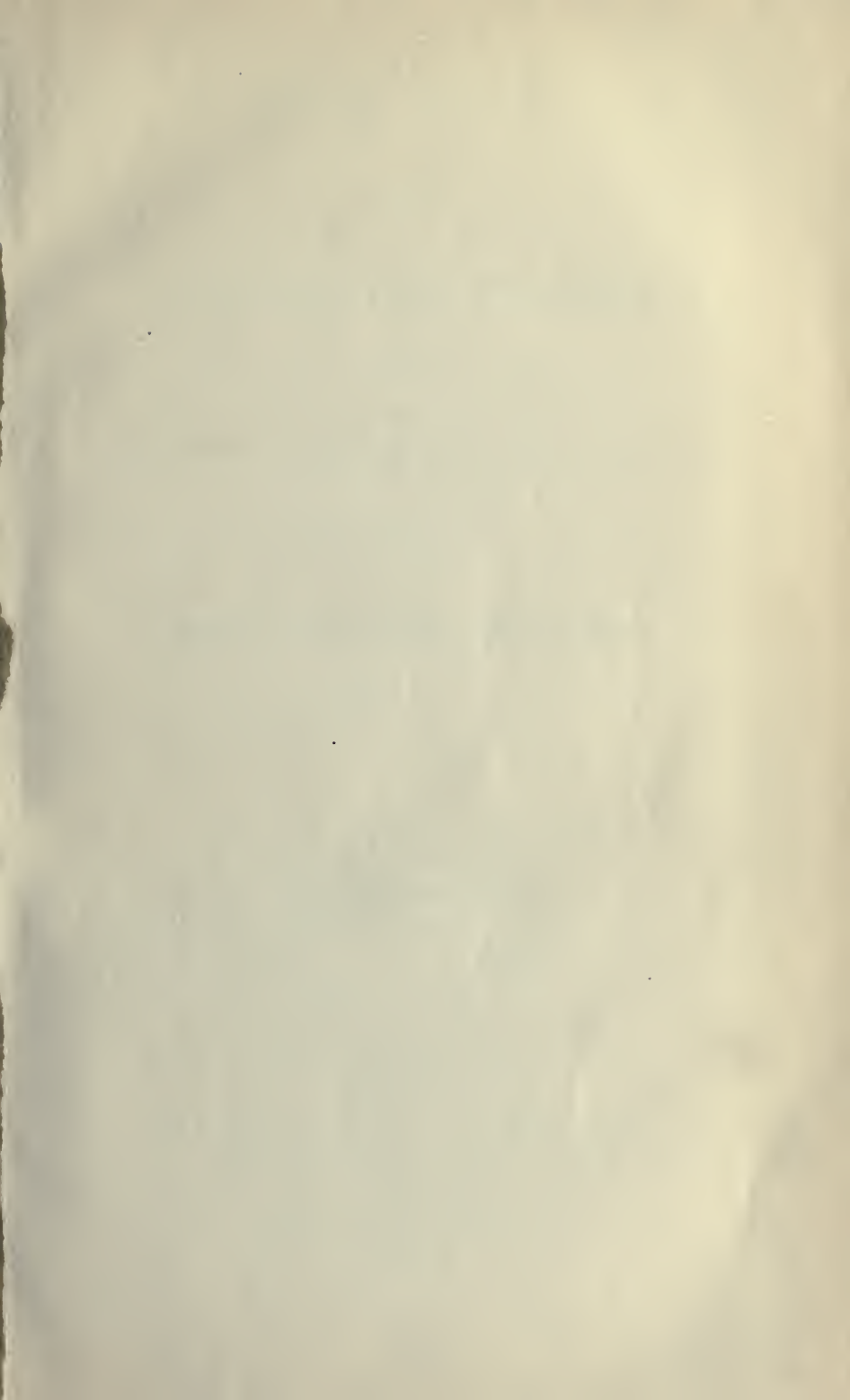


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PROTECTION

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NECESSARY TO THE

PROSPERITY OF THE AMERICAN FARMER.

BY HENRY CAREY BAIRD.

In giving to the public the following pages, it may be proper for the writer briefly to state that it is his almost exclusive aim to present the question of the development of a diversified industry in its bearings upon American Agriculture. He has attempted to demonstrate a dependence of the farmer upon the prosperity of those who work at the loom, the forge, and the anvil, in the mine and the workshop, which it is disastrous to overlook and disregard. In this connection it has been his effort to show that it is impossible to establish a thorough system of Agriculture in the absence of a near market—the want of such market obliges the farmer to give to transporters that which his farm demands should be given to, or rather expended upon it.

In so treating his subject, he is well aware that he has deprived himself of the opportunity of presenting and enlarging upon many interesting and important details regarding other interests. He feels, however, that demagogues and sophists have been so successful in inducing a large portion of the agricultural community to war upon their best friends, that too much stress cannot now be laid upon the importance of treating of PROTECTION AS PRE-EMINENTLY A FARMER'S QUESTION—those who are engaged in other productive pursuits, being the natural allies of the farmer. To the mechanic, the artisan, the mmer, and the operative, is he indebted for those conditions which make good and remunerative markets; and if he allows them to go down, he inevitably pays the penalty.

In the opening of his subject, he has thought it important to fortify his position by somewhat ample citations from leading authorities, touching the present condition and tendency of Agriculture, in different sections of the country.

LAND SPOILIATION.

In order to arrive at a just conception of the real wants of American Agriculture, it will be necessary to present testimony of an authentic character, showing what is really the present condition, and what are the tendencies of our system of culture, our "earth-butcher," as it has not inappropriately been termed. With this object, the following extracts are given.

MR. WARING, in a Paper read before the Geographical Society of New York (quoted by Carey, "Social Science," 1858, vol. 2, p. 213), says:—

"In the opinion of the writer, it would be improper to estimate the total annual wastes of the country at less than an amount equal to the mineral constituents of 1,500,000,000 bushels of corn. To suppose that this state of things can continue, and we as a nation remain prosperous, is simply ridiculous. We have as yet much virgin soil, and it will be long ere we reap the reward of our present improvidence. It is merely a question of time; and time will solve the problem in the most unmistakable manner. What with our earth-butcher and prodigality, we are each year losing the intrinsic essence of our vitality.

"Our country has not yet grown feeble from this loss of its life-blood, but the hour is fixed when, if our present system continue, the last throeb of the nation's heart will have ceased, and when America, Greece, and Rome, will stand together among the ruins of the past."

From "THE NEW ENGLAND FARMER," quoted in "Year Book of Agriculture," 1856.

"The constant deterioration of the soils of New England, and throughout most of the United States, is a fact of portentous and alarming significance."

From an Address delivered before the Valley Agricultural Society of Virginia, Oct. 21, 1858.

"During the past summer I heard an opinion expressed by Professor Henry, the distinguished Secretary of the Smithsonian Institute, which struck me at the moment as extravagant, but which a little reflection satisfied me was founded upon the strong probabilities of truth. It was that there was more wealth invested in our soil in fertilizing matter at the moment this continent

was discovered by Columbus, than there is at present above the surface in improvements and all other investments. * * * * The fertility which ages had accumulated upon its surface, has been the capital upon which the farmer has been drawing with reckless prodigality, from the first settlement of the country."

From "SOUTHERN AGRICULTURAL EXHAUSTION AND ITS REMEDY," by Edmund Buffin, of Va. "Patent Office Report," 1852, part 2, p. 373.

"The great error of Southern Agriculture is, the general practice of exhausting culture—the almost universal deterioration of the productive power of the soil, which power is the main and essential foundation of all agricultural wealth * * * Yet this unprofitable procedure, which would be deemed the most marvellous folly in regard to any other kind of capital invested, is precisely that which is still generally pursued by the cultivators of the soil in all the cotton-producing States."

CHARLES CARTER LEE, of Powhatan Co., Virginia, says:—

"With the largest area of arable land of any nation in the world; with the smallest population in proportion to the square mile; with the lowest rate of taxation; with skill, enterprise, ingenuity, and freedom from all feudal trammels, we appear to be fast returning to the wilderness state, and upon a condition of absolute dependence upon taxed and over-crowded Europe, for the bread we eat, the beef we roast, and the horses we ride."—"Virginia Georgics" note, p. 116.

From a Speech of Hon. JUSTIN S. MORRILL, in the House of Representatives of the U. S., April 20, 1858.

"By the system of husbandry generally pursued here, the land is held until it is robbed of its virtue, skimmed of its cream, and then the owner, selling his wasted field to some skinflint neighbor, flies to fresh fields with the foul purpose to repeat the same spoliation; and this annual exodus which prevails over all the older States, and even begins upon the first settlement of the new States before their remoter borders have lost sight of the savage, painfully indicates that we have reached the maximum of population our land will support in the present state of our agricultural economy."

DECLINE IN THE YIELD OF WHEAT.

From "A Statistical View of American Agriculture," an Address delivered before the American Geographical and Statistical Society, N. Y., March 25, 1858, by JOHN JAY, Esq.

