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UNITED STATES OF AMERICA.

THE
RESOURCES OF THE UNITED STATES
FOR
SHEEP HUSBANDRY AND THE WOOL
MANUFACTURE.

AN ADDRESS

DELIVERED BEFORE THE NATIONAL AGRICULTURAL CONGRESS, AT
NEW HAVEN, CONN., AUGUST 29, 1878.

BY

JOHN L. HAYES, LL.D.,

SECRETARY OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS.

PUBLISHED UNDER THE DIRECTION OF THE MASSACHUSETTS SOCIETY FOR
THE PROMOTION OF AGRICULTURE.

BOSTON:
11 PEMBERTON SQUARE.

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IN the middle of the last century there lived in England a gentle scholar, by name John Dyer, whose discursive mind had led him to forsake the profession in which he was initiated, and in which his father was distinguished, — the law, — for art and literature. Entering the Established Church, according to the ideas of his time and country the most suitable field for these pursuits, his productions — notable among which was a poem on Grongar Hill, a word picture of English scenery — gained him patrons. To his first very modest living were added others, until, in the evening of his life, he found the competence and repose which enabled him to write, and to publish in 1757, his chief work, the great English pastoral poem, the "Fleece;" its topics being the "care of sheep, the labors of the loom, and the arts of trade." Notwithstanding the affectations of style peculiar to the period, and the traditional treatment of a pastoral subject, this work — as an exhaustive treatise on the sheep husbandry of the period, as a representation of the then existing textile arts, as a pictorial map of the course of British

trade, and as a repository of all the classic traditions and associations connected with sheep husbandry and wool manipulation—is one of the most valuable legacies left us from the “silver age” of British literature.

The poem, however, never became popular, in spite of the tribute to the author by his contemporary and brother-poet, Akenside, who declared that he would regulate his opinion of the reigning taste by the fate of Dyer’s “Fleece;” for, if that were ill received, he would not think it any longer reasonable to expect fame from excellence.

Dr. Samuel Johnson, to whose coarse mind all common things were ignoble, says of this poem, “It is universally neglected, and I can say little that is likely to call it to attention. The wool-comber and the poet appear to me to be such discordant natures, that to attempt to bring them together is to couple the serpent with the fowl. When Dyer, whose mind was not unpoetical, has done his utmost by interesting the reader in our native commodity, by interspersing rural imagery, and, incidentally, by clothing small images in great words, and by all the arts of delusion, *the meanness naturally adhering and the irreverence habitually annexed to trade and manufactures* sink him under insuperable oppression.” We might wonder at this illiberality on the part of so great a scholar, if we did not consider that, within the memory of most of us, similar sentiments as to trade in all products but one, and as to manufactures in general, prevailed among the most cultivated classes in many of the proudest States of our own country.

Over a century has passed since Dyer (to use Johnson’s clumsy witticism) was buried in his woollens; but how much wiser now seems the poet than his illustrious critic! The poet saw in the fleece and the loom the great source of England’s commercial supremacy. He doubtless remembered the words of the quaint old “Golden Fleece,” published just a hundred years before his time: “Wool is the flower and strength, the blood and the revenue, of England.” With prophetic vision, he pictures the towns which were to spring up through the trade in fleece and web. As was the scene which Virgil describes, of

“ Hurrying Carthage, where the Trojan chief
 First viewed her growing turrets . . .
 . . . the echoing-hills repeat
 The stroke of axe and hammer ; scaffolds rise,
 And growing edifices ; heaps of stone
 Beneath the chisel beauteous shapes assume
 Of frieze and column.”

How far do Bradford, Leeds, Huddersfield, Halifax, — all built up by the wool manufacture, and mostly since the poet’s day, — surpass his predictions ?

Looking beyond the seas, he sings,

“ A day will come,
 When through new channels sailing we shall clothe
 The California coast.”

And he continues, —

“ That portion, too, of land, a tract immense,
 Beneath the Antarctic spread, shall then be known,
 And new plantations on its coast arise.
 Then rigid winter’s ice no more shall wound
 The only naked animal ; but man
 With the soft fleece shall everywhere be clothed.”

California, with its six million sheep and its magnificent mills, and Australia with its flocks of over sixty million, almost literally contributing clothing from their soft merino fleeces to the whole world, are more than fulfilments of these prophecies ; for what is predicted of Englishmen may be claimed for all their descendants. The Australian wool trade, centring in London, employs more tonnage than all the British trade in wool textiles did a hundred years ago. Thus is verified the poet’s description of London, where trade, “ enthroned amid a thousand golden spires, gives audience to the world ;” and his lines, —

“ What bales ! what wealth ! what industry ! what fleets !
 Lo, from the simple fleece how much proceeds !”

Dyer lived in the time when the work of spinning and weaving, conducted only in scattered households, began to be concentrated in large buildings employing many workmen.

The change of system was very salutary in its effect upon the moral character of the work-people, and was hailed with delight by the benevolent. The first experiment of concentrating textile labor was made in the workhouses of Bristol and Birmingham. The poet carries his reader to one of these houses, in which he

“ Views with wonder and with silent joy
The sprightly scene, where many a busy hand,
Where spoles, cords, wheels, and looms with motion quick
And ever-murmuring sound, th’ unwonted sense wrap in surprise.”

This was the dawn of the factory system, which created the existing textile manufacture; covering England with its palatial mills, and employing, in cotton alone, 35,000,000 spindles, 400,000 looms, and 650,000 workmen.

The poet lived also in the time when the ancient distaff was still used for spinning in Norwich and Suffolk, and when the double-spoiled wheel was a novelty. But the marvel of his time was Paul’s invention of roller spinning; in which rollers or cylinders, through which the wool or cotton is drawn, are the mechanical substitutes for the thumb and finger of the hand-spinner, — an invention often, with great injustice to Paul, attributed to Arkwright. Dyer gives the first contemporary description of this invention, his book having been published three years before Arkwright took out his first patent.

