

QE
115
A29
1880
SLRA

50873
1880
Robert Peter

On the general excellence of the soils
of Kentucky, &c.

Geological Survey of Kentucky.
John R. Procter, Director.

13
26
1
QZ
115
A29
1880
SLRA

A. H. ...

GEOLOGICAL SURVEY OF KENTUCKY.

JNO. R. PROCTER, DIRECTOR.

TO THE
FARMERS OF GREAT BRITAIN AND IRELAND.

ON THE GENERAL EXCELLENCE OF

SOILS OF KENTUCKY, &c.

BY ROBERT PETER, M. D.,

CHEMIST TO THE GEOLOGICAL SURVEY, PROFESSOR IN THE STATE AGRICULTURAL AND
MECHANICAL COLLEGE, &c., &c.

WITH INTRODUCTION
By JOHN R. PROCTER.

YEOMAN OFFICE—S. I. M. MAJOR, PUBLIC PRINTER.

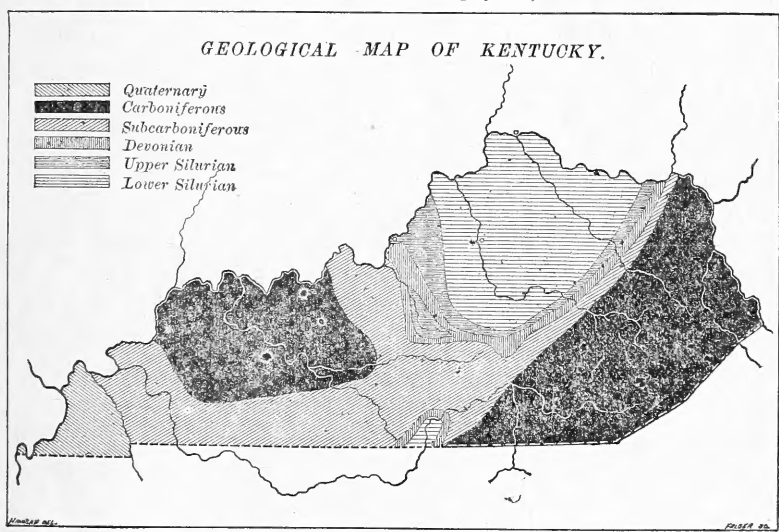
LIBRARY, U. S. NATIONAL MUSEUM
 126380
 JAN 11 1884
 SMITHSONIAN INSTITUTION

TO THE FARMERS OF GREAT BRITAIN.

Kentucky is situated between latitude $36^{\circ} 30'$ and $39^{\circ} 6'$ north, and longitude $5^{\circ} 00'$ and $12^{\circ} 38'$ west from Washington. AREA about 40,000 square miles. The detailed survey of the State will probably demonstrate that the State is larger than is now supposed.

THE RIVER boundary of the State is 813 miles: by the Big Sandy or Chatteroi on the northeast for 120 miles; by the Ohio on the north for 643 miles; and by the Mississippi on the west for 50 miles. The Chatteroi, Licking, Kentucky, Green, Cumberland, and Tennessee are the principal rivers, having their source in the Cumberland Mountains, and affording to all parts of the State admirable drainage and river communication with the Ohio and entire Mississippi river system. No State has a frontage on navigable rivers equal to Kentucky.

[Taken from Eclectic Geographies.]



The surface of the State is an ELEVATED PLATEAU, sloping from the Cumberland Mountains on the southeast to the Mississippi and Ohio rivers on the north and west. The *eastern coal-field*, comprising about 10,000 square miles, has an elevation above sea level of from 650 feet on the Ohio river and 1,300 feet on the southwestern border to 3,500 on the southeastern border. The great Central, or BLUE GRASS region (LOWER SILURIAN on accompanying map), has an area of about 10,000 square miles, and an elevation of from 800 to 1,150 feet. The DEVONIAN and UPPER SILURIAN has an area of about 2,500 square miles, and an

elevation of from 430 on the northwestern end to 1,100 feet where it curves around the Lower Silurian on the southeast. The SUB-CARBONIFEROUS has an area of about 10,000 square miles, and an elevation of from 350 to 600 on the southwest to 950 feet in the Central region. The WESTERN COAL-FIELD has an area of about 4,000 square miles, and an elevation of from 400 feet along the Ohio river to 850 feet on the southeastern portion. The QUATERNARY has an area of about 2,500 square miles and an elevation of 280 feet along the river bottoms, and 350 to 450 on the uplands. It will thus be seen that the average elevation above the sea for the State is over 1,000 feet. The elevation above the streams is sufficient to afford most excellent drainage.

The monthly MEAN TEMPERATURE for the three summer months is 73°, 76°, and 73°, and for the three winter months 27°, 30°, and 35°. The average ANNUAL MEAN is 55°. The RAINFALL is 50.30 inches.

In HEALTHFULNESS the State ranks high. By the census of 1870, there were 27 States shown to have a greater death-rate than Kentucky. The healthfulness increased as follows since 1850:

Death to population was, in 1850, 1.53 per cent.

