failed as brood-mares, whilst a good number of bad runners have been dams of good race-horses. Beyond this roomy frame necessary as the eggshell of the foal, the mare only requires such a shape and make as is well adapted for the peculiar purpose she is intended for. It is better to bree4 from animals of a medium size of their kind, whether male or female, not too big,

nor too small." To ensure the mare being stinted she should be perfectly healthy, and living as much as possible in a state of nature; not overfed with corn, but rather have cooling diet, unless she is poor. Fattened animals often prove barren. The best time for covering is when the heat commences. If convenient it is often recommended to do so a second time when the heat passes off. "Like the broodmare," says Stonehenge, "the stallion requires several essentials, commencing also, like her, 1st with his blood; 2ndly, his individual shape; 3rdly, his health; 4thly, his temper. But there is this difficulty in selecting the stallion, that he must not only be suitable, but he must also be adapted to the particular mare which he is to serve. Thus it will be manifest that the task is more difficult than the fixing upon a broodmare, because (leaving out of consideration all other points but blood) in the case a mare only has to be chosen, which is of good blood, for her particular work; while in the other there must be the same attention paid to this particular, and also to the stallion's suitability to the mare, or to "hit" with her blood. The rock upon which most men split is a bigoted favouritism for some particular horse; thus one puts all his mares to Birkenhead, another to Hunting Horn, although they may every one be of different blood and form. Now this cannot possibly be right, if there is any principle whatever in breeding; and however good a horse may be, he cannot be suited to all mares. Some say that any sound thorough-bred horse will do for a thorough-bred mare of the same kind, and that all is a lottery; but I hope you now perceive that there is some science required to enable the breeder to draw many prizes. That the system generally followed of late is a bad one, I am satisfied, and with the usual and constant crossing and recrossing it is almost a lottery; but upon proper principles and careful management, there would be fewer blanks than at present. We cannot expect to find a perfect mare nor a perfect horse; there is some "if this," or "but that" in all them. The breeder, however, must be particularly careful that both should not be faulty in the same place —that both should not have the same objection—and whereon one is deficient the other must be unusually developed. In thus matching his mares the judgment of the breeder is proved, that they may "hit" well. The same rule of course applies to all animals. Mr. Bell well observes, that "the importance of the influence of the sire in breeding horses is in no point more clearly proved than by the fact that the progeny of the most celebrated race-horses have generally sustained the reputation of their sires. Thus the descendants of Eclipse numbered no less than 364 winners, and those of Matchem, Highflyer, and other celebrated horses have partaken of the same inherited excellence. Sultan, the property of the Duke of Beaufort, which covered at £30 a mare after he was 20 years old, Snap of the House, General, and Admiral of Ludlow, and not forgetting Sir Sampson, were celebrated stallions in this country 20 and 30 years ago; and though they are long since dead, yet they now live, and are well known in their descendants. It is a remarkable fact that the first male put to a female, especially if he be potent, influences more or less the progeny of that female by subsequent males. A striking case of this kind was first published in the *Philosophical Transactions*. A splendid mare, seven-eighths Arab, had a mule by a quagga, in the year 1816, the mule bearing the unmistakable marks and stripes of the quagga. In the year 1817, 1818, and 1823, this mare again foaled, and although she had not seen the quagga since 1816, her three foals were all marked with the curious quagga marks. Nor is this by any means an isolated case. Meckel observed similar results in the crossing of a wild boar with a domestic sow. Mr. Orton verified this fact in the case of dogs, and poultry. Mr. Merrick, in the *Veterinarian*, records the experience of his groom, who has had the management of stallions for 14 years, "that he has frequently noticed that well-bred mares, which had been difficult to stint with thorough-bred horses, have bred to an inferior, and subsequently to a thorough-bred stallion; but her stock by the latter has frequently showed traces of inferior blood, not to have been expected from the breed of either the sire or dam. You will, therefore, bear in mind that it is especially important that the first male given to a female should be well bred. I know that there is a foolish notion with some people about dogs, that the first litter is not likely to be good, therefore they allow the bitch for the first time to go about with