“ But patient art,
That on experience works from hour to hour,
Has a spiral engine formed,
Which on a hundred spoles, an hundred threads
With one huge wheel by lapse of water twines,
Few hands requiring; easy-handed work,
That copiously supplies the greedy loom.
 . . . it draws and spins a thread
Without the tedious toil of needless hands.”

The carded wool, he says, —

“ Is smoothly wrapped around those cylinders
Which, gently turning, yield it to yon cirque
Of upright spindles, which, with rapid wheel,
Spin out in long extent an even twine.”

The introduction of this simple machine, it would seem, was looked upon with apprehension by the spinning women of the time (the absurd notion, recently revived, that machinery destroys the laborer's occupation, prevailed a century ago); for the poet continues, —

“ Nor hence, ye nymphs, let anger cloud your brows ;
 Blithe o'er your toils with wonted song proceed ;
 Fear not surcharge : your hands will ever find
 Ample employment.”

Could he have dreamed that an improvement which seemed so vast, because it increased the spinner's power a hundred-fold, would be developed, as it is now, so that one mill in a single day, with the expenditure of force derived from seven tons of coal, can do the work of seventy thousand spinners of former times.

I have referred to this poem, partly that I might anticipate the objection which may be made to the meanness of my subject; partly to suggest that my seeming exaggerations may in time be disproved, as in the case of the enthusiastic poet; and partly to invite the attention of my sheep-growing friends to a work so obsolete that no American edition of it has ever been published, but in which they will find a source of that delight which comes from weaving into the web of the homeliest pursuit the golden threads of poetic thought and classic associations. Do not believe, with the great moralist, that the poet and the wool-grower or wool-worker are of "discordant natures." No grower ever bred a flock of perfect fibre and form, no workman ever designed and executed an artistic fabric, who was not impelled by that enthusiasm, that passion for the ideal, which is the soul of poetry. The wool-comber and poet of discordant natures! Look at Heilman of Mulhouse, the inventor of the mechanical wool and cotton comber, — an invention which has revolutionized the wool-growing of the world as well as the wool manufacture of the world. Heilman was a contemplative dreamer, — what some would call a "fancy man." Idly watching his daughters as they combed their luxuriant hair, the idea of his wool-comber flashed into his mind from the methods which they used. And thus it may be said that an invention

which ranks among the very first in the century (for all the manufacture of women's worsted dress-stuffs is due to it) was made by one of those dreamers whom the elegant Buckminster describes, after Milton, as those who

"Sport with Amarylis in the shade,
Or with the tangles of Neera's hair."

I have still another reason for my reference to the English pastoral. I owe to it directly the line of thought which I shall endeavor to follow in this discourse. Its dominant sentiment is exultation in the possession by Britain of a commodity which has enriched every nation possessing it. Inspired by this idea, I obey the patriotic instinct due to my British descent, and select for my topic the "Resources of the United States for Sheep Husbandry and the Wool Manufacture."

I do not for a moment doubt the appropriateness of this theme for a national congress of farmers. There is no department of agriculture so cosmopolitan and unsectional as wool production and its incidents. Unlike the production of any other textile, or even of the cereals, it can be pursued with advantage in one or other of its forms in every State, and almost every county, in our national territory. England and New Jersey show its fitness for the oldest-settled countries and the contiguity of cities; Australia, California, and Colorado, that it is the pioneer industry for new States. Russia, Shetland, and the sea-girt islands of Maine show its resistance to the rigors of cold. The most southerly country in the Union, Nueces and Starr Counties in Texas, with their 700,000 sheep, show that it endures the heat of the semi-tropics, although the genial influences of more temperate latitudes may be specially manifest in the fleeces of Ohio and the Panhandle of Virginia. There is no soil so arid that it will not respond to the marvellous fertilizer which the sheep affords in its manure, and none so permanently rich that in time it may not need this best of all restoratives. Though on a large scale, and as an exclusive pursuit, fitted better for cheap lands and purely pastoral regions, it may be a most profitable adjunct to our most important husbandry, — the wheat culture; while there is no cotton plantation, dairy farm,

or tobacco farm (as I shall hereafter show) where it may not be a valuable subsidiary, or usefully fill up some gap. Incidental to wool-growing is the production of mutton; through which, above all other means, the cost of animal food, the heaviest item of necessary expense in every household, is kept within reasonable limits. Incidental, again, to wool production is its manufacture; the woollen-mill invariably appearing where flocks are abundant and power at command. Thus the farmer has a market for his fleeces at his own door. Exchanging wool for cloth, without intermediary expenses, he finds the second great item of household expenditures — that of clothing — lessened by his sheep. This is not all: the woollen-mill is the first harbinger of a developed industry in an agricultural country. Other manufactures follow; a market is opened for crops which will not bear transportation. With a developed husbandry, lands increase in value; and, although the mills may pay no dividends, the prudent farmer is sure to thrive. This is no fancy sketch. When a boy, I saw the foundation laid of the first woollen mill on the Salmon Falls River, within a mile of my father's flock of three hundred merino sheep. This river now moves one hundred and thirty-two thousand cotton spindles and fourteen sets of woollen machinery. The mills, it is said, have not averaged three per cent annual dividends since their first establishment. But the valley in which they lie has become a paradise of prosperous farmers.

To fully comprehend the blessings we enjoy in our present opulence in sheep and wool, we must consider our resources at the commencement of the centennial epoch. It is difficult to conceive the poverty in woollens of the masses of the American people a hundred years ago. The soldiers of our Revolution were chiefly clothed in linen. Wool in Philadelphia, at the commencement of the War of the Revolution, cost seven shillings a pound. Although New England was best supplied with wool, Mr. Otis said, during the war, that there was not enough wool to furnish each inhabitant with a pair of stockings. The Assembly of Pennsylvania, by a resolution, recommended the people to abstain from eating, and the butchers from killing, sheep.

And the rich people of Philadelphia (the most opulent city in America) were urged to adopt the fashion of wearing leather doublets. Even the officers of our army were so ragged that, when guests at Baron Steuben's table, they were called by him, in friendly banter, his merry *sans-culottes*. In our last war, we clothed, mainly from our own flocks, 2,655,576 soldiers (the precise number) as no army was ever clothed before; and, at the close of the war, had a surplus in overcoats alone nearly sufficient to furnish an overcoat to one-third of all the voters in the United States.