"The Census of New York for 1855, shows that her wheat crop, once so famous, is actually decreasing, owing, as is supposed, in part to the ravages of insects, and in part to diseases of the plant, assisted, perhaps, by a gradual deterioration of the soil."

In AN ADDRESS delivered October 21, 1858, a high authority is quoted which states that in the neighborhood of Albany, New York, about 1775, the yield of wheat was from twenty to forty bushels per acre; and that from twenty to thirty bushels were common even with bad husbandry. The same address gives the yield according to other authorities in 1785, at from sixteen to twenty bushels, and in 1815, at from twelve to fifteen bushels; while by the State Census of 1845, Albany Co. gave seven and a half bushels per acre, Dutchess five, Columbia six, and Westchester seven.

"The Valley Counties" [of Virginia], it continues: "in which estimate I include alone the counties lying between the Blue Ridge and the North Mountain, exhibit an average of eight bushels to the acre [by the Census of 1850]. Since 1850, it has become so discouraging in its yield, that the farmer now in committing his precious seed to the earth, so far from feeling that buoyant hope that once caused him to anticipate a rich harvest return, feels a sad uncertainty whether he will realize the cost and labor that he has expended upon it."

From "THE WHEAT PLANT, its origin, culture," etc. etc., by JOHN H. KLIPPART, Cur. Sec. Ohio State Board of Agriculture, etc., Cincinnati, 1860.

"Several years ago, I became aware of the fact that wheat—the staple crop of Ohio—was annually diminishing in its yield per acre; that in less than fifty years the average product was reduced from thirty to less than fifteen bushels per acre. I also learned, that in Great Britain the yield had increased from sixteen bushels to thirty-six bushels per acre, during the same period." Preface, p. iii.

"A century ago, New England, Delaware, and Virginia, raised wheat as an ordinary crop; now, a wheat field is a rarity in those States, and they may be considered as no longer wheat-producing regions. Portions of New York, that formerly produced thirty bushels to the acre, now seldom average over eight bushels; and Ohio, new as she is, with her virgin soil, does not average over thirteen bushels to the acre. * * Unless our farmers turn their attention, and that very soon too, to the renovation of their wheat lands, even Ohio will soon be among the non-producing wheat lands."

In reference to the condition of the former wheat lands of New York, Maryland, Virginia, and Delaware, Mr. Klippart says "EXHAUSTION is written all over them in language too plain to be misunderstood." He also expresses the opinion that "Ohio is the most westwardly State in the wheat-producing region," and adds that "instead of the vain boast that we can feed the world from our surplus wheat," that if we fail to husband our resources, and stop the deterioration of our soil by the liberal

application of manure, and better tillage, we shall soon be importers of wheat, instead of exporters. See pp. 301, 307, 323, 326-7.

DECLINE IN THE YIELD OF INDIAN CORN.

It is sometimes maintained by agriculturists, that while our wheat fields are declining in their yield, there is a gain in the production of Indian Corn, quite sufficient to compensate for the loss in the former. This opinion is doubtless expressed without much knowledge, and can, probably, in a measure be traced to the fact that owing to the great increase in the amount of land devoted to this staple, the aggregate crop is larger, while the land is deteriorating, and the yield per acre is decreasing step by step, and year by year.

There is probably no State in the world which collects more complete or accurate agricultural statistics than Ohio. The "Reports of the Ohio State Board of Agriculture" furnish complete returns of the number of acres planted in corn for a series of years, and the number of bushels gathered. From these we take the following statement of the number of acres in that State planted in corn in each year from 1850 to 1858, inclusive, with the number of bushels gathered in each year, and the average per acre.

	Acres.	Bushels.	Ave. bush. per acre.
1850	1,537,947	56,619,608	36.82
1851	1,664,427	61,171,282	36.81
1852	1,730,188	58,165,517	33.62
1853	1,836,493	73,436,090	39.98
1854	1,972,337	52,171,551	26.45
1855	2,205,282	87,587,434	39.72
1856	2,084,893	57,802,515	27.73
1857	2,254,424	82,555,186	36.62
1858	1,834,138	50,863,582	27.73
First 5 years, average per acre,			36.81
Last 5 years, " " " "			32.95

DECLINE IN THE YIELD OF COTTON.

From a speech delivered in the United States Senate.

"I can show you, with sorrow, in the older portions of Alabama, and in my native county of Madison, the sad memorials of the artless and exhausting culture of cotton. Our small planters, after taking the cream off their lands, unable to restore them by rest, manures, or otherwise, are going further West and South in search of other virgin lands, which they may and will despoil and impoverish in like manner. * * * In traversing that county, one will discover numerous farm-houses, once the abode of industrious and intelligent freemen, now occupied by slaves, or tenantless, deserted, and dilapidated; he will observe fields, once fertile, now unfenced, abandoned, and covered with those evil harbingers, foxtail and broomsedge; he will see the moss growing on the mouldering walls of

once thrifty villages, and will find 'one only master grasp the whole domain' that once furnished happy homes for a dozen white families. Indeed, a country in its infancy, where fifty years ago scarce a forest tree had been felled by the axe of the pioneer, is already exhibiting the painful signs of senility and decay apparent in Virginia and the Carolinas."

From an Address before the South Carolina Institute, by GOVERNOR HAMMOND, November, 1849:

"These are not mere paper calculations, or the gloomy speculations of a brooding fancy. They are illustrated and sustained by facts, current facts of our own day, within the knowledge of every one of us. The process of impoverishment has been visibly and palpably going on step by step with the decline in the price of cotton."

From De Bow's Resources of the South, 1852, vol. 1, p. 363:

"The native soil of Middle Georgia is a rich argillaceous loam, resting on a firm, clay foundation. In some of the richer counties nearly all the lands have been cut down, and appropriated to tillage; a large maximum of which have been worn out, leaving a desolate picture for the traveler to behold. Decaying tenements, red old hills, stripped of their native growth and virgin soil, and washed into deep gullies, with here and there patches of Bermuda grass and stunted pine shrubs, struggling for a scanty subsistence on what was once one of the richest soils of America."

From "PROGRESS OF AGRICULTURE IN THE UNITED STATES." By DANIEL LEE, M.D. Patent Office Report for 1852. Part II., p. 2.

"Cotton culture presents one feature which we respectfully commend to the earnest consideration of Southern statesmen and planters, and that is the constantly increasing deterioration of the soil devoted mainly to the production of this important crop. Already this evil has attained a fearful magnitude; and, under the present common practice, it grows a little faster than the increase of cotton bales at the South. Who can say when or where this ever-augmenting exhaustion of the natural resources of the cotton-growing States is to end, short of their ruin?"

From a "Southern Journal," quoted by CAREY, "Social Science," 1858, vol. ii., p. 88.

"An Alabama planter says that cotton has destroyed more than earthquakes or volcanic eruptions. Witness the red hills of Georgia and South Carolina, which have produced cotton till the last dying gasp of the soil forbade any further attempt at cultivation; and the land, turned out to nature, reminds the traveler, as he views the dilapidated condition of the country, of the ruins of ancient Greece."

DECLINE IN THE YIELD OF TOBACCO.

By the census of 1840, it is shown that the total crop of tobacco gathered was 219,163,319 lbs.; while by the census of 1850, it was but

199,752, 655 lbs. In Maryland it declined during these ten years from 24,816,012 lbs. to 21,407,497 lbs.; in Virginia, from 75,847,106 lbs. to 56,803,227 lbs.; in North Carolina, from 16,772,359 lbs. to 11,984,786 lbs.

"It is evident," says Dr. Charles T. Jackson [Patent Office Report, 1858, Agriculture, p. 291], "from the analysis of tobacco, that it is a great exhaster of the mineral salts;" and Baron Liebig has remarked that "certain celebrated kinds of American tobacco were found gradually to yield a smaller quantity of ashes, and their value diminished in proportion."

PREVENTION AND CURE OF EXHAUSTION.

To prevent exhaustion, as well as to remedy it after it has taken place, it is requisite that those elements which have been drawn from the soil should be restored to it. No escape from this necessity is possible under any circumstances of soil, climate, people, or country.

While there is some want of agreement among agricultural, chemists, as to what are the precise functions of the various chemical substances which perform a part in the mysterious phenomena of vegetable structure and growth; there is an entire unanimity on the part of all who occupy high position, that this great law or provision for the restitution of the elements must be complied with, or exhaustion is inevitable. Nature will not permit man continuously to draw from the mine of wealth which she has furnished for his use, except under certain restrictions. When the several products which have been given to him have administered to his sustenance, comfort, or convenience, and thus performed each its appointed part, the refuse must be given back to the land, becoming again material for aiding in the same process of vegetable nutrition.

"The life of men, of animals, and of plants," says Liebig, "is connected in the closest manner, with the return of all the conditions which promote the vital process. The soil, by its constituents, contributes the life of plants, its continuous fertility is inconceivable and impossible without the return of those conditions which have rendered it productive."