Death to population was, in 1860, 1.42 per cent.

Death to population was, in 1870, 1.09 per cent.

That the conditions are most favorable for the production of a healthy, vigorous race of men, is attested by the following table, compiled from the measurements of the United States volunteers during the civil war, by B. A. Gould:

NATIVITY.	Height in inches.	Weight, pounds	Circumference around the forehead and occiput, inches	Proportional number of tall men in each 100,000 of same nativity.	Ratio of weight to stature, pounds to inch.
New England	67.83	139.39	22.02	295	2.07
New York New Jersey, and Pennsylvania	67.52	140.83	22.10	237	2.10
Ohio and Indiana	68.16	145.37	22.11	486	2.15
Michigan, Missouri, & Illinois.	67.82	141.78	22.19	466	2.10
KENTUCKY AND TENNESSEE .	68.60	149.85	22.32	848	2.19
Free States west of Mississippi river	67.41	. . . . .	21.97	184	2.13
Canada	67.08	141.35	22.11	177	2.11
England	66.74	137.61	22.16	103	2.05
Scotland	67.25	137.85	22.23	178	2.08
Ireland	66.95	139.18	. . . . .	84	2.09
Germany	66.66	140.37	22.09	106	2.12
Scandinavia	67.33	148.14	22.37	221	2.15

The speed and endurance of the Kentucky horse, and the superior development of all kinds of domestic animals of the State, are well known.

Kentucky takes high rank as an agricultural State, notwithstanding the large area of coal-measure rocks and the extent of forests in the State. More than one half the State is covered with virgin forests, the State being only exceeded in area of woodlands by three other States; yet it ranks as the eighth State in value of agricultural products.

No State or country is susceptible of greater VARIETY of PRODUCTS, as is well shown by the following table, compiled from the United States Census reports. It will be seen that in each decade it excelled all other States in the production of some one or more staple articles :

	1840.	1850.	1860.	1870.
Wheat	First.	Ninth.	Ninth.	Eighth.
Swine	Second.	Second.	Fourth.	Fifth.
Mules . . . . .	. . . . .	Second.	Second.	Third.
Indian Corn	Second.	First.	Fifth.	Sixth.*
Tobacco	Second.	Second.	Second.	First.†
Flax	Third.	First.	Third.	Eighth.
Rye	Fourth.	Eighth.	Fifth.	Fifth.
Hemp	First.	First.	First.	First.
Wool . . . . .	. . . . .	Seventh.	Ninth.	Twelfth.
Cotton	Eleventh.	. . . . .	. . . . .	Twelfth.
Value of Live Stock . . . . .	. . . . .	Fifth.	Fourth.	Eighth.

The lands of Central Kentucky have been cultivated for 70 years and more without manure, and the production now, with good cultivation, is equal to the best farming lands of England.

The soils of the Blue-Grass Region were formerly thought unfitted to the production of fine tobacco; but the high price and increasing demand for a certain class of tobacco has led to an extended planting in that region, and instances are frequent where lands which have been in cultivation for several generations, have yielded, during the past year, from 1,500 to 2,000 pounds of tobacco, worth from 15 cents to 20 cents per pound. There is no danger, with a proper rotation, of exhausting such lands by tobacco culture. After tobacco, wheat and clover succeed well, and a few years in clover prepares the land for another large yield

*The greater price per bushel realized in Kentucky for Indian corn, over the corn grown in the West, would place this State higher in the list were the value of this crop given.

†In 1870 Kentucky produced near one half of all the tobacco produced in the United States, and more than one half of all the hemp. The production of tobacco in this State increased from 105,305,860 pounds in 1870 to 158,184,829 pounds in 1873. The returns for the census of 1880 are not yet published; but the present tobacco crop is the largest ever produced in the State, and the yield of hemp from a few counties in Central Kentucky will be three fourths the entire product of the United States.

of tobacco. As an instance of what can be done with Kentucky lands when worn by improper cultivation, the writer has personal knowledge of the following, which is but one of many similar examples:

Farmer M—— purchased, ten years since, an old “worn-out” farm—having been rented for a number of years to careless tenants. At the time of purchase the land would not produce over 25 bushels of Indian corn per acre; by a proper rotation, using no manure, and making money all the while from the farm, the yield of corn has been increased to an average of 60 bushels per acre. There are no lands in Kentucky which may not be restored in this manner.

The nearness of Kentucky to large and growing markets;* the increase of manufacturing and mining in the State, and to the North and South; the large demands for grain by the cotton-growing States on the South, insures to the farmer here remunerative prices for all farm products, without the necessity of paying the cost of long freighting to profitable markets. The farmer from Great Britain will probably find in Kentucky conditions more alike to his own country than elsewhere in America. A recent visitor to this State,† after describing the excellent macadam roads, substantial stone walls, and other fencing of Central Kentucky, adds: “It is a region reminding the traveler of the very richest part of England, while the frequent comfortable houses will remind him that he is not in England, but in a country where the farmer owns the land and spends his substance upon it.”