It is related that General Lafayette, during the War of the Revolution, was invited by the ladies of Baltimore to a ball. He attended; but, instead of dancing, made this address to his fair hosts: "You are very handsome, you dance very prettily, your ball is very fine; *but my soldiers have no shirts.*" Of course the appeal of the gallant young Frenchman was effectual in procuring a liberal supply. During our late war, of shirts in their orthodox meaning, — under-garments of cotton or linen, — it might be said, in Falstaff's words: "There's but a shirt and a half in all the company." But the abundance of wool caused the substitution of wool for cotton underclothing, and procured the supply by the government of woollen shirts and drawers, blouses and stockings, to which the excellent hygienic condition of our armies has been largely attributed. Mr. Hazard, a veteran wool manufacturer of Rhode Island, informs me, that he remembers that before and up to 1800, when he commenced the first manufacture of linsey-woolseys, the half-grown girls in the country districts of the Providence plantations were commonly nearly as naked as savages, and invariably hid themselves at the approach of a traveller. Now a single mill, in New England, making exclusively women's dress-stuffs, consumes for this purpose, every week, the fleeces of ten thousand sheep.

The number of sheep in the United States on the first day of January, 1878, as estimated by the eminent statistician of the Department of Agriculture, Mr. J. R. Dodge (than whom there is no higher authority), was* : —

* The tables were illustrated in the lecture by large charts.

Maine	525,800
New Hampshire	239,900
Vermont	461,400
Massachusetts	60,300
Rhode Island	24,500
Connecticut	92,500
New York	1,518,100
New Jersey	128,300
Pennsylvania	1,607,600
Delaware	35,000
Maryland	151,200
Virginia	422,000
North Carolina	490,000
South Carolina	175,000
Georgia	382,300
Florida	56,500
Alabama	270,000
Mississippi	250,000
Louisiana	125,000
Texas	3,674,700
Arkansas	285,000
Tennessee	850,000
West Virginia	549,900
Kentucky	900,000
Ohio	3,783,000
Michigan	1,750,000
Indiana	1,092,700
Illinois	1,258,500
Wisconsin	1,323,700
Minnesota	300,000
Iowa	560,000
Missouri	1,271,000
Kansas	156,600
Nebraska	62,400
California	6,561,000
Oregon	1,074,300
Nevada	72,000
Colorado	600,000
The Territories	2,600,000
Total	35,740,500

The prominent facts shown by this table are, the extension of sheep husbandry in the new Territories: California, 6,561,000, ranking first; Texas, 3,674,700, third. Oregon, Colorado, and the Territories have over four million. This increase in Texas and new States of the West is partially due to a transfer of sheep from the old to the new States. Ohio, which is credited with 3,783,000 sheep, had, in 1868, 7,622,495. In some of the New England States, sheep husbandry has greatly declined, largely through a change to dairy-farming for supply-

ing milk to the cities, Massachusetts, Connecticut, and Rhode Island, together, having only 177,000.

In comparing former periods, we find that Massachusetts, in 1640, had 3,000 sheep; Virginia, 1649, the same; the New Netherlands, in 1643, had but sixteen sheep.

The first attempt for an accurate estimate of sheep in the country in more recent times, within my knowledge, is a statistical view of the number of sheep in the several towns and counties of New England and the other principal wool-growing States, in 1836, by Messrs. Benton and Berry. The number returned by them, is shown in the following table:—

Maine	622,619
New Hampshire	465,179
Vermont	1,099,011
Massachusetts	373,322
Rhode Island	81,619
Connecticut	255,169
New York	4,299,879
New Jersey	250,000
Pennsylvania	1,714,640
Delaware	150,000
Maryland	275,000
Virginia	1,000,000
Ohio	1,711,200
Kentucky	600,000
Total	12,897,638

Vermont and New Hampshire had then nearly twice as many sheep as they now have; Connecticut, two and a half times as many; Rhode Island, a little more than three times as many; and Massachusetts, six times as many.

The progress in sheep husbandry is not shown merely by the increase in the number, but by the increase of wool production; for careful culture, and the introduction of different races, have increased the quality of wool in a greater ratio than is shown by the increased number of sheep. Messrs. Benton and Barry estimate our wool-product in 1836 at 41,917,324 pounds. The census returns for 1860 place our wool production in that year at 59,673,952 pounds. The estimate, I think, is too small. In 1866, according to the estimates of Mr. Lynch (a most reliable authority), the clip of the old States had reached

120,000,000 pounds; and that of the Pacific States and Territories, 17,000,000 pounds, — a total of 137,000,000 pounds. The period from 1860 to 1866 was marked by the war and Morrill tariff, both influences highly stimulating to wool-production. In 1877, there was a production in the old States of 117,000,000 pounds; and in the Pacific States and Territories, of 208,000,000 pounds. Thus, with less than half the number of sheep in the old States, the wool-production in the whole country is five times as great as in 1836.

As it is always interesting to compare our own resources with those of other nations, I have shown on this chart the number of sheep in the world, as estimated by Messrs. H. Schwartze & Co., of London, competent authorities.

ESTIMATE OF THE NUMBER OF SHEEP IN THE WORLD.

	Year of Return.	No. of Sheep.
United Kingdom	1876	32,252,579
Russia	1870	48,132,000
Sweden	1873	1,695,434
Norway	1865	1,705,394
Denmark	1871	1,842,481
Iceland	800,000
Germany	1873	24,999,406
Austria	1871	20,103,395
Switzerland	1866	447,001
Holland	1873	901,515
Belgium	1866	586,097
France	1872	24,589,647
Italy	1874*	6,977,104
Spain	1865	22,054,967
Portugal	1870	2,706,777
Total Europe (excluding Turkey and Greece), about		190,000,000
Australasia	1875	62,000,000
Cape	Estimate	16,000,000
River Plate	"	60,000,000
North America	"	50,000,000
Remainder of America	"	6,000,000
Total		384,000,000
Turkey, North Africa, Persia, &c., say		65,000,000
India and China, say		35,000,000
Grand total		484,000,000

* Recent statistics place them at 9,000,000.