This distinguished philosopher divides the constituents of plants into the combustible and the incombustible. The former are those which pass off in burning, and are derived from carbonic acid, water, and ammonia; and the latter are the ashes which escape combustion, consisting of phosphoric acid, potash, silicic and sulphuric acids, lime, magnesia, iron, and chloride of sodium. All of these substances are elements of food, all are necessary, and all are of equal value, when supplied in proper proportions; but no one of them will perform the function of another. For instance, our

authority compares the substances, the presence of which in the soil is necessary to the vigor of plants, to as many links in a chain round a wheel; the strength of the chain depending from first to last, upon the weakest of these links.

Carbonic acid and ammonia serve to combine with the mineral elements in the formation of the constituent parts of the plant; and the proportions of the former will limit and control the extent of the combination. In other words, the quantity of mineral food appropriated, if present in sufficient amount, will bear a certain and definite proportion to the carbonic acid and ammonia. If the mineral elements be not present, however, in sufficient quantity, their absence can in no wise be compensated for, by any surplus of carbonic acid and ammonia. Of carbonic acid there is generally an abundance supplied by the air, and if salts of ammonia be added to the soil without the addition of the necessary quantity of mineral elements, and the soil be sufficiently well prepared to permit of the mineral matter being freely appropriated by the plant up to the full capacity of the carbonic acid and ammonia, the process of exhaustion is thereby greatly increased; and if under such tillage a field "has produced a large crop for one or more years, it is thereby impaired in fertility for future crops."

Such being the facts, it must be apparent that the farmer, to manure to the highest advantage, and with the utmost economy, must make himself acquainted with the truths of agricultural chemistry. Without a knowledge of this department of science, it is utterly impossible for him to acquire an insight into the properties and comparative value of different manures, the constituents of soils, the elements held in excess, and those which are not present in sufficient quantity, or are entirely wanting.

But, as it will be shown hereafter, this knowledge will be utterly useless to him, unless he is favored with a near market, and thereby enabled to put it in practice.

INSECTS DESTRUCTIVE TO VEGETATION. CIRCUMSTANCES UNDER WHICH THEY APPEAR, AND THOSE UNDER WHICH THEY DISAPPEAR.

"As a tree in a feeble state," says Downing, "is always most liable to the attacks of insects, those on a sandy soil are the first to fall a prey to numerous maladies;" and he adds, "in thoroughly examining many of the fruit-gardens of the middle States, in nine cases out of ten, where a variety of fruit was unusually liable to disease, to blight, or the attacks of certain fruit-destroying insects, as the curculio, the trees themselves were on a sandy soil; while on the other hand, and frequently in the same neighborhood, the same sorts were

growing luxuriantly and bearing abundant crops where the soil was a rather strong loam."

"For a few years the growth and productiveness of the trees upon sandy soil is all that can be desired; but the trees are shorter lived and sooner fall and decay than where the soil is stronger."

Mr. Field, in his volume, "Pear Culture," N. Y., 1859, quotes Mr. A. O. Moore, to the following effect, in regard to SCALE INSECTS: "They feed upon the more sluggish juices of the trunk and limbs;" and, he adds, "trees situated in grass lands, or otherwise neglected, peculiarly invite this *sloven's pest*." Again he says, "Slow-growing varieties of the pear are more subject to it than the rapid kinds." In reference to the slug, the same writer says: "It is found in much greater abundance on weakly growing trees than on those of a strong and rapid growth. This fact points to the first and fundamental remedy, the securing of healthy trees, and by the proper enrichment and preparation of the soil, of the thrifty and uniform growth."

At a meeting of The Fruit-Grower's Society of Western New York, held in Rochester, September 27, 1859, Mr. W. P. Townsend stated that the old fruit trees in his father's orchard being covered with moss, the effort was made to remove it by scraping; but this was found very laborious and tedious work. In preference to this, he drew in upon these premises an average of half a load of manure to each tree; next year the bark began to peel, and, of course, to bring with it the moss, and the trees increased in vigor. The next summer he turned the hogs into the orchard, and they pretty thoroughly rooted it all over. Even to the tops of the trees, the old bark had started, and the body had all the thrifty and vigorous look of young trees. The fruit which had formerly been from one half to three fourths wormy, is now fair, smooth, and free from vermin. By invigorating the trees, the insects disappeared.

A recent journal gives the plan pursued by HENRY DULL, of Pennsylvania, for getting rid of the APPLE-TREE BORER. He planted his orchard eighteen years ago, and the trees thrived very well until five or six years since, when they began to droop and look sickly. The apple-tree borer was found in great numbers, and had done so much damage that some of the trees appeared to be beyond recovery. He then decided to apply as a manure the urine from the cow stables. This was done most liberally, besides washing the trunks of the trees. "The result is," says Mr. Dull, "I have not a borer in my orchard, and the trees have completely recovered and give me abundant crops."

MR. CHARLES WATERTON, of Walton Hall, England, in a recent paper on the subject, argues that vermin are *the effect*, and *not the*

cause of disease in trees, and he uses the following language:—"I invite the anxious reader to pay attention to any tree at which the scolytus is pursuing his ordinary calling. Then let him examine the same tree during the following summer, and he will find the little round holes in the bark, just as the insect had made them, without any alteration whatever. After this, let him take a gimlet, and bore as many dozens of holes as he may think fit in the sound bark of some healthy trees. Let him visit these in the course of next summer, and he will perceive every gimlet hole made up by new bark under the old bark."

He says that a tree nearly severed by the ax, or blown over, and adhering by a strip no thicker than a man's hand, will continue to live, and sometimes flourish. The mere action of the insect, were the tree in health, would have no more effect upon it than the gimlet holes; hence, as the insect only attacks it when in a state of decay, it has not, of course, the power to heal up the holes, the best evidence of its unhealthy condition, and the truth of the view taken.

Of the curculio, a writer in the "COUNTRY GENTLEMAN," March 1, 1860, says:—"Finding these insects in the black knot, some have supposed they were the *cause*. This reminds me of the wise remark of some one, 'How wonderful, and how great a blessing it is, that a large river has been made to run alongside of nearly every large city!' The fact is thousands of cases of the black knot have been found in their incipient state, where no curculios have made their appearance. If this insect is the cause, it must *always* be present."

From Proceedings N. Y. State Agricultural Society, Feb. 8, 1860 (Country Gentleman Vol. XV., p. 126):—"Mr. A. B. Dickinson of Steuben county, had much experience in the culture of the plum, and was satisfied that the knot was occasioned by an uncongenial soil, and by the roots of the tree standing in cold water. His soil was stiff clay, with a hard pan beneath. He was accustomed to prepare the soil in which he set out his tree by the addition of good loam, clearing of surplus moisture, &c., and his trees outgrew the knot entirely. He would pay the expenses of any of the gentlemen present who would come and see his trees, if they discovered a knot of curculio upon his trees; and would guarantee he could set out their young trees for them and grow off the knot."

MR. TOWNSEND GLOVER, entomologist to the Patent Office (Pat. Of. Rep. 1858, p. 256 says, in reference to the wild orange trees of Florida, "that those growing on rich soil appeared to be much less liable to the attacks of scale or bark louse, than such as are found c

poor lands; which fact appears to indicate that if the soil of the sweet-orange groves were improved by means of manure and careful cultivation, the trees would acquire the requisite vigor to throw off the insect." By the same writer, it has been observed that upon trees injured by frost, the scale insect appears in the ensuing summer in more than usual numbers, and most plentifully on those most severely injured.

MR. J. H. KLIPPART, in his valuable work on "THE WHEAT PLANT," says in reference to that staple, "Complaints are occasionally made of wire-worm and cut-worm; but a careful cultivation and a proper rotation of crops has lessened the evil." In regard to the Hessian fly, the same writer says, "A fertile soil, rich in all the constituent elements necessary to a healthy growth of the wheat plant, is of the first importance. Thus it lies within the power of the agriculturist to control by proper manuring, plowing to a proper depth, &c., and it is even supposed that the Hessian fly has been a benefit by compelling farmers to adopt a better mode of culture than was formerly in vogue;" and adds, "This improved culture has had the effect not only of lessening the ravages of the fly, but of increasing the productiveness of the better cultivated land." Again, "nothing tends more to infect land with insect plagues than successive cropping and slovenly farming."

"It is nearly ten years," says Moore's "RURAL NEW YORKER," of Aug. 3, 1859, "since a full crop of wheat has been produced in this State—the prevalence of the midge (miscalled weevil) in those sections which formerly produced the great staple most abundantly, and the consequent partial or entire destruction of the crop, having caused a great change in the agricultural operations, and materially depreciated the value of farming lands in many localities. The ordeal has been a severe one; but the skies are brightening, and we believe that wheat can again be abundantly and profitably grown in sections where the midge has prevailed and proved so destructive for several years. * * * * In every instance where early varieties were sown at the proper time on good, dry, and properly prepared soil, we have found the crops good, excepting only where the severe June frost proved injurious. * * * * No one need expect to grow good wheat and evade the midge, unless he has a rich, warm, and comparatively dry soil, and gives it good culture; but with these and attention to the requisitions above-named, we believe wheat can again be cultivated successfully in western and central New York, and other midge-infected sections of the country."