Probably no other State in the Union has a POPULATION as purely English in descent as Kentucky. Of the total population (by the census of 1880) of 1,648,599, only 271,522 are colored, and 59,468 foreign born.

Kentucky has hitherto made no effort to induce immigration, and the great lines of travel connecting the East and West passed north of the State. This, and the fact that the railways of the North and West owned large tracts of land, and spread broadcast publications to induce immigration, has carried the great tide of immigration north and west of the State. The great advantages afforded by this State are now attracting attention, and, for the first time in the history of the country, persons from the newly-settled States of the Northwest are seeking homes in Kentucky and States south of the Ohio river.

*The census of 1870 placed the centre of population of the United States near the northern border of Kentucky. The present census will probably place the centre within the border of this State.

† Mr. Edward Atkinson.

The scope of this communication precludes anything beyond a short notice of the MINERAL RESOURCES of this State. The area of coal is 12,700 square miles. The detailed survey will show a larger area. Thus it will be seen that the area is greater than the entire area of England, Scotland, Ireland, and Wales. Most of the beds are above drainage, and can be mined by drifting, without the expense of deep shafting and costly pumping. The coals are of excellent quality. In the WESTERN COAL-FIELD are twelve workable beds of coal. Associated with the lower coals are several beds of limonite and carbonate iron ores. One bed of ore of good quality has an extensive area above drainage, and is from three to five feet thick. In addition to the numerous beds of bituminous coal in the EASTERN COAL-FIELD, there is an extensive area of cannel coal of great richness and purity. The iron ores contiguous to good coals in that field are numerous.*

In addition to the facilities afforded in these coal-fields for profitable mining and manufacturing, a wide field is afforded for development in agriculture. The lands are very cheap, and will produce well under proper culture. The large and growing demands for timber will insure a market for the forest products, so that the cost of clearing will be repaid when convenient to transportation.

The demands for building lumber in the States north and west of Kentucky are now supplied from the pine regions about the northern lakes. The timber of that region is going at the rate of 1,500 square miles a year, and will be mostly gone in ten years. After which, the populous region referred to must look to Kentucky, and States south of Kentucky, for the immense quantity of lumber needed.

BUILDING STONE of great excellence is abundant in the State; also FIRE-CLAY and POTTERY CLAYS of excellent quality. The great variety of products, abundant WATER-POWERS, cheap fuel, and variety and abundance of excellent timbers, will insure a healthy development of manufactures.

For grazing or sheep husbandry, the cheap coal-measure lands offer special advantages. To the farmer with money, who wishes for his family the advantages of an old civilization, good roads, etc., the Central or Blue Grass Region, and the Sub-carboniferous limestone region of the State offers advantages equal, if not superior, to any other region in America. The lands, measured by the productions, beauty of scenery, healthfulness, nearness to market, are cheaper than elsewhere to be found.

* Persons desiring information respecting the mineral and timber resources will please apply to the Kentucky Geological Survey, Frankfort, Ky.

The following article by Dr. Robert Peter, on the "The Excellence of the Soils of Kentucky," is designed to form part of a publication, descriptive of the resources of this State, for distribution among the farmers of Great Britain and Ireland. The long experience and extended reputation of Dr. Peter as an agricultural chemist, united with his experience as a practical agriculturist, entitle his opinions on the subject treated to great weight.

ON THE GENERAL EXCELLENCE OF THE SOILS OF KENTUCKY, &c., &c.

BY ROBERT PETER, M. D., CHEMIST TO STATE GEOLOGICAL SURVEY, &c., &c.

In the chemical study of the soils of Kentucky, for which the writer enjoyed a very large opportunity in the analyses by him of about seven hundred different samples from over all the geological formations of the State and from most of its counties, he has been deeply impressed with the fact, that while a great body of them, covering a large area of the surface of the State, are exceptionally rich, fertile, and practically durable, there are none which would prove irreclaimably sterile under a judicious use of the modern appliances of agriculture.

Professor N. S. Shaler, late Director of the Kentucky Geological Survey, who had made an extensive reconnoissance all over the State, remarks in one of his Reports, that out of its nearly 40,000 square miles of area "all are inhabitable except that which is under water," and that even in the hilly region on the eastern border, on the flanks of the great Allegheny range, there is very little waste of surface—not a square mile—because of contour, and that the only really infertile soil is that on the small strips formed on the outcrop of the conglomerate on the edge of the coal-measures. No State, he adds, having so much mineral wealth, possesses so large an area of fertile lands.

Many causes have contributed to this fortunate result, and first:

Geological Causes.—The rock strata underlying the soil have been formed in very remote geological ages, and mostly under deep waters remote from its shores, out of earthy materials very finely divided. Only occasionally do we find, in coarse sandstone or conglomerate rocks, evidences of the violent action of the waters on shallow surfaces. Under the deep ocean which covered this portion of the earth's surface, when the ancient limestones and shales were formed which now underlie our soils, the mighty circulation of the waters caused by the greater

heat of the tropics as compared with that of the north polar regions—the upper warmer current constantly flowing to the pole while the lower colder one returned to the equator—tended continually to carry the lighter, finest particles, and the soluble portions of the disintegrating rocks of the north farther and farther south, and to deposit them in beds under the deeper waters of the existing southern ocean. The finer were the particles to a greater distance were they carried by the waters before, by gradual subsidence, they found a resting place as a sediment, which in the course of time was to become a rock.