THE CHARACTERISTICS OF AMERICAN SHEEP HUSBANDRY.

The numbers of sheep grown in a country convey a very inadequate idea of the nation's resources. The character of the animals is of the first consideration. The sheep of the United States consist, first, of what are called the native sheep, which are descendants of the unimproved coarse-woolled English sheep first introduced (apparently of the old Leicester race), before Bakewell's improvements. Their product of wool in the extreme Southern States, where the old race is most characteristic, is about two pounds to the animal. The mutton, though not fat, is considered excellent. Second, descendants from the improved English races, principally brought from Canada. Third, the Mexican sheep found in Texas, New Mexico, Colorado, and California; a hardy, though a coarse and sparsely-woolled sheep, descended from the Chourro race in Spain,—that country not permitting the fine-woolled sheep to be exported, even to her colonies. Fourth, the merino sheep, and crosses of that breed with three other named races.

The merinos constitute the principal and characteristic race in the United States. This is the most important fact in the enumeration of our resources for sheep husbandry and the wool manufacture. England has no merinos, except in her colonies; Russia, with sixty-five million sheep, has but twelve million merinos; France, but nine millions. Although the numbers in this country cannot be exactly given, the merinos and grades in the United States probably exceed twenty-five million. Merino wool is for clothing what wheat is for food: it is the chief material for cloth at the present day, entering into the coarsest as well as the finest. While the softest, it is the strongest, of all wool fibres, from the number of filaments which may be spun in a yarn of a given diameter. From its fulling and spinning qualities, or what is sometimes called its carrying power, it is the best adhesive for the cheaper fabrics,—coarser wool, cotton, or shoddy; the mixture of merino wool increasing indefinitely the materials for cheap clothing. Abundant merino wool is the greatest boon the world has received from the animal kingdom

in the last century. It is literally, in its extended culture, the product of the last century. A hundred years ago, all the merinos in the world, confined exclusively to Spain, did not, it is believed, number a million. 1765 marks the epoch of the first exportation of the merinos to Saxony; 1786, to France; 1803, to Australia; 1802, the introduction of the first merino sheep, whose descendants are known to have survived, to this country. The fact should be specially commemorated here, that to a Connecticut citizen, General Humphreys, and to the introduction to his farm, contiguous to this very city, of twenty-one rams and seventy ewes of the merino race, may be directly traced the most celebrated breeds of the American merino, and those through which our flocks have been chiefly ameliorated; producing individuals actually sold for \$5,000 each, others for from \$2,000 to \$3,000, and one for which \$10,000 was refused. The years 1809 and 1810 were the periods of the introduction of 3,850 merino sheep, by Consul Jarvis of Vermont, and about 2,500 by others, but all from the prime flocks of Spain; these flocks having been confiscated by the Spanish government, because the grandees, to whom they had belonged, had joined the French. The sheep above mentioned formed the source of all the merino sheep in the country, with the exception of the very few sheep of the Saxon blood now remaining, whose parents were introduced from Germany in four years, commencing in 1824, about 3,000 having been imported in that period. It is worthy of especial notice that our merinos were directly derived from the best flocks of Spain, before their decline; and that the new characters, impressed upon the original Spanish race, are all of our own creation.

I would like to dwell at length upon that greatest marvel in the history of our domestic animals, — the isolated existence in Spain, for centuries, of this race of the merino. That it was a creation of man, I cannot doubt; but when and how will always remain a mystery. To those who wish to study this question, I would recommend the perusal of an admirable essay on the origin of the merino sheep, written by Mr. George William Bond, and published in the seventh volume of the “Bulletin of the National

Association of Wool Manufacturers." I cannot refrain from adverting to a single point brought out by Mr. Bond's essay. The name "merino" is supposed by some writers to indicate that this race was imported from beyond the sea. Others declare it to mean "wandering," being identical with transhumantes; the sheep being moved from one section to another, according to the season. Doctor E. Oldendorff, in a learned communication, which will be published in our Bulletin, repudiates both these suppositions, and derives the name of the sheep from officers known under the ancient Spanish law, as *Merinos Majores* and *Merinos Minores*, the duty of the former being to distribute the pasture-lands to the transhumantes sheep; and that the flocks were called merinos after the officers who had care of them.*

The fibre of the merino sheep is not the only excellence of the animal. When properly bred, this race has a hardiness or (as the French call it) *rusticity* surpassing all other high-bred races. The yolk or soap (fat and potash being its chief constituents) which nature provides to assist the growth of the wool, abounding in this race more than any, causes the tips of the fleece to be cemented, and, with the assistance of the interior yolk, causes the fleeces to be impenetrable to the rain and snows. A lighter pasture suffices for their sustenance than would support the mutton races. Unlike the mutton sheep, the merinos *herd* admirably well; that is, keep while travelling or moving from pasture, in compact flocks, easily tended by the shepherd or his dog. They will thrive well in flocks of from 1,000 to 1,500 head. The wool, in this race, being of more importance than the mutton, and, being more easily transported than any other agricultural commodity, distance from a market is but a little impediment to their culture. This race is therefore fitted, above all others, for the remote pastoral lands, and for culture on a large scale. Another quality of the merino race is of peculiar value in certain districts. This is, the power which it possesses of imparting its qualities to inferior races, the

* Mr. Livingston gives the same derivation in his treatise on sheep, published in 1813.

male animals possessing what is called *prepotency*, — a characteristic of long-established races. The merino gives scope to the breeder's highest art; which is, in the words of Polixenes, in Shakespeare's charming pastoral, the "Winter's Tale," to

"Marry
A gentler scion to the wildest stock,
And make conceive a bark of baser kind
By bud of nobler race."