any and every dog, little thinking the bad effect such treatment has upon future litters. In explanation of this phenomenon that eminent physiologist, Professor Carpenter, in his celebrated work upon "Human Physiology," writes: "Some of these cases appear referrable to the strong mental impressions left by the first male parent upon the female; but there are others which seem to render it more likely that the blood of the female has imbibed from that of the fœtus, through the placental circulation, some of the attributes which the latter has derived from its male parent; and that the female may communicate these, with those proper to herself, to the subsequent offspring of a different male parentage." The same author also writes: "There seems good reason to believe that the attributes of the germ are in great degree dependent not merely upon the habitual condition of the parents, which have furnished its original components, but even upon the condition in which those parents may be at time of sexual congress. Of this we have a remarkable proof in the phenomenon well known to breeders of horses, that a strong mental impression, made upon the female by a particular male, will give the offspring a resemblance to him, even though she had no sexual intercourse with him. In conclusion, allow me to say that agricultural societies are to be blamed very much for the little attention they pay to horses as compared with other stock, especially poultry. They ought to give liberal prizes to the brood mares and stallions of all breeds, and pay as much attention to them—they deserve more—as to cattle, &c. The best stallion should have to travel within the district of the society during next season, and not to receive the prize until the end of that time. I must add that our great landlords generally overlook the interest of their tenants, and consequently their own also, in not keeping good thorough-bred stallions, of different breeds, for the use of their tenants at a nominal charge. Farmers themselves also overlook their own interest too often by being "penny wise and pound foolish," in looking more at the fee of the horse, when they engage him, than at his shape.

Examine your pickles, sweet-meats, and everything put away.

Treatment of Peach Trees.

R. Seamans, of Cecilton, Maryland, thus gives his plan of treatment of peach trees, which he cultivates on a large scale:

"They should be carefully examined every year, and all the worms and *ova* destroyed. A shovelful of wood ashes thrown around the roots every spring is beneficial. When six years old, the soil should be cautiously removed for about two feet round the trunk, so as to examine the root. A strong wash of lime and some salt should then be applied to the top of the root at the trunk and for about eighteen inches above it, prior to which application the rough bark should be scraped off. The removed soil is left open for one week, then placed in its former position. A yearly examination for worms, a rich soil, and careful cultivation, are all necessary for the prosperity of the peach tree.

Extirpating Thistles from Grass Land.

To me there have appeared few things more extraordinary in the history of farming knowledge than the perverse tenacity with which prejudice has so long preferred the scythe to the roller in keeping down thistles. In the North Riding of Yorkshire, as far back as forty years ago, the roller was an approved instrument for destroying thistles in pasture grounds: and most effective it proved to be—the bruise and crush of the top of the plant extending in mortification to the root. No doubt of it, the scythe makes a clean sweep—so does a surgeon when he cuts a leg off; but let a crushed leg remain attached to the body, and the undertaker will assuredly have employment.

Pitch Phenomenon at Sea.

While the bark *Rolla*, of New York, was in the Gulf of Mexico, on May 4th, it passed through a scum of smoking pitch, which extended for several miles, and emitted a most nauseating odour. It was supposed by her captain (Mr. Rogers) to be thrown up by a submarine eruption from some part of the bottom of the ocean. This, we think, is the true explanation of the phenomenon. There are extensive formations of mineral pitch in Cuba, Trinidad, and other West India islands, and no doubt there are beds of this material under the waters of the gulf.—*Scientific American.*

Reclaiming Clay Soils.