Hence geologists inform us that, even in strata which had been deposited or formed at the same geological time, the rock layers at the North are sometimes formed of coarse-grained, insoluble, silicious material, while those farther South and West are limestones, or fine-grained shales, rich in phosphates and other soluble materials.

Another geological cause of the comparative fertility of Kentucky soils is, that these rock strata, out of which they were formed, and which are made up of the most finely divided or soluble materials, were raised above the general surface of the primeval ocean very early in geological history, and have therefore been exposed to the disintegrating influence of the atmospheric agencies for immense unknown ages, so that soils formed of these rocks alone have been gradually produced to a much greater depth than is to be observed in almost any other country. Soils thus formed, in place, out of the rock strata on which they rest, are called by writers *Sedentary soils*, and said to have usually little depth. They are hardly known over the broad expanse of our continent north and west of Kentucky, the whole of that extensive region being covered by a mixed deposit of clay, sand, gravel, and boulders, called the "Drift," made up of the debris of more northern rock strata, which have been carried, during long periods of polar refrigeration by the immense glaciers, which then covered a great portion of the Northern Hemisphere.

This mixed deposit—made up largely of coarse and hard silicious materials, which so covers the country of the great Northwest that scientific observers of the North have asserted that the soil is not affected by its underlying rock stratum—does not seem to have crossed the Valley of the Ohio river to enter Kentucky. The southern extremity of the polar ice-field seems to have been near the line of our latitude, and the great stream of water flowing from it, carrying its gravel and sand, deflected by the river valley and by the elevated tableland of our ancient rocks, was turned west of our State, leaving undisturbed and unburied the rich soil which had been produced in the long period during which those rocks had been raised above the ocean level.

Professor Shaler states (Rep. Ky. Geol. Sur., N. S., Vol. III, p. 208): "I have not been able to find in this Commonwealth any trace of ancient gravels which have come from north of the Ohio, the whole evidence going to show that there has been, within the time that a granite boulder can endure near the surface, no glacial action that could bring the northern drift any distance south of the Ohio."

To these fortunate geological conditions, therefore, are our Kentucky soils greatly indebted for their fertility and for the extremely fine state of division of their constituent particles. In the great majority of these soils analyzed by the present writer, the silicious particles, left after digesting the soils in chlorohydric acid, of specific gravity 1.1, all passed through a fine sieve, which had sixteen hundred meshes in the centimetre square. All scientific writers on soils attach the greatest importance to the relative fineness of the particles which form them. Mons. DeGasparin ("*Terres Arables*," 3me. ed., p. 33) says: "It must not be forgotten that the nutritive power of a soil, other things being equal, is in direct proportion to the fineness of the particles which compose it;" so much so, indeed, that when a soil is to be chemically analyzed, only the "fine earth," or that portion which will pass through a sieve having ten wires to the centimetre, is taken for the analysis, the coarser part being considered practically inert as to plant nourishment—only a skeleton, which is not to be taken into account when estimating the fertility of a soil; and this is especially true when the coarser particles are of quartz, or some hard silicate not readily to be disintegrated or decomposed by the ordinary process of weathering, or which do not contain any essential element of plant nourishment.

In this important particular our Kentucky soils are more valuable than the great body of those of the great Northwest: that not only are their constituent particles very minutely divided, but even these, fine enough to pass through the meshes of the finest sieve above described, are not entirely fine sand of *silica*, but contain a considerable proportion of fine particles of decomposable silicates, which in the process of weathering help to keep up the supply of essential plant food, and make the soils very durable. In some of his analyses of Kentucky soils the writer has found as much as 2.9 per cent. of potash in the fine silicious residue of a soil which was left after a week's digestion in diluted chlorohydric acid, but which would gradually be unlocked and made available for plant growth under the influence of time and the atmospheric agencies.

The late Dr. David D. Owen, former Director of the Kentucky Geological Survey, placed in the writer's possession a series of samples of soils which he had collected during his celebrated exploration of the great Northwestern Territory for the United States Government in 1847-'50; some of which the writer analyzed, giving the results in Vol. IV, O. S., Kentucky Geological Reports. These soils, characteristic of the best of this great prairie region, are mostly very dark colored, sometimes almost black, from the presence of a large proportion of organic matter, some of which is peaty or semi-bituminous—of little value for plant food—derived from the decomposing remains of many successive growths of grasses or aquatic plants in recent or former ages; but in them all, and in some of them in very large proportion, are visible grains of quartzose sand, reducing materially the quantity of "fine earth," and, consequently, the durability of these soils. While the organic matters, the dark vegetable mould, give to such soils great fertility at first, and cultivation is facilitated by the sandy ingredient, the durability of such soils, without the aid of artificial fertilizers, would be much less than that of our best Kentucky soils, which contain no coarse sand, but are altogether "fine earth," made up partly of decomposable silicates. By reliable accounts the older prairie farmers find it necessary even now to resort to artificial fertilizers, while on the best lands of Kentucky cropping for a hundred years has not yet brought about this necessity, nor will it perhaps for hundreds of years more, where the soil rests on a decomposable limestone which annually gives up in solution to the soil above as much essential mineral plant food as may be removed from it in a judicious system of culture.