A continuous use of merino bucks builds up, upon a stock of inferior ewes, a flock of fine and densely-woolled animals, with marvellous rapidity. A Mexican ewe shearing one pound of coarse wool, if bred to a pure merino buck, will produce a lamb which, when one year old, will shear at least three pounds of much finer wool; and the produce of this lamb, if a ewe and bred to the merino, will go up to four and a half or five pounds of still finer wool.

The South has enough hardy ewes, obtainable at a cheap price, upon whom this transformation may be made, to stock her country. Texas, New Mexico, Colorado, and Mexico possess, or can easily obtain from Mexico, the Mexican sheep of the Chourro race, — a race distinguished for its robust temperament, the facility with which it is nourished, and its resistance to hunger and tempestuous seasons. It is from these qualities of the merino, and from our having in the old States an ample supply of regenerators specially adapted to the demands of the new States, that sheep husbandry has advanced in California, the trans-Missouri regions, and Texas, with a rapidity equalled only in Australia and the Argentine Republic. In those States it is no longer, as thirty years ago, an adjunct to other farming. It has become an exclusive pursuit. Single proprietors in California have as many as 100,000 sheep. One proprietor could, in 1875, show a flock of 14,192 pure merino ewes descended from 400 pure merino ewes purchased in 1862, besides the males which had been reared or slaughtered. There are single proprietors in Texas having 30,000 head. One Texas gentleman informs me that he has 15,000 sheep on a ranch of 80,000 acres, all of which is enclosed with a wire fence. The rapidity with

which the increase takes place seems inconceivable to those who do not know the laws of arithmetical progression. According to my Texan informant, who has given me the data in precise detail, the increase which may be counted on is eighty per cent. The flock-master, commencing with enough range next October, with 1,600 ewes, will have, March, 1880, 4,160 head; in March, 1881, 6,400 head; and in March, 1882, — less than four years, — 9,280 head from his original flock of 1,600 ewes. The flocks in Texas are entirely, and in California mainly, founded upon the Mexican or Chourro stock. The improvement in the general clip from these States each year is signally observable to the expert purchaser.

While the new States may boast of their immense flocks, the old sheep-growing States are the sources from which these flocks are sustained or regenerated. And thus the decline of sheep husbandry in some of the States of the North is more apparent than real. To appreciate the value of the infusion of blood from the merino flocks of the North, we must note in more detail the national resources for sheep husbandry which we derive from our own improvement of the merino race. Our breeders have established a distinctive variety of this race, having its characteristics, like the Saxon or French merino, and presenting essential differences from its Spanish ancestors, or any other merino family. This race is recognized as the American merino. The State of Connecticut can claim the honor of taking the first steps in this improvement. One of her citizens — Stephen Atwood, of Woodbury — bought a ewe from Colonel Humphreys, in 1813, which he bred to rams of pure Humphreys' blood until 1830, when he used rams from his own flock. This flock was kept pure, and had become so much improved as to attract the attention of breeders throughout the country; among others, that of Edwin Hammond, of Middlebury, Vermont, who, between 1844–46, purchased the principal portion of the ewe lambs of Mr. Atwood's flock. With this material, he developed, in the short space of about fifteen years, the race recognized throughout the world as the typical American merino. Mr. Hammond's stock was the foundation

of the principal breeding flocks in the country ; and his standard and methods have at least been the guides for the most successful breeders. I do not propose to follow out in detail Mr. Hammond's achievements. I will state only some of the present results accomplished through him and his successors.

The weight of Spanish merinos at the commencement of this century was, for rams, from forty-two to one hundred pounds ; for ewes, from thirty to seventy pounds. The average weight of the unwashed fleeces of the rams was eight and a half pounds ; of the ewes, unwashed, five pounds. At the present time, in a characteristic breeding section, — the Valley of the Genessee, New York, — of which I have authoritative information, small flocks, containing from fifty to a hundred breeding ewes, will, in some instances, average upwards of fifteen pounds of unwashed wool each ; while selections of ewes, not in breeding, often shear from eighteen to twenty-two pounds unwashed wool, which scours from six to seven and a half pounds. The live weight of these ewes reaches from ninety to one hundred and thirty pounds, the stock rams produce from twenty-six to thirty-six pounds unwashed wool, having a weight of from one hundred and fifty to one hundred and ninety pounds.

It is obvious that, with this great increase of size, the flesh-producing qualities of the animal have been equally increased with its wool-bearing aptitudes. These sheep are not referred to as types of flocks most desirable for the farmer or the wool-manufacturer. They are deformed by wrinkles, have an excess of yolk, and produce not fine, but *medium* wools, though fortunately these medium wools constitute the great bulk of the fleeces in demand for our manufactures. These sheep are bred specially to produce rams for sale in the States at the South and West possessing the native or Mexican sheep. To improve the inferior sheep, it is found that the rams must possess certain qualities in an exaggerated degree.

It is claimed by the breeders that the constitution of these

* See in Appendix the statement of Mr. W. G. Markham, President of the New York Wool-Growers' and Sheep-Breeders' Association, kindly prepared by him at my request.

animals, evinced by a carcass modelled after the type of a short-horned bull ; great density, rather than length, of fleece ; a complete covering by the fleece of the body, hind-legs, and belly ; a superabundance of yolk, and medium fineness of wool, — are the most desirable qualities to be imparted to the light, dry, and thin-fleeced native sheep of the South and far West.

The American merinos, certainly, are highly appreciated abroad. Sheep of the Hammond stock, exhibited by Mr. Campbell at the International Exhibition at Hamburgh, obtained the highest prize in the class of heavy-woolled animals. Mr. Graham, of Australia, says, "Of all imported sheep, those of our first cousins, the Americans, are the best ;" and, "The best rams imported to Melbourne of late years were those sent by Mr. Campbell," an American.

An important fact connected with the improved American merino should not be omitted. Our breeders, in aiming to increase the weight of their fleeces, have developed the length of the staple, and have unconsciously created a merino combing-wool, — a wool in special demand through modern improvements in machinery and changes in the fashion of goods. Mr. Fernau, an eminent Belgian wool-manufacturer, who has thoroughly studied our wool resources and manufactures, says, that three-quarters of the American wool is a *combing-wool*, and will ultimately be employed for this purpose. This point will be referred to at more length hereafter.