No subject can be more important to large districts of our country, than the reclaiming of clayey and other heavy soils. Among these we may name the red-kellis hard pan soils, ferruginous clays, ferruginous loams, etc. As to the first, in common with some of the others, we will not be disputed in the assertion, that when clayey or heavy soils are properly reclaimed, they are more valuable than lighter soils. The fact that they retain manures, requiring less in amount to raise crops, is alone a strong argument in their favor. Their ability to repeat a greater number of crops without exhaustion, and their general adaptability to all crops instead of being suited only to special crops, add materially to their value.

Clay soils are always more fully charged with the inorganic constituents of plants than light soils; and when once in the proper mechanical condition to avail of atmospheric influences, insuring higher temperature and consequent chemical action to liberate phosphates, alkalies, etc., they form the most profitable farms. One of the peculiar properties of clay is to receive and retain ammonia, even against the effort of running water to remove it; the formation of new chemical compounds with the divided silicious matters pervading it in degree, as each grain surrounded by alumina presents all its surface upon the slightest contraction of the clay by drainage. No clay soil is entirely without sand, and in such soils the land may be viewed as *miniature rocks*, generally of diversified kinds, containing all the primaries of nature; while in sandy soils the particles all arising from the same or similar rocks, do not supply so great a variety of pabulum for plants. Most clays, therefore, when in admixture with the other materials which go to make up a soil, have a greater variety of constituents, are in better condition for improvement than other soils. Their compact condition requires amendment, however, before their advantages can be availed of.

First—Under-drain them thoroughly; the redundant water being parted with, the clay contracts and a series of pipe-like openings first occur; these permit a more thorough circulation of atmosphere, which in turn divides these pipes into lesser portions, like broken and partially ground tobacco pipes; the adhesive property of the clay is now lessened, and sub-soil plowing ameliorates it materially. Fall plowing by ridging and back furrowing, leaving the surface like a succession of inverted letter V's, permits the freezings and thawings of winter to ameliorate still further their condition; these ridges split in the spring by a double mould-board plow, and then cross-plowed, give a kindly soil, capable of being used even for garden purposes. The day has passed when farmers suppose that clay soils retain manures because they will not pass water. They now know that water heavily ladened with any matters in solution, if filtered through sand containing only one per cent. of *clay*, will be rendered pure, the clay retaining all the matters before held in solution. They also know that all the gases are received and retained by clays; and, therefore, manures decomposing in clay soils can neither filter downward in solution, or rise into the atmosphere as gases, and for these reasons the clay soils retain manures. If clay has such properties, it has always had them, and during all time clayey soils have been storing up Nature's treasures; put them in proper mechanical condition to permit roots and atmosphere to percolate them, and they will furnish food to plants.

All the above remarks apply to all the kinds of soil named in the opening of this article. If deleterious matters are contained in them, as in the copperas clays, the admission of atmosphere renders these foreign substances the more soluble, and while the clay retains all matters required by plants, it freely parts with such solutions as are unfriendly to vegetation. The red-kellis subsoils fall to pieces as soon as under-drained and sub-soiled plowed, and in doing so yield up potash in abundance.

We dug a well sixty feet deep seven years ago through this red kellis, blasting all the way, and the kellis seeming to be solid sand-stone. When exposed to the atmosphere for a few months, it fell to pieces and made a soil worthy of being used as a manure on many other soils.—*Working Farmer.*

Deep Plowing---When to do it.

I am a practical advocate of deep plowing, having been engaged for several years past in deepening my farm, and having found it more profitable to add to my land in this way than by buying more acres. My deed runs down to the centre of the earth, and I mean to make the most of it, and I

have found that this also gives me another advantage, for the deeper I get my farm, the higher my grain grows, so I gain in both directions, and by this means I reckon I've got at least thirty per cent. more available space than formerly; at any rate my seventy dollars per acre land would now bring me ninety dollars—but I hav'nt got to the bottom nor top of it yet, and I mean to stick to it.

I have found by experiment that it is best to run the plow deeper when raising oats and winter grain, rather than when breaking up for corn.