Dr. N. B. Cloud, of Alabama, quoted in

"TURNER'S COTTON PLANTERS' MANUAL," 1857, says:—

"I give it as my opinion that if the same land throughout the country were planted in cotton but once in four years, it would prevent the rust—I am sure it would of lice; and I think it altogether probable it would do much toward relieving it from the injury of the bole-worm."

In a report to the Philadelphia Society for Promoting Agriculture, March 1, 1860, MR. MILTON CONRAD, of Chester Co., Pa., says:—

"This extremely low temperature, which was so nearly fatal to our cereals, and injurious to the grass crop, so chilled and froze the young sorgho plants in many situations as to cause their immediate death, and in many others made them so sickly as to render them an easy prey to aphides and other noxious insects, producing a lingering though certain extinction of the plant."

RUST, SMUT, MILDEW, BLIGHT, AND OTHER DISEASES INCIDENT TO VEGETATION, WITH THE CIRCUMSTANCES UNDER WHICH THEY APPEAR.

Of rust, mildew, and diseases resembling them closely in character, DR. CARPENTER ("Microscope", London, 1856, p. 384) says:—

"It may be considered as certain that an admixture of the spores of any of these fungi with the grains, will endanger the plants raised from them; but it is equally certain that the fungi have little tendency to develop themselves in plants that are vegetating with perfect healthfulness. The wide prevalence of such blights in bad seasons is not difficult to account for, if it be true (as the observation of Mr. John Marshall, a few years since, rendered probable) that there are really *very few* wheat grains, near the points of which one or two sporules of fungi may not be found entangled among their minute hairs; and it may be fairly surmised that these sporules remain dormant, unless an unfavorable season should favor their development, by inducing an unhealthy condition of the wheat plant. The same general doctrine probably applies to the botrytis, which from 1847 to the present time, has had a large share in the production of the potato disease, and the oidium, which has a like relation to the vine disease. There seems no doubt that in the fully developed disease, the fungus is always present. * * * * So does it seem probable, on a consideration of all the phenomena of the potato and vine diseases, that neither the botrytis of the one, nor the oidium of the other, will vegetate in perfectly healthy plants."

MR. TOWNSEND GLOVER, entomologist to the Patent Office, in his Report on Diseases, &c., of the Cotton Plant (Pat. Of. Rep. 1857, p. 126-7), says of the blight, that it is prevalent in all alluvial bottoms, as well as on the uplands, and observes further, "In directing my inquiries to the effects produced by the

rotation of crops in fields where cotton had been cultivated, I ascertained that on one plantation in which the fields had been planted with cotton for five consecutive years, the first and second crops were perfectly healthy; the third slightly attacked with the disease; the fourth still more blighted; and that of the fifth year had large patches of blight, ranging from a quarter of an acre down to a few yards square. On another plantation on which cotton had been cultivated for several years in the same field until 1856, when one side was planted with corn and the other with cotton, and the whole field again planted with cotton in 1857, it was observed that the crop produced on the portion of the field planted with corn the previous year was vigorous and healthy, whilst that on the old cotton land was small and diseased."

Mr. L. HARPER, of Miss. (quoted by Turner, Cotton Planter's Manual, N. Y., 1857, p. 149), says of rust of cotton:—

"This fungus is produced by a diseased state of the plant, caused by a stagnation in its growth, and a consequent relaxation in the circulation of the fluid or sap of the plant." He also expresses the opinion that "of one hundred cases of rust among the cotton, perhaps scarcely one is owing to an unfavorable season, and ninety-nine to a defective cultivation."

INSECTS, BLIGHT, SMUT, AND RUST; WHY DO THEY ATTACK VEGETATION?

The investigations of science are daily and even hourly furnishing us with clearer and more unquestionable evidence of the great beauty with which nature has adapted her various means towards the several ends she has in view. We are slowly but surely learning that one phenomenon after another, which had been regarded as presenting evidence of a "discord," was but "harmony not understood." The observations, as well of scientific as of unscientific men, have been sufficiently clear and full, to demonstrate beyond cavil or dispute, that a portion at least of the insect world is in no wise a departure from the harmony of the system of nature.

Different flies, while in the "larvæ" or infant state, render important service by feeding upon carrion and all kinds of filth; by the aid of various tribes of scavenger beetles, offensive matters disappear, which, if they remained to pass through a slow process of decay, would contaminate the air and render it noxious to animal life. Those whose larvæ live in stagnant water assist in preventing the water from becoming putrid, by consuming the decayed matter which it contains. The larvæ of various other insects live upon excrescences growing upon trees; and, in the words of a distinguished naturalist, "those of

others in rotten wood and bark, thereby joining with the grub of certain beetles to hasten the removal of these dead and useless substances, and make room for new and more vigorous vegetation."

No phenomenon of matter is more universally observed than the ceaseless round of change to which it is subjected. Especially is this made apparent in organisms, whether animal or vegetable. The primary and necessary condition of their existence—the quality which is inseparable from their nature—is, that they shall pass through a system of composition, decomposition, and recomposition. The cessation of this compound operation—this co-ordination of actions—is known to us as death. In animal organisms, so soon as that mysterious force, life, ceases to control the elements, the mass of them fall asunder and pass from the solid or liquid to the gaseous state. Thus the oxygen, hydrogen, nitrogen, and carbon are set free from their combinations in the animal economy, and form new combinations as well with each other as with the oxygen of the atmosphere, and becoming carbonic acid, ammonia, and water, are "transformed into the waving leaves of Nature's forests, or the green carpets of the hills."

In vegetable life we also find a round of change—a co-ordination of actions. The living plant is constantly at work during the season of growth, appropriating ammonia, carbonic acid, and the various mineral elements of the soil. It takes in carbonic acid, which is composed of carbon and oxygen: the former goes to form the structure of the plant; and the latter is given off to the atmosphere, and is an element of animal life so important that in its absence instantaneous death ensues. When, during the proper season of growth, any plant ceases to perform with vigor any one of its appointed functions, it is in a condition known to us as disease; and when these functions cease entirely death immediately takes place.

In plants there is a condition or property which has been very appropriately compared with animal heat, and which is necessary to be preserved—is, in fact, a circumstance upon which depend life and the power to appropriate and assimilate food. This vegetable heat, if so it may be called—this mysterious quality, acting upon the plant and giving it the vital principle—is in turn sustained and increased in power by the plant on each accession made to its vigor by the elements which it has taken from the air, the water, or the soil.

In order to generate and preserve this heat, it is necessary that the temperature of the plant should be maintained within a given range, and, as has already been shown, the healthy and vigorous growth of the plant is dependent upon the presence, in sufficient

quantity, of carbonic acid, ammonia, and the various mineral elements of the soil. Nor are these all the conditions which are requisite to vegetation. In order that the plant may appropriate the food by which its roots are surrounded, spread these roots vigorously through the soil, become strong and healthy, the ground must be properly prepared with the plow and the harrow, or the spade and the rake, or by drainage if it is wet.

Such being some of the fundamental laws which govern vegetation, and "the laws of nature being invariably executed," it is in no way remarkable that under circumstances in which these provisions are not complied with by the husbandman, his trees, roots, and other plants should struggle through a miserable existence, exhibiting every evidence of an absence of vigorous health. Decomposition of organisms being as necessary a part of the work of nature as composition, and in fact but a preliminary to recomposition from the same materials, we need not be surprised on seeing her set her army of insects to work in destroying any worse than useless organized body. Her most active agency will in one case be the apple borer, in another the Hessian fly, or in another the midge, or such remedy as the peculiar case may call for. Again, she calls to her aid "smut," "mildew," "blight," "potato rot," or some other like provision, by which she removes these cumberers of the earth, to make room and food for vigorous growth, or to allow rest to the soil.*

The wisdom of the laws by virtue of which nature removes decaying and noxious animal matter strikes us more forcibly because it seems more nearly to concern ourselves, our health, and our comfort; but when she acts with similar means and appliances upon diseased vegetable bodies, which are appropriating food from the soil and making no sufficient return, she shows herself equally worthy of our admiration. She removes that which is injurious to vegetable life, and if we would enjoy her bounty, and avail ourselves of her gratuitous services, we must obey her laws. With a succession of such outrages as have been perpetrated on the soil of this country since its discovery, under the name of "agriculture,"

* The opposing forces, tending respectively towards vegetable structure and decay, bear, in every clime and country, a fixed and unvarying relation to each other. Accompanying the rank and luxuriant vegetation of the tropics is always found, developed in a equally high degree, the power of nature to hasten and accomplish decay. In the Isthmus of Panama, for instance, it is almost impossible, even with the utmost care, to protect from destruction by worms, for any considerable length of time, the wooden handles of axes, shovels, and other implements: and a perfectly healthy tree, when felled to the ground, becomes, within a few weeks, a prey to the same destroyers. On the other hand, in any climate so cold that in the winter months vegetable growth does not take place, there is, at that season, no insect capable of attacking the passive, unresisting plant.

it is not surprising that our farmers should suffer as they do by these decrees of nature.