An important qualification must be made to these laudations of our improved merinos. Very few of the old wool-buyers and cloth-manufacturers of the country will admit that there has been any improvement in American wools. It is true that the light fine fleeces of old times, with the prices then paid for them, were more profitable to the manufacturer, as they contained so much more scoured or fine wool to the pound of the merchantable commodity. But when the greater present demand for medium wools, the vastly increased abundance of these wools caused by the improvements adverted to, and the conversion of clothing-wool to combing-wool, are taken into consideration, it cannot be denied that the wool industry of the country, upon the whole,

has been greatly benefited by the change. The bulk of American merino wools are of strong, sound, and healthy staple; having few weak spots in them from unequal feeding. Those from the older States of the West are free from burs. Those from California have this defect in a high degree. They are admirably fitted for flannels, blankets, and fancy cassimeres, and the great bulk of our card-wool manufacturers. They are so excellent, as a whole, that Mr. Fernau says they are too valuable to be used for clothing purposes. They supply nine-tenths of all the card or clothing wool consumed in American mills.

But the improvements of our breeders have gone far enough in the direction lately pursued. It is the opinion of many eminent growers that a new departure should be taken in our wool-growing. Having stated our positive resources in merino-sheep husbandry, let me show the negative side, and point out our deficiencies. Our merino wools as a class have become coarser in staple than they were thirty years ago. They are less clean than at that period; that is, they abound more in yolk. The Ohio wools would formerly waste in scouring but forty per cent on an average; now the waste is from forty-five to forty-eight per cent. It is believed that average merino flocks need an infusion of blood from finer and lighter woolled regenerators.

Again, we have a great deficiency of superfine merino wools; and these, when required, must be obtained mainly abroad. The principal objection to the existing protective duties on merino wools comes from the fine-cloth makers of the country, who, not without some show of reason, complain that high protective duties have failed in procuring the domestic supply of superfine wool promised by the wool-growers, under sufficient encouragement. It is true that the growing of these wools has declined throughout the world, as fancy cassimeres made of medium wools have so largely taken the place of the fine broadcloths formerly exclusively worn, for business as well as dress suits. The superfine, Saxony, Silesian XXX. (as the grade is called in the wool-trade of this country), or *electoral* wool, the proper appellation (from the elector of Saxony, in whose country the race producing this wool was first produced), is indispensable for

making the finest broadcloths or doeskins, the finest flannels, fine shawls, French merinos, and Tibets of the finest grades, felts for pianos and jewelry work, and many novelties. They should be grown by every country having suitable resources, which aspires, as we do, to industrial independence.

My own practical observation has led me to think that the electoral sheep cannot be profitably grown in the Northern States; although Mr. William Chamberlain, of Red Hook, New York, who had imported five hundred of the Silesian variety of this race, and bred them exclusively, declared that they thrived as well with him as any breed of sheep with which he was acquainted. But I am strongly impressed with the belief that a Southern climate, where succulent vegetation can be procured in the winter, contrary to general belief, is peculiarly fitted for the growth of very fine wool. This is the opinion of the best practical sheep-growers of the South; such as Colonel Watts, Mr. Cockerill, Mr. Howard, and others. In a recent paper on sheep husbandry in the South, I very earnestly recommended the culture of electoral wools at the South. I have recently received a letter from Dr. Ollendorff, a gentleman before referred to, of the largest experience in the culture of fine wools in South America and Germany, who says, referring to my paper:—

“It is undoubtedly a mistake to suppose that a warm climate injuriously influences the wool fibre in regard to fineness. On the contrary, I am of the opinion that the fleece of the pure merino, in a warm climate, with green, succulent grass nearly the whole year round, has rather a tendency to run *finer* than the interest of the sheep-breeder on a large scale requires.”

After the publication of the paper referred to, I pursued inquiries as to the culture of the electoral sheep in the district of the United States most famous for the growth of superfine wool,—the Panhandle region in Western Virginia, and the contiguous country in Ohio; into which country Spanish merino sheep, partially descended from Colonel Humphrey’s flock, and, subsequently, Saxon sheep, had been imported by Messrs. Wells & Dickerson. In answer to my inquiries, I obtained the fol-

lowing facts, in an extended communication from Mr. J. D. Witham, of West Virginia, a practical wool-grower and wool-dealer, from which I give some extracts in detail, as they furnish entirely fresh and original information upon a too much neglected branch of sheep husbandry.

“The Messrs. Faris Brothers, of West Liberty, Ohio County, West Virginia, formerly owned flocks which were bred with particular regard to fineness; and Mr. John Faris, who has still a portion of the old flock, claims to have bred the finest-wooled ram that ever was born,—his fleece weighing but a pound and three-quarters. All who saw him pronounced him the finest they had ever seen. Some of the progeny of this ram is still to be found in two or three flocks in Ohio County.

“It is claimed by the farmers of this county, that they formerly bred from as pure Saxony sheep as could be obtained. Many of them were purchased from a Mr. Peabody Atkinson, who came from New England, and was an enthusiast in his devotion to fine-wooled sheep.

“Mr. Ninian Beall, near West Liberty, has a flock of about 500 sheep, ‘not as many as he would like,’ he says, ‘but enough for a sample.’ He warrants all to be XXX and pick-lock. The fleeces will average from three to three and a half pounds. He is now breeding from Silesian rams. His flock, with two or three others, may be considered the cream of the once-famous Saxony flocks of West Virginia. Notwithstanding the recent infusion of Silesian blood, they may be regarded as having a Saxony foundation; for the Silesian infusion is of comparatively late introduction. Mr. Beall is now breeding from ‘Beecher,’ a ram purchased at the Centennial, from the Silesian flock of the late W. H. Chamberlain, of Red Hook. He shears eleven pounds of beautiful unwashed wool, very compact, yet short in staple. Some persons think the Silesians are lacking in constitution. Mr. Beall pronounces this animal to have as good a constitution as any sheep in the country, and to be an excellent breeder. He has not found it necessary to nurse one of his lambs during the two years that he has been breeding from him. Mr. Beall prides himself as much upon his fine wool as any ‘electoral duke’ can. It seems quite appropriate that he should grow ‘noble’ wools. Residing on one of the richest and finest farms in any country, he is truly a lord in his own realm;—with his help around him, his every motion a command, and the very soil on which he treads seeming to know naught but to obey,—as his well-filled barns and waving corn will testify.