Corn is an aristocratic plant as you might know by its tasseled head, silk gloves, and long ears, and like such gentry it must have good nursing in the beginning, and the best living the land will afford. It sends its roots about, near the surface where it can find plenty of food, and where they can grow comfortably near the warm surface. If you plow deep enough to turn up the cold and hard subsoil, the seed planted at the usual depth will germinate where they meet with a cold reception, especially if the season be wet. Scarce any crop seems to be more benefitted by an early start, or to be more injured by a slow, painful growth in in the commencement. The young plants seem to be discouraged, and not having force enough to dig down to find a good living, they are apt to grow up sickly.

In cultivating this crop I have, therefore, practised turning up all the soil, gaging my plow to run just on the subsoil, and let the corn have the full benefit of the manure and clover which were plowed under. The crop is followed with oats, which can stand a cold and wet soil better. Then I drive the plow deeper, about an inch, as you recommended in your last number. The soil, mellowed by the previous hoed crops, gives the oats a good chance, and they bear the subsoil mixture on the top quite well. The following crop with me is rye and seeded down with clover and timothy, especially the former. Now I give the gage another turn, and bring up say another inch of subsoil, and the rye and the clover dig for their living—and mine—most admirably.

Rotation and Deep Soil---A Corn Experiment.

Regular rotation of crops and deep plowing are working wonders upon some of the old and long-worn farms of New England In the discussions before the Maine State Board of Agriculture, which met at the seat of government in January, many of the delegates bore striking and uniform testimony to the value of both these practices, especially upon lands that had been cropped hard. One of the members mentioned a field of fifteen acres, "badly bound out," which was plowed three inches deeper than ever before, and after an application of three bushels of plaster of Paris, produced a yield of 600 bushels of oats This is forty bushels to the acre. Another reported a yield 82 bushels shelled corn per acre—56 lbs., to the bushel, from a field similarly treated.

Results very much like these could be obtained from many of the old fields in Kentucky, which now grow nothing but sedge and briars, if deeply plowed, and the application of plaster were substituted by a generous quantity of barn-yard manure or a compost of which the base should be stable dung and scrapings from the woods.

We have our mind's eye now upon an old field twelve miles from Louisville, which was treated in this manner three years ago, and gave a yield of corn in return that much more than paid expenses. Without further preparation it was seeded to grass, sown upon the corn stubble, and will this season be more than fair pasture or meadow, for one or the other of which it is designed. The corn in this experiment was manured in the hill.

Our farmers complain of the great labor and heavy cost of such experiments. But such complaints are without reason. Every farmer who keeps merely two or three horses, four or five cattle, a half dozen hogs, if he will only litter his stalls, pens and barn-yard, with the cheap litter afforded by the woods a short distance from his dwelling-house, in quantities enough to furnish his animals with comfortable bedding, he can have every year, by planting time in the spring, a mountain of compost such as we have described that will perfectly astonish his own eyes.

So much for the cost of that part of the experiment. It really costs nothing, for it will pay for itself in the increased comfort supplied to his stock, and the diminished quantity of food necessary to carry them through the winter. As for the labor and expense of hauling out, that is not very formidable, when you post up and look the thing right in the face.

In the instance to which we have referred, after the field was checked off for the seed, a two-horse wagon and three men manured four acres per day—giving to each hill a large shovel full of the compost. The actual expense in this case was probably two dollars per day, but in any case would not be over four dollars, or one dollar per acre. Without the manure, the old field might possibly have yielded 25 bushels to the acre; with it, it yielded about 40 bushels. Difference, 15 bushels, which, only at 33⅓ cents per bushel, is $5.

All this is clear gain, for the cost of hauling out and applying the manure is fully repaid by the condition in which the crop left the ground for grass.

After this field has lain in grass two or three years, it will probably be turned over for another trial, and we will then speak of it again.—*Louisville Journal.*

Subsoil Plowing.

Before commencing spring work it will be well to consider which lands should, and which should not be subsoiled.