When a distinguished writer, already quoted, assures us that "it is even supposed that the Hessian fly has been a benefit, by compelling farmers to adopt a better mode of culture," we have at once the evidence that nature, in her wisdom, will put a limit to the depredations of the despoilers, and see justice done to a posterity, who, but for those "laws which are ever executed," would find themselves the heirs of a barren and desolate waste. With a thorough and intelligent system of culture, we may with confidence look to the time when from the farms of the United States, as the highly-cultivated fields near London, which supply its markets, insects and blight shall be "as strictly banished as from the court of Oberon."*

MARKET FOR FARM PRODUCE—WHENCE COMES IT?

That the shoemaker, the tailor, and the blacksmith find respectively a market for their various wares among those persons *not* engaged in the same pursuits with themselves, is a truth which probably few will be found to question. With the farmer it is much the same. He has little or no occasion to sell to or buy from his fellow-farmer, and must therefore look for a market to those persons who, not being producers of agricultural products, have need to purchase them.

This being the case, it may be asserted as a fact so clear and unquestionable as to need no proof, that the interest of the farmer is to be promoted by increasing the proportion of the people engaged in other than agricultural pursuits. Every influence exerted to draw men from agriculture into other employments, not only tends to increase the market for farm produce, but becomes an advantage to the farmer by reducing the number of those competing for the existing market for that produce. As, however, the people of a country live substantially off the products of that country, it is also for the interest of the farmer that as large a proportion as possible of those not engaged in agriculture should be occupied in productive pursuits;—the entire body of non-producers drawing their sustenance from the producers.

It is in view of these things, then, a matter of deep concern to the farmer that there should be a diversity of productive pursuits—that with a large and increasing number of miners, operatives, artisans, mechanics, and engineers, there should be a large and ever-growing market for the products of agriculture.

NEAR AND DISTANT MARKETS.

The farmer who has a market close at hand

carries the produce there at a trifling expense. In selling directly to the consumer, he receives from him the full amount paid by that consumer.

He who, on the contrary, is dependent upon a distant market, is either obliged to pay directly the cost of transportation to that market, or to sell his produce to the middleman or trader, and receive therefor the amount paid by the consumer *less the transportation, storage, and profits of the various parties who stand between producer and consumer*. Hence is it that while the farmer near New York or Philadelphia sells his corn at 70 cts. per bushel, he in the interior of Iowa receives for his but 25 cts. per bushel.

These statements being susceptible of proof by the examination of the condition of the eastern and western markets almost any day in any year, it is clearly manifest that it is to the interest of the farmer to have the consumer brought to the side of the farm. When, then, he sees a mine opened, a furnace put in blast, the fires of a rolling mill lighted, a foundry, or even a shop for the prosecution of the most trifling mechanical trade, started in his neighborhood, it should be to him a cause for congratulation.

But here is merely the beginning of this great and important subject. With a near market the farmer finds a demand for almost every product his farm can raise. His straw meets with purchasers,* as well as his wheat; and thus while he turns the entire product of his field to account, his western fellow-farmer, who is subjected to the tax of transportation on such produce as he can sell, makes a bonfire of his straw if he is far removed from a market.

A writer in De Bow's "SOUTHERN REVIEW," for July, 1859, computes the amount of cotton seed, and its value when the oil is expressed, as follows:

"3,600,000 bales, at 500 lbs. to the bale, is 1,800,000,000 lbs. of fibre, the cotton seed of which would be 3,960,000,000 lbs., or 1,980,000 tons; 3,960,000,000 lbs. is equal to 1,980,000,000 lbs. of kernel, which will give 87,120,000 gallons of oil, and 762,800 tons of oil cake. Value of 87,120,000 gallons of oil, at \$1 per gallon, \$87,120,000; 761,300 tons of oil cake, at \$25 per ton, \$19,037,000. Total, \$106,157,000.

This cotton seed is not, however, economised or utilized to any extent, and will not be until mills are established in the cotton country for extracting the oil; and consumers for that oil are brought to the side of the plantation.

The advantages arising from the existence of a near market, are very well shown by the following, from a late number of the "COUNTRY GENTLEMAN":

* In a Boston paper of 10th of March, 1860, straw is quoted as being worth from \$15 to \$17 per ton. In the *Homestead*, published at Hartford, Ct., March 1st, straw is quoted at \$10 to \$12 per ton, and hay from \$16 to \$18 per ton.

"PROFITABLE BLACKBERRY FIELD.—The editor of the Norwalk (Ct.) GAZETTE has been visiting the New Rochelle fields, belonging to Messrs. George Seymour & Co., and says that 'three acres under cultivation, have produced over four hundred bushels of blackberries, with a cultivation that cost \$8 per acre; and the blackberries, when sold in New York, realized, above expenses, \$3,200, or more than \$1,000 per acre. Besides this, thirty barrels of blackberry wine, now worth \$50 per barrel, have been made from the berries grown on the same lot, and there are plants enough for the sale of next spring, to make the net yield from this small lot, at least \$5,000.'"

How could such returns be made from the same land with an equal expenditure, in Wisconsin, Iowa, Minnesota or Kansas?

RETURN OF ITS CONSTITUENTS TO THE SOIL.

In order to return to the soil the constituents which have been extracted by the crops cultivated upon it, the primary and indispensable condition is that the crops should be consumed near to the place of production. A physical difficulty always exists in repaying to nature's great saving bank, the loans made to the farmer, which can in no way be fully obviated except by a near market—a producer of manure close to the farm.

The impossibility of ever returning to the soil of the States of the northwest, its constituents contained in the millions of bushels of wheat and corn sent for a market to the Atlantic States, and to foreign countries, is so apparent as to require to be merely pointed out. Therefore, as Liebig has shown, the removal of one bushel of wheat from a given tract of land, and a failure to restore to it any portion of its constituents, decreases the power of that land to produce wheat, to an amount equal to one bushel; the farmer who pursues this policy, is actually year by year disposing of his capital, and becoming the owner of a farm less and less valuable.

In view, then, of the extent to which such farming is practiced in the United States, we need not be surprised or incredulous, when informed by Dr. Lee, of Georgia,* that of the land cultivated in this country, one hundred millions of acres are damaged to the extent of three dollars per acre per annum, or, in other words, that a complete restitution of the elements of crops removed each year, cannot be made short of an expense of *three hundred millions of dollars!*

"The land," says Alderman Mechi, "is like a purse, you cannot keep taking out without replenishing, or you bring certain ruin. It seems nationally ridiculous to go to Peru for what we are wasting at home." As the "waste" which takes place in England, is utterly insignificant when compared with that in the United States, if "ridiculous" for the English to go to Peru for guano, how much more so is it for us!

* Patent Office Report 1852—Agriculture, p. 7.

INFLUENCE OF LARGE CITIES UPON AGRICULTURE.

In our own day, it is unfortunately too much as it was in the days of centralized Rome, when, in the words of Liebig, "the sewers of the immense metropolis of the ancient world engulfed, in the course of centuries, the prosperity of the Roman peasant." Now, as then, the sewers carry off into rivers, and thence to the sea, annually, far more wealth than the yearly production of the gold mines of California and Australia.

The establishment of local centres, by bringing the furnace, the foundry, the machine shop, the cotton mill, the woolen mill and the tannery, to the side of the farmer, counteracts and prevents centralization. By these means, cities no longer thrive at the expense of the country, which, with the town, is built up by a healthy and solid progress.

ROTATION OF CROPS.

In raising produce for a distant market, such crops only can be cultivated as will keep, and at the same time bear the cost of transportation. In the United States, these are Indian corn, wheat, rye, cotton, tobacco and sugar, with a few others of trifling importance. How unfavorable this restriction and limitation is to a proper rotation of crops, can be seen at a glance. In pursuing a system of rotation, the careful husbandman is guided by the chemical constituents of the crops, and does not, while professing to farm intelligently, commit the absurdity of year after year, planting in succession, wheat, Indian corn and rye, which are all very exhaustive, and severally draw from the soil very much the same constituents, and in nearly equal proportions. Green crops, on the contrary, to a great extent derive their elements from the atmosphere--from which they absorb nitrogen. This nitrogen thus becoming fixed in the soil, prepares it for the white, or corn crops.* Green crops to a farmer without a near market are almost as valueless as the weeds, upon the destruction of which so much labor and time are consumed. With a near market, too, he can cultivate almost any crops which will grow upon the land. Some idea of the profits of root crops with a near market, can be formed from the following paragraph from a recent number of "THE COUNTRY GENTLEMAN":

"Mr. R. F. Bolitho has a field in his possession at Chyandor, England, covering a space of little more than four acres, which has lately produced a crop of mangolds which it is believed are the very finest ever grown in the neighborhood. The globe ones averaged 54 tons per acre, and the long ones 52 tons per acre. Fine crops of potatoes and turnips were produced this year

from the same ground, which, added to the mangolds sold, realized the large sum of £140 6s. 10d. (\$701.70). Not a bad return in twelve months from four acres."

FARM DRAINING.