The great extension of railroads, under the liberal donation of public lands for their construction, has offered great facilities and inducements to emigrants to occupy the northwestern territory. The railroad companies have spared no pains to bring their lands into the market and invite settlers, and the result is, that this broad prairie country, much of which, previous to the construction of these railways, was believed to be an uninhabitable desert, is now covered by the cities, villages, and habitations of an energetic and prosperous population, who not only raise grain and cattle enough for home consumption, but actually rule the provision market of Europe. But while the bounteous productions of the virgin prairie soil have thus made the older countries tributary to the present wealth of ours, the gradual diminution of the annual production of grain per acre in the older settlements, and the inevitable shifting of the centre of greatest grain production further west to newer lands, foreshadow the event.

Topographical conditions in Kentucky combine with the geological ones to enhance the value of her soils and promote her agriculture. Taking the general level of the territory of the State, and disregarding the secondary and local elevations and depressions, it presents a gradual slope of the country, from the highest summits or ridges on the southeast, where some of these waves of the Allegheny range attain two to three thousand feet above sea level, down to the lowest part of the State, in the southwest prolongation, where it is only about three hundred and fifty feet above the sea, giving good drainage, and a sufficient fall in her rivers.

This is a most important consideration to the agriculturist. No territory on the whole continent is better drained, naturally, than that of Kentucky. Every tiller of the soil is aware that no successful cultivation can be carried on upon an imperfectly drained soil. In this important particular, also, is Kentucky soil superior to that of much of the country in the prairie region of the Northwest, where sloughs and ponds and little lakes often interrupt the continuity of profitable cultivation, and produce malaria.

In other countries and States great expense is of necessity incurred by the land-owner in rendering his soil productive by underdraining; but in extensive regions in Kentucky, where some of her richest soils rest on limestone beds, nature has provided a most extensive system of underdraining; so that in the Blue Grass Region, so-called, and in that of the cavernous sub-carboniferous limestone, a swamp or slough is of most rare occurrence, and artificial underdraining is not generally necessary for the removal of surplus surface water. Moreover, most of the rivers of Kentucky during the long ages in which the rock strata have been elevated above the sea, have worn their beds down far below the level of the intervening table-lands, and hence natural drainage is almost everywhere good and sufficient.

Meteorological conditions in Kentucky are also quite favorable to agriculture. The annual rain-fall never falls much below forty inches, and sometimes is more than fifty inches, in which respect it has greatly the advantage of the great Northwest. Here the warm winds from the Gulf of Mexico, mingling with the colder northwardly winds, are made to deposit their moisture in abundance, with only occasional droughts in the hotter portion of the year; while over the vast unbroken slope of the prairies of the northwestern country the air currents from over the distant oceans give out but a scanty supply of this essential fluid, water, and as we go farther and farther west, even this gradually fails, so that

the cultivator of the ground is forced to rely on costly irrigation with the scanty streams derived from the melting snow on the mountain ranges.

This ample supply of water on Kentucky soil helped to make it a timbered country. Even now, after an extensive clearing of the woods here, and a great waste of what would be at this time most valuable timber, a very large area of the State is covered with trees of ancient growth, which are becoming more and more valuable. In this we present a great contrast with the prairie region; there the new settler, even recently, has frequently built his first hut out of the prairie sods, or the herder on the plains has sheltered himself and family in a hole or cave dug out of the slope of a hill; here the first settler finds such a surplus of timber that his first thought too often has been how best to destroy it. This system of destruction, in order to make room for the plow or the hoe, is now no longer necessary, when some single walnut tree on the out-lands of the State might bring the price of many acres of the land on which it stands. Timber is now rapidly becoming more and more commercially valuable, and as our railroads and other means of transportation are extended, the wanton waste of our forests will cease. But forests are valuable far beyond their money value for timber; they exert a marked influence on rain-fall by aiding the mingling of air-currents which cause the condensation of watery vapor and the fall of rain, as well as by the collection and retention of surface-water, which gradually feeds our springs and water-courses, obviating temporary devastating floods, and keeping up a wholesome equilibrium of irrigation and moisture.