From the days of Jethro Tull until within the last twenty-five or thirty years, the farmers of England were content, in common with those of other countries, to stir the immediate surface of the soil, and were not aware that a greater depth of disturbance would produce a larger and better result. Indeed, it was generally believed that the whole matter which went to fertilize plants, belonged to the immediate surface, or that portion known as *loam*—a name given, until very recently, to the disturbed portion only—which, by the combined influences of the sun, air, and decay of vegetation, changes its color. The fact that the components of the soil beneath these points were all to be found as part of the integrants of plants was scarcely known, and still less so that they could not be absorbed by them, and thus go to make up the structure, until acted on by a series of influences caused by atmospheric contact and the presence of humidity; not the result of stagnant water. Liebig first exposed the true value of the inorganic substances of the soil, or those parts which were not the immediate result of plant decay; and farmers slowly yielded their long cherished belief that the black portions of the soil alone could make plants. These new doctrines gave rise to the use of a subsoil plow, which, without elevating the subsoil to the surface, disturbed it in places, and permitted a free circulation of atmosphere between its particles. The deep cuts made by the plow also acted in degree as underdrains, and permitted, under some special conditions of surface—such as the slope of hills, etc.—redundant water to pass way. Air necessarily entered, and chemical changes occurred; the surface of the particles of the subsoil were soon conditioned so as to sustain roots, and they passed into it to a greater depth than had been before known. These, in turn, absorbed from the subsoil larger quantities of inorganic matter, rendered soluble by chemical changes consequent upon moisture and air. The constituents were taken into the plants above, and portions not marketable as crops, decay in the upper soil, adding to the greasy, unctuous, organic matter new portions of inorganic food for future crops. Plants had longer roots as well as greater number of fibres, and larger crops was the consequence. The decay of these roots in the soil left tubes to great depths; the atmosphere could come in laden with gases, resulting from vegetable decomposition required by plants; rains and dews, which was the nitrogenous exhalations of all organic nature from the atmosphere, descended into the subsoils, which gradually changed color so as to make deep loamy soils in localities where before only sparse, shallow-rooted crops could be grown. All this was heard of by the American farmer long before he was awakened to action; and even now, when every truly practical farmer owns a subsoil plow, he can tell you of some neighbor who cautioned him against its use, and who insisted that the deep disturbance of his soil would let all the manure filter downward; that, if that were true, every well would be the receptacle of the results of decay, every spring would be a cesspool, and every rivulet but an organic charnel-house. Nature, in the wisdom of her laws, has rendered the carbon and alumina of the soil, after proper exposure to atmospheric influences, capable of receiving and retailing all the results of decay; and the value of a farm must depend upon the depth to which its surface by disturbance is rendered capable of performing this peculiar function.

Thoroughly subsoil-plowed lands soon be-

come capable of deeper surface plowing, without injuring the crops; and if underdrained, which is but the perfection of the very principles presented in the theory of subsoil plowing, then all the mechanical conditions necessary for maximum results are secured. And when these exist, the chemical conditions follow as a natural consequence.

Among the advantages arising from subsoil plowing may be enumerated the following: The value of land for agricultural purposes is doubled; the relative amount of manure required, as compared with the amount of produce, lessened; the farm is essentially protected from the effects of drought; all future labor of the farm is materially lessened, and thus the expenses of teams, the wear and tear of agricultural implements, are all decreased, while the quality of crops, and their quantity, are so augmented that, per bushel or per pound, they take a preference in every market.

It has been said, and probably with truth, that if the subsoil plows and underdrains of England had not been introduced up to this time, the area of land under cultivation could not have sustained her population. Fifteen years ago there was not in the State of ——, as many subsoil plows as there are now foundries for casting them; and when a friend of the writer first introduced the subsoil plow he had not a neighbor who had seen one. We suppose this may be said of farmers in every county in the United States within the last twenty-five years.

Harper's Weekly.