“It may be added, that the same manufacturer has purchased his

wool for the past nine years. Yesterday he sold his wool for 48 cents a pound; last year, for 60 cents."

I recollect distinctly and with great pleasure the exhibit of Mr. Beall's wool at the Centennial. As one of the judges of wool, I examined it, in company with the eminent Bradford manufacturer, Mr. Mitchell, and wrote his award with Mr. Mitchell's hearty concurrence: "An exhibit of Saxony fleeces, two bucks and two ewes, of fineness characteristic of the race."

Mr. Witham adds —

"There are some three or four other clips which sold for as much, or within a half-cent as much, as Mr. Beall's. I might mention Mr. James Ridgeley, of the same district; Mr. John Baird, of Philadelphia; and Dr. J. C. Campbell, of Richland District. These men claim to have never introduced Spanish merino blood into their flocks; and the products of their flocks are known as Saxony clips. Indeed, there are but few flocks in this country from which the Saxony blood has been entirely bred out."

Harrison County, adjoining the Panhandle, has been always famous for its superfine wool. Mr. Witham writes, —

"Mr. William Croskey, of Hopedale, has over a thousand fleeces, all grading XXX and above. I had supposed there was not such a clip in the country, and certainly there is not such another. It presents a very showy appearance, as it is 'rocked' up on an elevated platform in the middle of his barn floor. Snow-white in appearance, a manufacturer could but say, 'I came, I saw, I bought.' He has his ram fleeces, some fifteen or twenty, piled on the outside of his pile in the 'wall' in one place, and tells you, 'Now, I will give you this pile, if you will pick out the bucks' fleeces.' They are washed, and present as showy and white an appearance as any of his fleeces. His wool is longer in the staple than I expected to see it. Much of it has delaine length, — the very wool for French cashmeres and merinos.

"Mr. Croskey considers his sheep the hardiest that are bred in the Ohio, Pennsylvania, and West Virginia region. The wool pays as well as any other raised in that region. His fleeces average three and three-quarter pounds. He sold last year for sixty-five cents a pound, straight through, without any deductions or dockings. I said to him, 'What breed of sheep do you have, Mr. Croskey? Is it Saxony?'

"'I do not know. I have aimed to breed the best and finest sheep

that I could get. I do not like the Silesian; bred them one year, but sold all the stock when two years old. I do not think there is a drop of Silesian blood in my flock. The Silesians may be very good sheep, but not what I am breeding for. I have some of the best of Thomas A. Wood's flock, acknowledged by all to have been the finest of that section, but sold and scattered among other wool men after his death. I had one of his rams, which died last year at the age of twenty-two years, and which took the premium or medal as the finest sheep at one of the world's fairs. I have now twenty better sheep than him, in every respect.'

“Do you not think your breed of sheep, or the Saxony sheep, tender?’

“I suppose my sheep are Saxony, if any thing. They are not American merino, Spanish, Silesian, or any other breed of which I have heard. This ram, dying at the age of twenty-two, would seem to indicate hardiness. I do not house my sheep. Some of them have free access to sheds; but they are just as apt to select the highest knoll of a cold night as any other place. I think there is no hardier sheep, no sheep better adapted to this climate; and we have as hard a climate as anywhere, the thermometer getting down as low as 25° below zero, and up to 100° in the shade, nearly every year. I have not as much trouble with my lambs in dropping time as some of my neighbors who raise Spanish or American merinos.’

“Do you think the tendency of your flock is to grow finer and lighter, or not?’

“My flock is finer than when I commenced breeding, forty years ago; and the fleeces will average one pound heavier,—obviously because it has become longer, with no more grease. I feed but little grain. I can raise two of my Saxon sheep where you can raise one merino. Neighbor Mulholland tried this, and found the Saxon the hardiest, and much the easiest kept. With the same care, it will raise nearly as much wool; and probably more, taking the grease into consideration.’”

I will add, that I also remember the wool of this same Mr. Croskey at the Centennial, and that the judges gave him an award in these terms: “An exhibit of twelve samples of Saxony wool of the highest excellence.”

The above extracts show that our Southern friends who desire to pursue the fascinating pursuit of superfine sheep husbandry may find in our own country breeding animals to start their

flocks, thoroughly acclimated, having all the fineness of the original Saxons without their tenderness of constitution, and producing heavier fleeces without loss of fineness of fibre. Thus we find what will be to most of us an unexpected addition to the American resources for sheep husbandry.

To appreciate this American improvement, we must consider the delicacy of the original Saxons. In Germany, they were not only housed during winter and at night, but their barns were actually warmed in severely cold weather. In yearning time, as Dr. Randall states, they received, and came to require, as much care as human patients. I well remember that nearly all the lambs from my father's flock of imported Saxons required to be suckled by hand.