Many countries which now are arid deserts, because mainly of the destruction of their forests rather than the exhaustion of their soils, were formerly well watered, and supported a dense population; and the general knowledge of these facts, as well as the increasing demand for, and value of, timber, will not only make the present extensive woodlands of Kentucky very valuable, but induce her intelligent settlers and inhabitants to adopt a judicious system of forestry, which will supply to the present and following generations a sufficient and constant supply of timber, as well as conserve the climate and productiveness of the region. This cannot too early be taken into earnest consideration. The settlers of the prairie region have, under inducements offered by the Government, planted out an immense number of forest trees, mostly, however, of *soft* woods of quick growth, and suited to the soil and dry climate; but *hard* wood is and will be scarce and dear in that region, while in Kentucky hard wood is native to the soil, and easily grown, and will

always be valuable, especially on the cheaper lands of the coal-measure hills, which are not so easily cultivated with the plow as those of the plains.

The tree-planting which has been done on the arid Western prairies has already somewhat improved the climate, and increased the rain-fall, so that the common remark of the uncultivated Indian is, that rain follows the white man wherever he goes.

With the natural advantages presented by Kentucky, it is somewhat remarkable that the prices of her lands are yet much below their intrinsic value, even when compared with those of the cheap lands of the Northwest.* Many causes, which we will not particularize, and which we hope are now measurably removed, have produced this effect. It cannot be long, however, before these advantages will begin to be appreciated; and with an extension of our internal improvements now in successful progress, not only will the uncultivated cheap lands of Kentucky be made to smile with harvests, but the development of her unequalled mineral wealth will offer an extensive home market for farm products. Perhaps no part of the United States offers at this time stronger natural inducements to enlightened settlers from other countries, who will bring energy, skill, or capital to aid in her development, than does Kentucky at this present time.

* Kentucky is practically free from debt—owing but \$180,000, and having on deposit that amount in cash to pay same—with about \$750,000 of available assets in addition. The State taxation is 45½ cents on each \$100, on a very low valuation of property. Of this amount 25 cents is for the purpose of revenue, 20 cents for Public Schools, and ½ cent for the State Agricultural and Mechanical College.—J. R. P.

WHAT CONDITIONS IMMIGRANT FARMERS FROM GREAT BRITAIN MAY FIND IN KENTUCKY.

The old country farmer or farm laborer, brought up and trained under certain local conditions as to methods of farming, various crops and social customs, must necessarily become a learner in some respects and for a time, and be obliged to relinquish some old-established habits of life and of management, when he emigrates to this new country. Hence, the climate, crops, and methods of farming are, in some respects, different from those to which he has been accustomed, as well as the habits of the people.

The intelligent and educated English farmer, however, will find this but a temporary inconvenience. He can readily learn the nature of our peculiar crops, and in a short time acquire from the native farmers the modes of husbandry best adapted to them. To him there will be no great difficulty in laying aside for a time the local prejudices or prepossessions of his home training, and in adapting himself to the new conditions of this country.

Indeed, after a brief apprenticeship in making himself acquainted with our different climate, crops, and husbandry, he may, in consequence perhaps of his wider experience in modern scientific agriculture, find himself able to improve our farm methods, and to become a teacher instead of a learner.

Notwithstanding the local differences between farming in the old and in the new country, many farm products are necessarily the same in both. Our great staple, Indian corn (maize), it is true, is unknown as a crop in Great Britain, and hemp and tobacco, great staples here, are but little cultivated there; but our farm animals are just the same. Horses, mules, sheep, and hogs are profitable live stock here, and we cultivate the same grasses, and raise wheat, barley, rye, and oats, flax, &c., here as they do in Great Britain.

The celebrated "Blue-Grass" of the rich limestone region of Kentucky, is the "smooth-stalked poa or meadow grass" of England (*Poa pratensis*). The timothy or herd grass (*Phleum pratense*), the orchard grass (*Dactylus glomerata*), as well as other good grasses grown in Great Britain, flourish here, and the clovers, especially the red clover (*Trifolium pratense*), are used with great advantage on all our soils generally, not only for pasturage or for hay, but for fertilization. Our Indian corn, so very productive here, supersedes many of the feeding and fattening stuffs of England, furnishing food for both man and beast. It figures