A Hole in the Pocket.

A great many men have a hole in the pocket, and so loose all the little change they put in And the worst of it is they do not know it—if they did, they could mend up the hole and so put an end to the loss. Every day they are minus a few dimes, and they wonder how they come so short. When bills are to be paid they cannot imagine how they came to be so short of change. At the end of the year they are surprised to find so poor a footing up. They work hard, rack their brains on plans, and still they do not get ahead much. Bills accumulate, income diminishes, and still they do not discover the hole in the pocket.

One man has bad fences, gates and bars. The cattle break through every now and then and destroy crops, and occupy time in driving them out. The pigs creep through the holes. The geese find many entrances. The horses get away. The boys and men and servants and dogs are kept on the run after rougish cows and jumping horses and climbing hogs. The stock becomes uneasy and does not thrive. The crops are injured. The fences are often broken down. Time is consumed. The trouble is—that man has a hole in the pocket. One man has no sheds, nor barns, nor grainries, nor tool-houses. His hay and grain he stacks. His vegetable he buries. The rain spoils much of his hay. His grain is much injured and wasted. The rats eat his corn; and the damp weather moulds it. His potatoes rot. His pumpkins are destroyed. His apples do him but little good. His tools are rotted and rusted in the open weather. His stock is chilled and stunted for want of shelter. His trouble is a hole in his pocket, out of which slips all his profits, much of the fruits of his hard labor.

One man has poor plows of the senile stamp of his ancestors. He only skins the land with it. He can't afford a modern plow. He don't believe in sub-soiling. Draining is the nonsense of scientific fools. Drills are a humbug. Deep plowing would spoil the land. So he plows and sows as his grandfather did, on the worn-out soil of his venerable ancestor. He has a hole in his pocket, and will have till he takes up to the importance of good tools and good culture of himself and soil.

One man don't take a paper; can't afford it; has no time to read; don't believe in book-farming; likes the old ways best; denies all the stories he has heard from rumor, about large cattle and crops and profits; doesn't believe in new notions. For forty years he has planted his corn on the same ground; sown wheat in the same field; pastured the same land and mowed the same meadows. He has heard of "rotation of crops," but doesn't know what it means nor cares to know. A bad hole has this man in his pocket.

And who hasn't got a hole in his pocket? Reader, haven't you? Look and see. Is there not some way in which you let slip the dimes you might better save; some way in which you waste time and strength and mind? If so, then you have a hole in your pocket. Indeed, many a man's pocket is like a seive. Whose pocket is a treasury, safe and sure?— *Valley Farmer.*

The Blind Boy.

An editor, from whose selections we take the following lines, has beautifully said, that for himself he could not see to read them through.

It was a blessed summer's day;
The flowers bloomed, the air was mild,
The birds poured forth their tender lay,
And everything in nature smiled.

In pleasant thought I wandered on,
Beneath the deep wood's simple shade;
Till, suddenly, I came upon
Two children who had thereto strayed.

Just at an aged beech-tree's foot,
A little boy and girl reclined;
His hand in hers he gently put—
And then I saw the child was blind.

The children knew not I was near—
The tree concealed me from their view—
But all they said I well could hear,
And could see all that they might do.

"Dear Mary," said the poor blind boy,
"That little bird sings very long;
Say do you see him in his joy,
And is he pretty as his song?"

"Yes, Willie, yes," replied the maid,
"I see the bird in yonder tree,"
The poor boy sighed and gently said,
"Sister, I wish that I could see!"

"The flowers, you say, are very fair,
And bright green leaves are on the trees,
And pretty birds are singing there,
How beautiful to one who sees!

"Yet, I the fragrant flowers can smell,
And I can feel the green leaf's shade,
And I can hear the notes that swell
From those dear birds that God has made.

"So, sister, God to me is kind;
Though sight, alas, He has not given;
But tell me are there any blind
Among the children up in heaven?"