In the first settlement of a country, the pioneer, being poor and provided with imperfect implements, does not select for the site of his home or his farm, the land which is richest. He devotes his energies to that which he can cultivate most readily, and from which with the most trifling expenditure of time and means he can receive the earliest returns to his labor.

Observation in any country which has been long or thoroughly settled, will show that the pioneer and his cotemporaries built their rough houses, and commenced their farming operations upon the higher, drier and healthier lands, and left those rich with washing from the hills, and from the accumulated decay of countless ages, to their successors.

As population and wealth increase, and the farmer is better paid, the richer soils are drained and cultivated. A too rapid advance from the poorer to the better soils, brings with it increasing uncertainty in the returns, as may be seen during almost any season on the richest lands of Indiana, Illinois, or the cotton plantations on the river bottoms of the South. The men who cultivate these lands are more or less uncertain as to the fate of their crops almost to the day on which they are to be garnered. The following returns of the productions of Iowa, as found in the State Census of 1858, will give some idea of the operation of this influence:

	Acres.	Crop—bush.	Pr. acre.
Wheat, spring,	750,719	3,090,049	4.12
do winter,	29,190	203,204	6.96
Oats,	315,372	1,703,760	5.40
Corn,	986,096	23,366,684	23.40

These returns, when taken in connection with the low prices of agricultural produce, furnish a sufficient explanation of the cause of the pecuniary troubles of the people of Iowa for two years past. With no home demand worth relying upon, the farmers of this State have been restricted to the cultivation of three or four staple grain crops; and, small as these crops are, when sold to distant consumers they are still subjected to the tax of transportation.

In England the crop of wheat averages 30 bushels, and those of oats and rye 36 bushels, per acre. In France, the yield, as given in "ENCYCLOPEDIA BRITANNICA," vol. x. p. 246, is wheat, 34½ bushels, rye 31½ bushels, and oats 37½ bushels.

The earlier efforts* in drainage, being such only as the farmer can, with the means at his command, pursue, are of the rudest character.

* Nature, in a measure, performs this office, in the growth of weeds, and therein furnishes to man a lesson which it were well for him not to overlook or disregard.

In time, however, with an increase of wealth, and the advantages which improvements in mechanical industry and the application of steam give, TILE DRAINAGE, that magical agency in agriculture, is introduced.

Among the very numerous advantages of this system so clearly pointed out by Hon. H. F. French* are, that it removes from the roots of plants, the stagnant water and thus increases their warmth; it gives them more vigor and renders them far less liable to be frozen out in cold weather; it makes the soil more porous, and allows the roots to penetrate to a much greater depth; the soil being more open, the water-sinks deeper, and while in wet weather it is less wet, in dry weather it retains its moisture for a far greater length of time; the soil is deepened and the absorption of fertilizing substances by the roots is much facilitated; and the health, strength, power and yield are increased to an extent which is not incredible merely because of the unexceptionable character of the witnesses, and the overwhelming nature of their testimony.

It must be quite apparent that DRAINAGE, in breaking the force alike of excessively wet and dry weather, removes from the farmer two of his most trying cares, and causes of disappointment and ruin. He has more control over his farm and his crops, and is less and less at the mercy of the elements. While it is absolutely necessary upon low wet lands, we are assured by John Johnston, of Geneva, the father of this system in America, that there are few, if any, lands which are not vastly improved by it. The practical results on upland are well shown in the following paragraph from a recent agricultural paper:

HOW UNDER-DRAINING PAYS.—A Vermont correspondent of the N. E. Farmer tells a brief and pleasant story of his under-draining two acres of cold, stony up-land, at an expense of \$30 per acre, using some tile and some stone—the latter being plenty on the ground. The crop the year before draining was two small loads of brakes and some hay, hardly worth cutting. Of the crop the year after draining, he says:—"This spring I broke it, manured lightly, and planted to potatoes, corn, and beans. The crops did well, and at harvest were worth, in our market, about \$100, which paid the \$60 invested for draining, and \$40 for labor. The land is now worth, at least, \$50 per acre.

It must be observed, however, that agriculture becomes a science and tile drainage is introduced only when, by means of a near market, the farmer is well paid for his produce. Tile drainage is not, and cannot be practiced by him who is ground to the earth in poverty, by the exhausting tax of transportation, and, because of the exhaustion of his soil, the

owner of land less and less valuable with each crop which is taken from it.

COAL AS AN AGENT FOR THE PRODUCTION OF WEALTH, AND POWER, AND THE ADVANCEMENT OF CIVILIZATION.

Professor H. D. Rogers, the distinguished geologist, in his "Geology of Pennsylvania," recently published, shows that a vein of coal four feet thick, yielding one yard net of coal, will produce 5,000 tons of coal per acre, which coal possesses a power equal to the life-labor of more than 1,600 men. A square mile of such a vein contains 3,000,000 tons—equal to the life-labor of 1,000,000 men. "In coal, this" (the labor-power of a man for his life) says an English reviewer of Professor Rogers's volume, "is represented by three tons; so that a man may stand at his own door while (this) quantity of coal is being delivered, and say to himself: There, in that wagon, lies the mineral representative of my whole working life's strength." When we contemplate the further and indisputable fact that one man can, unaided, and under disadvantageous circumstances, mine in ten hours this quantity of coal, we need not be surprised that Peter Barlow, the distinguished engineer, after a full examination of this subject in all its phases, should have said:

"It seems indeed a reasonable inference from all that has now been stated, that man was designed by his Maker for a higher principle of action—for the exercise of skill, and for invention; to regulate the action of the lower animals to the purpose of labor; to convert air, fire, and water to his service, and only where skill and dexterity are required, to become himself a mechanical agent."

The annual production of the coal mines of Great Britain is 68,000,000 of tons, which if applied to the production of mechanical power would give the equivalent of 450,000,000 of men. But while by no means all this product is so applied, when it is fully considered how various and wonderful are the applications of machinery, the very existence of which is in a great measure due to the power of steam generated by the aid of coal; and to what a remarkable extent this steam power is economized and turned to advantage by this machinery, we shall have no great difficulty in concluding that Great Britain avails herself of coal as a mechanical agent, annually and permanently, to an extent equal to if not exceeding that of 450,000,000 of men. Indeed it is so assumed by English writers of authority. Here then, by this coal is furnished to the people of Great Britain, what has most appropriately been compared to hundreds of millions of willing slaves, "who require no drink stronger than water, no food other than their own vitals, neither raiment nor shelter."

* "Farm Drainage," N. Y. 1859.

In view of these facts there is no need to ask why it is that Great Britain has acquired so vast a power, has been enabled to subject almost the entire world to her influence, either trading or political, and to grow rich thereby. The mystery, if any there be, finds a solution in the history of the development of her coal mines, and the invention of the steam engine, and the various modern mechanical appliances.

The question then arises, how do our coal fields compare in extent and richness with those of Great Britain?

The estimated area of coal in Great Britain is 7,530 square miles, while that of the United States is 196,650 square miles! It is further calculated that the coal fields of Great Britain contain 190,000,000,000 tons, while those of the United States have 3,720,400,000,000—the latter being nearly twenty times the quantity of the former. The total yield of anthracite coal in the United States, from the opening of the trade, in 1810, to Dec. 31, 1859, was 94,573,617 tons, or 27½ millions more than the annual product of Great Britain.

If, then, Great Britain derives her great power and importance from this element of natural wealth, and from the appropriation of the forces of nature which are held by her hills and valleys, and we possess nearly twenty fold these stores, does not the plainest dictate of common sense indicate to the people of the United States, no longer to be "hewers of wood and drawers of water" for other nations, but to follow the example of England, rapidly, completely, fully, intelligently, and without delay?

When once these facts are clearly pointed out, a proper judgment as to the policy to be pursued by ourselves would seem to require but little more than the *instinct* which directs the horse when thirsty to drink of the water in the brook through which he is passing, or when hungry to eat of the hay in the rack at which he is standing. The provident industry of the ant, the bee, or the beaver, would seem to be of a much higher order, and of a more far-seeing nature, than the mental effort necessary to enable the boasted "lords of creation" to perceive the mode by which they are to make their country truly great, and give to its people prosperity and happiness.

It will be urged by some, however, as it has been many thousand times before, that in this country we lack the capital required to develop this wonderful store of wealth and power. The question then naturally arises, what is capital?

CAPITAL is the instrument by the aid of which production is directed to the uses of man, and exists in the form of land and its various improvements, coal, iron, copper, lead, and other minerals, mines, steam-engines, mills, furnaces, factories, houses, agricultural

products and implements, books, schools, colleges, mental development, gold and silver.

Are any of these absent in this country? If they are, will not coal, and the power which it gives, put us in possession of very many of them? Why, then, not call this great force to our aid?

How inconsistent to complain of a want of capital while declining to do this, and thereby annually plundering our farm lands of capital—constituents of the soil and of vegetation—to the amount of \$300,000,000; and in addition thereto, shipping to foreign shores since the discovery of the gold of California, more than four-fifths of the product of those mines!