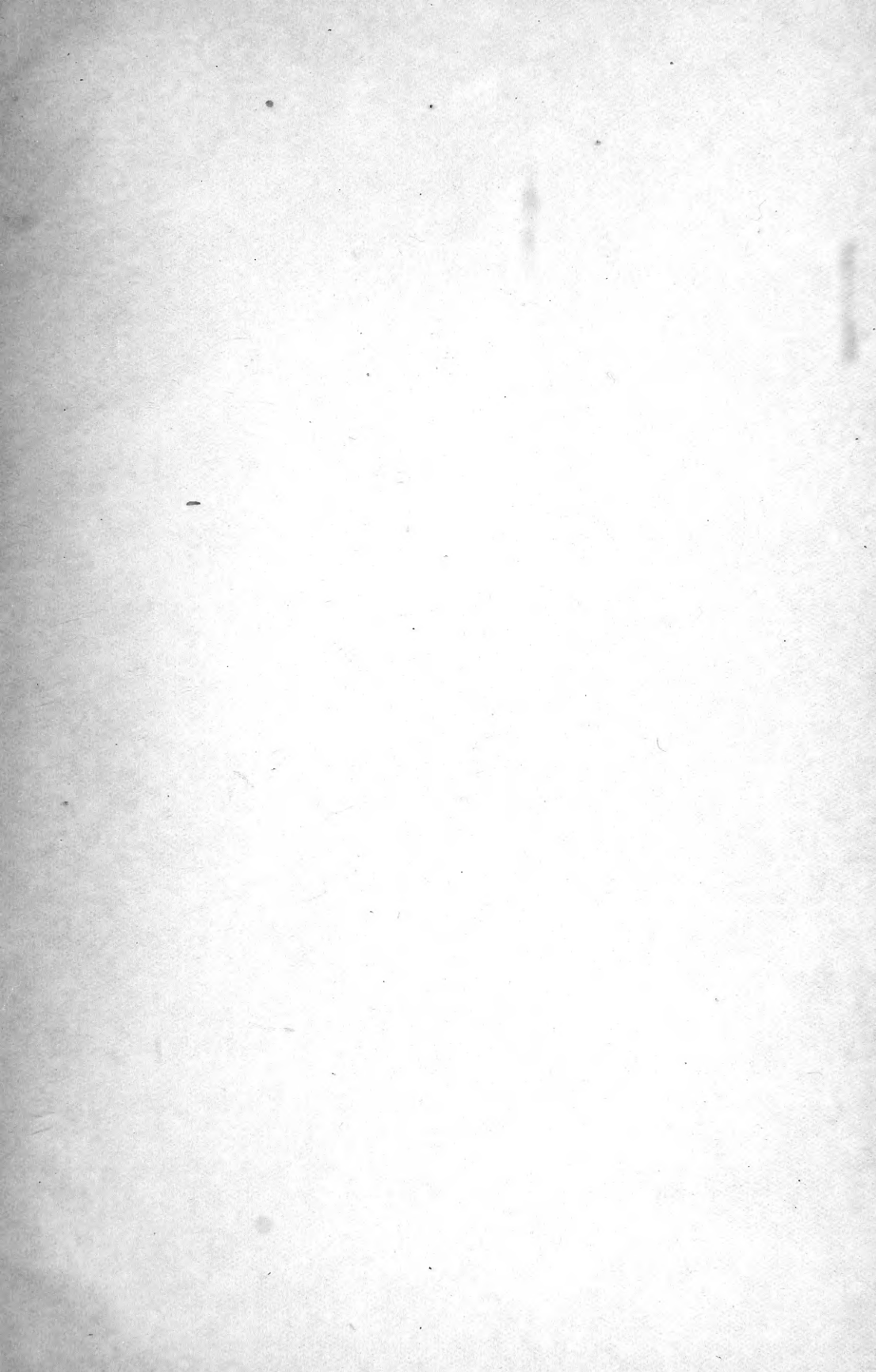
largely amongst our farm products, and takes the place of many of the minor crops of the older country.