"No, dearest Willie; there all see:
But why ask me a thing so odd?"
"O, Mary, He's so good to me,
I thought I'd like to LOOK at God."

Ere long, disease his hand had laid,
On that dear boy so meek and mild,
His widowed mother wept and prayed
That God might have her sightless child.

He felt her warm tears on his face,
And said, "O, never weep for me,
I'm going to a bright, bright place,
Where Mary says I God shall see.

"And you'll come there, dear Mary, too,
But, mother dear, when you come there,
Tell Willie, mother, that 'tis you—
You know I never saw you here!"

He spoke no more, but sweetly smiled,
Until the final blow was given;
When God took up the poor blind child,
And opened first his eyes—in heaven.

Water Music.

'Twas in summer—glorious summer,
Far beyond the smoky town,
Weary with a long day's ramble
Through the fern and blooming bramble,
Needing rest, I sat me down.
Beetling crags hung high above me,
Ever looking grandly rude;
Still there was some trace of mildness
In this scene so weird—its wildness
Might be sought for solitude.

Birds and flowers, songs and beauty,
Seemed this rugged realm to fill;
That which was my soul entrancing
Was the music and the glancing
Of a rock born plashing rill.
Lingering there, I was delighted,
Musing on the day gone by,
Watching its bright spray pearls sprinkled,
Every silvery tone that tinkled
Touch'd some chord of memory.

'Twas as if sweet spirit voices
Threw a spell around me there;
Now in lightest notes of gladness,
Now in deeper tones of sadness,
Waiting, whispers to my ear.
Memory, hope, imagination,
Seemed to have usurp'd my will;
And my thoughts kept on a dreaming
'Till the bright stars were a gleaming,
To the music of the rill.

What a world of strange reflections
Came upon me then unsought!
Strange that sounds should find responses—
Where e'en mystery ensconces—
In the corridors of thought!
Then emotions were awakened,
Making my heart wildly thrill,
As I lingered there and listened,
While the dew around me glistened
To the music of the rill.

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ALEXANDRIA, VA.,

IMPORTERS AND DEALERS IN ALL KINDS OF

FERTILIZERS,

Have received their SPRING SUPPLIES, and offer for sale—

No. 1 PERUVIAN GUANO,

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

COLUMBIAN GUANO,

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

Organic Matter, yielding Ammonia	14.55
Water	8.55
Phosphate of Lime	60.88
Magnesia	.10
Sand and other insoluble matter	15.92
	100

SOMBRERO GUANO.

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

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

	per cent.
By Prof. Morfit, of New York,	79.70
" Piggot, Baltimore,	79.31
" Hayes, Boston, of 1st sample,	89.60
" " " 2d "	89.20
" Reese, Baltimore, 1st "	85.14
" " " 2d "	86.60
" " " 3d "	72.04
" " " 4th "	72.04
" Chilton, New York, 1st "	86.34
" " " 2d "	84.94
" Piggot, Baltimore, 1st "	76.85
" Hinson, Liverpool, Eng.	80.20
" Deck, New York, 1st "	88.00
" " (of a selected specimen)	98.25

	per cent.
By Prof. Maupin & Tuttle, University of Va.,	85.16
" Gilham, of Virginia Military Institute,	81.
" Stabler, Alexandria, Va.,	79.
" Booth, Garrett & Camac's (Philadelphia,) analysis of three cargoes,	80.
" Way, London,	71.
" Nesbit, "	79.
" Voelcker, Royal Agricultural College, England,	75.
" Leudet, Havre, France,	78.
" Kindt & Toel, Government Chemists, Bremen,	78.
" Johnson, Yale College,	80.25

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

And for a like array of eminent authority, promiscuously obtained from promiscuous cargoes, in different 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,

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

Analysis by Dr. R. H. Stabler.

Soluble Phosphate of Lime	37.00
Sulphuric Acid	11.00
Organic Matter	29.10
Water	22.90
	100

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