When, too, it is considered that the same national policy which would develop our coal, and give us steam power almost without limit, would create a diversity of employments, establish local action, and near markets for agriculture produce, save the farmer from the crushing effects of the tax of transportation, put a stop to "earth-butcery," or "land-spoliation," develop our agriculture, enable the farmer to cultivate the richest soils, banish insects and blight as completely as they have been driven from the farms near London, and enable us to retain for our own uses the precious metals, for which we have so much need,—the suicidal character of our present policy is made so apparent that it seems wonderful how demagogues could ever have fastened it upon an intelligent people.

RAW MATERIALS AND FINISHED COMMODITIES.

Some idea of the additional value given to raw materials by the application of labor and machinery will be conveyed by the following facts:

Straws manufactured in, and now received from, Switzerland, Germany, France, and Italy, are sold in this country at as high a rate as \$10,000 per ton.

Flax is manufactured into cambrics, laces, and embroideries, and sold for, on the average, more than \$10,000 per ton; while in some of the finer descriptions of French and Swiss goods of this character we pay as high as \$100,000 per ton. "Point d'Ayçon lace," says J. S. Homans ("CYCLOPEDIA OF COMMERCE," 1858, p. 1157), is worth from \$500 to \$600 per pound."

Shoddy cloth, of the "old clothes" wool of Europe, is very extensively sold in the American market in cloths for coats and ladies' cloaks, and in table covers, at times as high as \$5.00 per pound.

The following statement from "THE LONDON ARTISAN" shows to how great an extent lead, copper, cast iron, wrought iron, and hemp are increased in value by the application of labor and machinery—the table giving in each instance, the price of one dollar's worth.

of raw material after it has been fashioned into the shape indicated, as follows:

LEAD.

As sheets.....	1.32
Small printing type.....	30.00

COPPER.

Household utensils.....	4.92
Fine metallic cloth.....	52.00

IRON (CAST).

Ornamental.....	48.00
Ornaments for the person.....	148.00

IRON (WROUGHT).

Twisted gun barrels.....	240.00
Pen-knife, blades.....	650.00
Polished steel buckles, &c.....	900.00
Scissors (finest).....	450.00
Sword handles (polished steel).....	980.00

HEMP.

Cordage and cable.....	4.00
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When this increase in value is fully considered, and it is borne in mind—

That raw materials, including agricultural produce, are almost exclusively the result of human labor:

That manufactured products are to an equal extent the result of steam and machine power:

That about six thousand times as much human labor is necessary to produce the same result, when it can be reached at all, without the aid of steam as with it:

We need not wonder at the existence in Great Britain of such a state of things as the following, pointed out in 1852 by Alderman Mechi, the great English agriculturist, who says:

"Last year the consumption of cotton-wool was 760 millions of pounds weight, for which we paid eighteen millions of sovereigns [\$90,000,000]. After making it up into every conceivable form and pattern, and supplying all our own people, we sent as much abroad as brought us home thirty millions of sovereigns" [\$150,000,000].

With these facts and figures before us, it need be the cause of no great mystery when we observe that countries which are exporters of raw materials only, and therefore steadily exhausting the fertility of their soil, while paying this enormous increase in price to countries which have called the steam engine and machinery to their aid, are *invariably and without exception poor*.

EXPORTS AND IMPORTS.

Any country which exports raw agricultural produce, in so doing is really sending from her shores, never to be returned, the elements which constitute the fertility of her soil, and must yearly become poorer and weaker, if these exports bear a large proportion to the total amount of her production. That country, too, which imports agricultural produce from the lands of "the hewers of wood and drawers of water" is actually enriching her-

self at the expense, and from the life's blood of those poor people, who are thus entailing upon themselves, their children, and their children's children poverty and exhaustion.

That government, however, which pursues a policy which results in bringing the loom, the anvil, and the forge to the side of the farm, thereby enables its farmers virtually to export their raw materials, without agricultural exhaustion, in every article of manufactured goods exported. "A piece of fine cloth, for example," in the words of Adam Smith, "which weighs only eighty pounds, contains in it the price not only of the eighty pounds weight of wool, but sometimes of several thousand weight of corn, the maintenance of the different working people, and of their immediate employers." "The corn," adds this great man, "is in this manner virtually exported in the complete manufacture, and may easily be sent to the remotest corners of the world."

The foregoing proposition being true, it follows of a logical necessity that the import of any manufactured article of foreign production is virtually an import of the agricultural produce consumed by the men, women, and children who were engaged in its production. The practical effect of this will more fully appear from the following:

In the year 1855, the imports of iron into the United States, in its various forms, were the result of the labor of 60,500 men. With the usual average per family, the employment thus furnished yielded a support to 302,590 men, women, and children, who required for their sustenance breadstuffs and provisions during the year to the value of \$15,129,500—just about the amount of our total exports of those products to Great Britain during that year. Had this iron been produced at home, it would have furnished to the American farmer, near to his own door, an increased market for his products to the amount of \$15,000,000, and at the same time have relieved him from the cost of transportation, and placed it in his power to restore to his suffering soil all the constituents of wealth extracted. As it was, our exports of breadstuffs and provisions to Great Britain in 1855, divided among all the inhabitants thereof, gave a consumption by the 302,590 men, women, and children—the households of the iron producers—of the value of just \$173,476.

THE PRECIOUS METALS.

Gold and silver are to the body politic—the society—what food and the oxygen of the atmosphere are to the animal economy, or what fuel is to the steam engine. These metals give motion, and from motion comes power. With their influx into any country comes activity, and an increased production, with a corresponding ability to consume material things. The precious metals, coined into money and

in active circulation, are, in the words of an eminent American economist, "a saving-fund for labor, because they facilitate association and combination, giving utility to billions of millions of minutes that would be wasted did not a demand exist for them at the moment the power to labor had been produced." "Labor," adds the same writer, "being the first price for every thing we value, and being the commodity that all can offer in exchange, the progress of communities in wealth and influence is in the direct ratio of the presence or absence of an *instant* demand for the forces, physical and mental, of each and every man in the community, resulting from the existence of a power on the part of each and every other man to offer something valuable in exchange for it. It is the only commodity that perishes at the instant of production, and that if not then put to use is lost forever."

Those metals go *from* those countries engaged almost exclusively in agricultural pursuits, and in which agricultural produce is low for the want of a home demand, and manufactured products are high because of an absence of home supply.

Those metals go *to* those countries in which there is a diversity of employments, in which steam is called to the aid of man, in which the constituents are annually returned to the soil, and in which the richest lands are drained and cultivated.

Those metals go *from* those countries in which the rate of interest is high, *to* those in which it is low; *from* those in which bank-notes are not used, *to* those in which they are—the higher charge for the use of money, and the absence of bank-notes, equally having a tendency to prevent combination and association, and causing a waste of labor—that most perishable of all commodities.

With a steady and increasing flow of the precious metals into any country, there is a tendency to an increase in the exports of finished products from that country—those products rapidly decreasing in price, with the improvements in machinery. This is well illustrated by France, which, within the past quarter of a century, has made a net gain of these metals, by importation, of over \$500,000,000; which inward flow still continues, and with it an immense and annually increasing export of manufactured products, until now she is only surpassed by Great Britain in the extent of that trade.

PRICES.

With steadiness in mining, manufacturing, and the mechanic arts, new applications of steam and machinery are made, which decrease the actual cost in the production of finished commodities, thus bringing the value of the manufactured article, step by step, nearer to that of the raw material out of which

it is produced. With this steadiness and an increasing consumption, comes a regular and growing home competition, which restrains profits within reasonable bounds—acting like a balance-wheel or the governor of a steam-engine. Steadiness, however, is the primary condition upon which this competition can accomplish a healthy growth. Periodical depressions and "crises" from external causes, will produce directly the opposite result—that of giving the control and possession of the market among the producers at home to those only who have sufficient wealth to pass through these "crises" without being ruined.

The actual fact, as well as the cause of the decline in the prices of manufactured products, is well given by Alderman Mechi, of London, who has already been quoted. He says:—

"The price [of cotton goods] has decreased enormously, and they are now within the reach of the million. The same remarks apply to the silk, wool en, earthen-ware, and other every-day commodities. Then, how has all this abundance and cheapness been produced? Not by an over-weening and inflexible attachment to the wagon and the flail—not by a rejection of steam. No! manufacture discarded its pack-horses for canals, and its canals for railways. The spinning-jenny, the mule, and the power-loom, impelled by mighty steam, perfected by the results of innumerable and costly experiments have blessed the inhabitants of this happy kingdom with employment and comfort."

The same writer institutes a comparison in the production and price of iron in Great Britain in 1800 and 1851, as follows:—

1800,	tons	18,000,	Price per ton,	£9.
1851,	"	2,500,000,	"	£3.