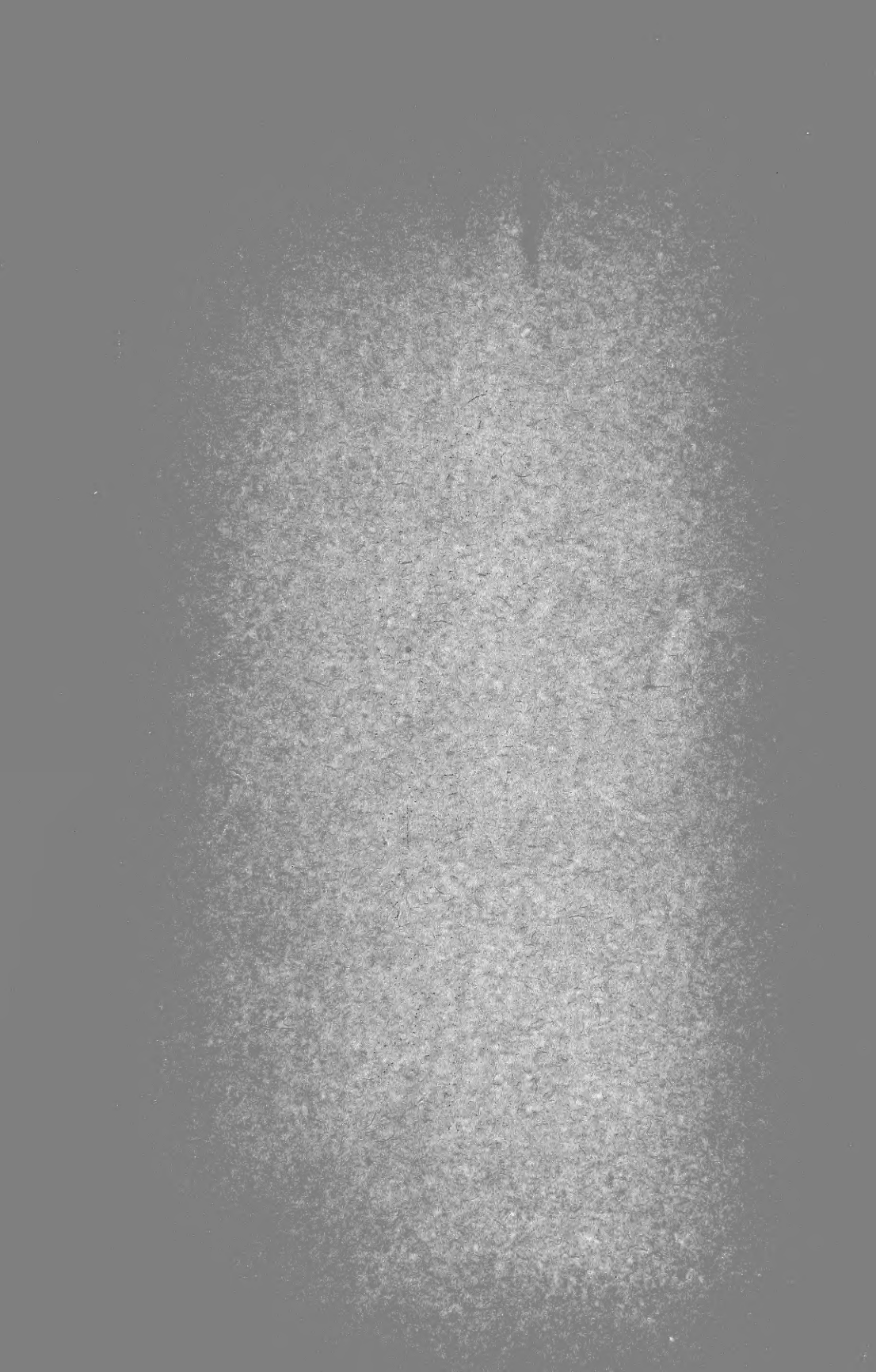
The knowledge and experience of the intelligent English farmer in the management of the soil to maintain or increase its productiveness would be of great value in this region, where our native farmers have much to learn in this relation; and his skill in the raising and management of live stock could be of great service to him here. If he has capital enough to purchase a stock farm in the rich "Blue-Grass" region, and to stock it with animals of improved breed, he would, with skillful management, find a ready and profitable market for many years to come. The Blue-Grass soil, quite rich in phosphates, produces finer horses and better cattle and hogs than almost any other part of our territory, and requires less expenditure for fertilizers. Hence, naturally, it is held at a higher price than the lands on the other geological formations generally, and is all occupied and cultivated. The immigrant with limited capital would necessarily look for cheaper and newer land, yet in the forest, in the less closely settled portions of the State, of which there is an abundance at very low prices; and there, as already stated, the native timber on the land may, by judicious management, be made a source of considerable profit to him, more especially if it is near a railroad or other means of cheap transportation.

The lands even of the hilly regions of the coal-formation of the State are well adapted to sheep husbandry. Indian corn and the small grains, and various grasses, flax, potatoes, and other products, may be profitably cultivated in the valleys and on the table-lands, and some of the slopes of the hills, which last mentioned situations are also well adapted to apples, peaches, pears, grapes, and all the fruits and garden products of the temperate zone.

The new country, however, requires adaptation on the part of the cultivator to the new conditions, as already mentioned, and the pioneer farmer must expect to turn his hand to many things which do not need his attention in his old home country, as well as to lay aside some of the old habits and customs in which he has been trained from his youth upward. But the grand compensation to him will be, if he is a good manager and of industrious habits, that he may become a fee-simple freeholder of landed and other property, which will annually become more valuable, in a free country of equal rights and very moderate taxation; and if he is near a market, his farming and gardening may not only give ample support to his family, but yield a good and increasing income.

The English farm laborer, accustomed to earn a very scanty pittance at home by daily labor, not having enjoyed the advantages of much early education, and having probably been trained on the farm to one special kind of labor only, may perhaps find it more difficult than will the capitalist or the renter to adapt himself to the new conditions of this country. But if he is a man of good common sense and morals, and is not too old to learn, and is willing to be taught, he may very greatly improve his own condition here, and leave his children the patrimony of an improved social position, obtained by improved early education and an increase of his worldly goods. If he has no capital but his ability to labor and the farm training he has received, he may readily find profitable employment on the richer lands of the State in taking charge of live stock and in the common work of the farm; or, if he be a trustworthy man and a good farmer, he may either rent land or cultivate on the shares. It is true he may be obliged to give up some of his old time-honored habits and customs, and learn to do many things he never was required to do at home; but he will soon find, if he is not too intensely wedded to the old notions peculiar to his own country, that he is more than doubly paid for the change by the greater advantages and profits of his new situation. His daily beer, considered a *sine qua non* by the English farm laborer, may not at all times be at hand for him here, but his daily ample meal of meat will soon enable him to forget its absence; and moreover, he may find his head clearer and his body more healthy and strong under the daily meat diet than with the daily use of malt liquor. But, above all other considerations, we would place that of his ability to greatly improve the condition of his family, and to leave his children citizens of a republic in which labor is honorable and all men equal in their civil and political rights.





SMITHSONIAN INSTITUTION LIBRARIES



3 9088 00826 8781