While this state of things has been steadily progressing, he also shows the advantage which the farmer has gained by an increase in the prices of certain agricultural productions, thus: "Since 1770, the price of butter has increased more than 100 per cent., meat about 70 to 80 per cent., and wool more than 100 per cent." Full particulars of prices would indicate an equal average rise in nearly all of the products of the farmer which were extensively cultivated ninety years since—each step towards bringing the consumer to the side of the producer being to the advantage of the farmer. Possessed of no other evidence, an unerring judgment may be formed of the advancement of any state or people, by a general comparison of the prices of raw materials and finished commodities in that state or among those people—the difference being great in countries which need development, and slight in those which have it. The ratio of increase in the raw products being very much controlled by natural causes, and that of finished commodities, by the aid of steam and machinery, being almost without any limit, we need be at no trouble in finding the cause. We might place the same proposition in another form by saying that those people who call to their aid the willing slave, "who requires no drink stronger than water, no food other than his own vitals,

neither raiment nor shelter," will pay their farmers, and all others having raw materials—labor included—to dispose of, better than those who are resolved to be "hewers of wood and drawers of water" for the nations who own thousands of steam engines and hundreds of thousands of pieces of machinery.

WHY IS PROTECTION NECESSARY?

That a country possessing so much inherent vigor as our own should need protection from the competition of any other people, has been denied by a large body of men. That such necessity there be, however, is proven by the fact that every "free trade" period in our history has ended in almost universal bankruptcy of the people, with bankruptcy of corporations, and State and general governments; and that the only way in which we have recovered from these misfortunes has been by a re-adoption of the protective policy. That our industry is not able to sustain itself under the peculiar "warfare" of Great Britain, is a fact patent to every man who will see the truth.

The nature of the competition on the part of Great Britain, against which our home productions and home labor have to contend, is officially stated in the following extract from the "Report of the Commissioner appointed under the Provisions of the 'Act 5 and 6 Viet. c. 99,' to inquire into the operation of that act, and into the state of the population in the Mining Districts, 1854. Presented to both Houses of Parliament by command of her Majesty," p. 20.

"I believe that the laboring classes generally, in the manufacturing districts of this country, and especially in the iron and coal districts, are very little aware of the extent to which they are often indebted for their being employed at all, to the immense losses which their employers voluntarily incur in bad times in order to destroy foreign competition, and to gain and keep possession of foreign markets. Authentic instances are well known of employers having in such times carried on their works at a loss amounting in the aggregate to three or four hundred thousand pounds in the course of as many years. If the efforts of those who encourage the combinations to restrict the amount of labor, and to produce strikes, were to be successful for any length of time, the great accumulations of capital could no longer be made, which enable a few of the most wealthy capitalists to overwhelm all foreign competition in times of great depression, and thus to clear the way for the *wholesale trade* to step in when prices revive, and to carry on a great business before foreign capital can again accumulate to such an extent as to be able to establish a competition in prices with any chance of success. The large capitals of this country are the great instruments of warfare (if the expression may be allowed) against the competing capital of foreign countries, and are the most essential instruments now remaining, by which our manufacturing supremacy can be maintained; the other elements—cheap labor, abundance of raw materials, means of communication, and skilled labor—being rapidly in process of being equalized."

(The Italics are in the original.)

The success which has followed the efforts of the British manufacturers of iron, in this direction, is very well shown in the following facts:—

Under the protective tariff of 1842, the production of iron in the United States rose from 230,000 tons in 1842 to 765,000 tons in 1846. In the latter year the "free trade" policy was

inaugurated, and by 1852, a large proportion of the American producers had been ruined, and the production fell to 500,000 tons.

Under the protective policy, the prices of "pig" iron in New York were as follows—

1843, per ton,	24.07	1845, per ton,	32.62
1844, "	25.67	1846, "	30.42

showing an average of \$28.14½.

After the ruin of a large body of the American producers had been accomplished, and the British manufacturers with large capitals had "cleared the way for the whole trade to step in" from abroad, a railroad mania sprang out of the emigration of hundreds of thousands of men, women, and children to the West, there to establish new homes and prepare new farms, whereon to raise produce to be brought into competition with the farmers of the East. Driven to the West, as these emigrants were, by the abandonment of the protective policy, and the consequent development of no new mines, the building of no mills, furnaces and factories, the farmers of the East thereby lost the market for agricultural produce which these people furnished.

With a demand for railroads, and a decreased supply of American iron, the prices of "pig" in New York were as follows—

1853, per ton,	34.81	1855, per ton,	31.98¾
1854, "	35.56	1856, "	32.55¾

showing an average of \$34.20, or \$6.05½ higher than it had been under the protective tariff of 1842.*

This branch of the subject cannot be more appropriately concluded than by a quotation from a speech of the late Count de Morny, then President of the French Corps Legislatif, and the half brother of the Emperor.

"Free trade," says he, "may, it appears to me, be considered as the object to which society is tending; but protection must be the means of arriving at it. Suppose free trade established in a new and poor country, what will that country produce? I do not deny but that it can develop some favored industry by a natural privileged situation, but foreign competition would stifle in their bud all those things which it requires in order to prosper—capital, skillful workmen, experienced overseers, easy communication, and a good market—in fact, all the conditions which time alone can give. A transition, consequently, is indispensable; and to preach free trade to a country which does not enjoy all these advantages, is nearly as equitable as to propose to a child to contend with a grown man."

FREEDOM.

The man who is isolated and separated from his fellow-man is little better than a slave. Dependent upon his own unaided productive power, the quantity of things which he can consume is greatly limited, and there is almost an entire absence of the comforts and conveniences of life, the early settler being obliged to content himself with a log cabin, and the coarsest food, and most scanty clothing.

Having no consumers near at home, he is subjected to the tax of transportation, reducing his return to two thirds, one half, or even in some cases to one third the amount paid by the distant consumer, although the quantity which he has for sale is small in the extreme. Being dependent upon a distant market for the few things he has the ability to purchase, he is again taxed by the transporter; while the farmer

* "Report on the Finances," 1857, p. 230.

with a near market receives the full price paid by the consumer for his produce, and buys manufactured commodities for twenty to fifty per cent. less than his poor cotemporary.

Man passes from slavery towards freedom in proportion as pursuits become diversified, and the tax of transportation decreases; as steam and machinery are called to his aid in production, the best soils brought under control and cultivation, and agriculture becomes a science. By increasing the production of a country, there come of necessity increased means of consumption. With the application of steam and machinery, and an increase in the productive power of labor so aided, it is enabled progressively to command an increasing proportion of the commodities so produced. Thus is the man of the present being steadily emancipated from the control of the accumulated capital of the past, and becoming more and more free. In all advancing countries, with the new applications of labor saving machinery, this is seen by an increasing remuneration to labor.

By diversifying the pursuits of the people of the country, production would be greatly increased, the remuneration to agriculture would rapidly augment, the work of land spoliation would gradually decline and eventually cease; steam would give its aid, and hand and hand would advance agriculture, commerce, manufactures and the mechanic arts.

CONCLUSION.

When once the farmers of the United States have had their eyes opened to the fact of the entire harmony of all the real interests of the country, they will disregard the specious but false cry of "free trade," which has fastened upon the people and the country that British policy, the consequences of which are:—

That our soil year by year produces less and less per acre of wheat, Indian corn, cotton, tobacco, and other crops:

That the ravages of insects, blight, mildew, and other manifestations of disease, annually rob the country and the farmer of millions of dollars:

That through the ruin of the miner, the artisan, the mechanic and the engineer, the market for the produce of the farm declines, while the number of farmers increases:

That by the separation of the consumers from the farmer, the latter is limited to the small profits paid by that produce which will bear transportation to a distance, and is sub-

jected to the grinding tax of transportation in reaching that market:

That owing to the poor remuneration and the distance to market, it is impossible to return to the soil the constituents removed, and agriculture does not become a science in the United States:

That local action is annihilated, and a few large cities being built up at the expense of the country, the sewers "engulf" the wealth of distant farms:

That a proper rotation of crops, from the absence of near markets, is impossible:

That, except to a very limited extent, and in favored localities, the richest lands do now, and must, continue undrained and uncultivated:

That the people of the country are in a great degree prevented from calling to their aid the immense productive power of steam and machinery:

That the prices of raw materials remain low, and those of finished commodities high:

That we have been obliged to ship, in payment of debts unnecessarily incurred in foreign countries, since 1848, four fifths of all the gold produced by the mines of California, while the poor and struggling farmers of the West pay for the use of money 25, 50, and even 75 per cent. per annum, and almost entire townships have passed, or are in danger of passing, through the hands of the sheriff:

That a development of a diversity of employments is prevented, and the demand for skilled labor and intellectual effort is steadily becoming less in proportion to the population.

So soon as they do recognize these important truths, and act upon them, they can permanently change the policy of the country, and in so doing will take the first grand step towards freeing agriculture from its greatest drawbacks, and making it a highly remunerative occupation. Let them then resolve, once and for all, that they will no longer allow themselves to be influenced by those miserable appeals to their selfishness, which in the past have led them to sustain a policy the result of which has been to crush out and destroy the diversified industry of the country, without which there can be no genuine and permanent prosperity to AMERICAN AGRICULTURE. This accomplished, our country must advance in power and greatness, and her people in wealth, happiness, and culture.

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