Immediately connected with this branch of my subject, the merino sheep, is the question of our territorial resources for the further extension of the pastoral-sheep husbandry as a principal or exclusive pursuit; for which, as has been before said, the merino races are especially adapted. The fact must be admitted, that sheep-growing for wool alone is not likely to be ever again profitable in the Northern and Eastern States; for the obvious reason, that wool can be raised more cheaply on the cheap lands of the West and South, where shelter and winter-feeding are required only occasionally and for brief periods, and where the vegetation is spontaneous. The pastoral-sheep husbandry in prosperous countries has a character of evanescence which is really one of the best proofs of its beneficent results. It first occupies the waste pastures, and then converts them from the domain of the crook to that of the plough. California, with its 6,500,000 sheep, producing 50,000,000 pounds of wool, it is said, has occupied all her available pasture-lands. To supply the deficiency, her wool-growers have resorted to the culture of the alfalfa,—that wonderful fodder plant which yields from six even to eight tons of hay, and which is preferred by cattle and sheep to any hay whatever. "The Pacific Rural Press" of March last, describing a ranch having 7,000 sheep, says that 1,300 acres sown to alfalfa were cut last year five times, yielding a ton and a half of hay to each acre. In 1876

some 40,500 acres were planted with this clover in California. Under this system, sheep are fed on the ranch instead of the distant hillsides, and four or five times as many can be kept on the same territory. This is the first step to an improved husbandry, — to mixed crops, to mutton sheep, and finally the retirement of the nomadic shepherd to new lands, to be in their turn converted to permanent settlement.

California is but the margin of the Western lands which may be occupied for sheep husbandry. To quote Dr. Latham, "there is an area of country between the Missouri River and the Pacific coast containing 1,650,000 square miles, or more than a billion of acres, which is one immense pasture ground, — boundless, endless, gateless, — and all of it furnishing winter grazing." This winter grazing, it hardly needs to be said, is the characteristic feature of our continental pastures; the peculiar climatic conditions of the high interior country permitting the rich and abundant grasses, like the "bunch" and "gramma," to be cured while standing. The vast number of wild graminivorous animals which have wintered on these plains for ages shows that nature itself has pointed out this country as the grazing ground of the continent. One illustration will suffice to show the infinite resources of that region for sheep husbandry. The valley of the Republican is 250 miles long and 100 miles wide, containing 16,000,000 acres. There is not a rod of these 16,000,000 acres, says Dr. Latham, which is not the finest of grazing land, and is not covered with a luxuriant growth of blue buffalo and gramma grasses. All the sheep of California could be pastured in this single valley. A large portion of this region is made available by the Union Pacific Railroad and its branches. Even more valuable grazing lands, I am informed, will be made available by the completion of the Northern Pacific Railroad, — a great national work whose accomplishment would be made certain simply by the extension of the original grant asked for from Congress. With this line completed, sheep and cattle raised on the bunch and gramma pastures could be water borne from the head of Lake Superior to Buffalo, on their way to the

markets of Europe, which it is America's destiny to supply with beef and mutton.

Omitting, as I am compelled to do, any notice of the resources of the intervening settled States of the West, — of which Minnesota, producing this year 40,000,000 bushels of wheat on lands where twenty years ago the buffaloes roamed, and entering with great vigor and success into sheep husbandry, is a splendid example, — I will glance at the resources of the South, a region preferable to many on account of its greater accessibility.

In the ten States of the cotton belt, excluding Texas, there are 2,600,000 sheep, on an area of 267,000,000 acres, or one sheep to a hundred acres. Considering the small number of animals and their inferior character, sheep husbandry, in the proper acceptation of the term, does not exist at the South. And yet the wisest agriculturists of the South admit that merino-sheep husbandry would be a most advantageous adjunct to the cotton culture. Winter-feeding is required but from two to three months; while the flocks must be fed from five to six months at the North. Succulent food can be obtained throughout the year. With nutritious alfalfa and the Bermuda grass, more nutritious even than blue grass; peas, which take the place of clover; rye and oats, which may be pastured in winter, without injury to the crop of grain; turnips, which may be fed from in the field, as in England; and, above all, cotton seed, at fifteen cents a bushel, — sheep may be fed at a much lower cost in the South than at the North.

But the resources for a sheep husbandry on a large scale is the immediate question in hand. The pine-lands of the Carolinas, and especially of Georgia, it is believed, are favorably adapted for sheep husbandry on a large scale. Millions of acres of pine-lands upon which the wire grass grows spontaneously, furnishing an excellent pasturage for a large part of the year, can be obtained at from fifty cents to one dollar an acre. The few weeks' feed in winter may be furnished by winter oats or turnips, for which the land can be prepared simply by harrowing. General Gordon, of the United States Senate, has recently em-

barked in sheep husbandry on a large scale upon these lands ; and practical gentlemen from the North who have visited this country this summer inform me that they shall follow his example.

We must go to the extreme South for the country which offers, in my judgment, the most hopeful field to the enterprising shepherd who does not fear Mexican depredations or Indian raids. In Texas we find a climate so mild that the sheep thrive absolutely without shelter. Pasturage is afforded throughout the whole year by the indigenous, perennial mesquite grasses, and so abundantly that the store sheep are kept fat throughout the year without any other forage. Pastoral-sheep husbandry is here reduced to a perfect system ; and there are absolutely no obstacles to its pursuit as advantageously as in any other country in the world, except the unsettled state of the country, which railroads will soon cure. Emigration and sheep are pouring in from the North and California, and skilled shepherds from Europe and even Australia. Even with its nearly 4,000,000 head, only two counties (Nueces and Starr) are occupied. Texas has an area which exceeds that of the German Empire by 60,000 square miles, and there are 80,000,000 acres of land still unlocated. If two acres are required for one sheep (the usual estimate), and only half the land is fitted for sheep culture, there are still enough unoccupied lands to support 20,000,000. Mr. Emerson says that the wealth of modern times is due to a very few great staples. Let the South, as she can, place Queen Wool by the side of King Cotton in her territory, and she may indeed assert her sovereignty in material resources.

MUTTON SHEEP.

In discussing the merinos, I have dwelt upon only one of the aptitudes of the ovine animals, — that for wool production. The aptitudes of sheep for producing mutton and manure, which are no less important, demand a brief consideration. Under this head, I shall speak less of what we have done than what we ought to do. I need not say that the flesh-producing aptitude is found in the highest degree in the long-woolled sheep of the

English races. Before this audience, I need not dwell upon the special characteristics of the principal English races. You all know that English sheep-husbandry, such as it now exists, for mutton as its principal object, commenced with the introduction of the turnip culture, by William of Orange, at the end of the seventeenth century, as by this culture the same land could support three times as many sheep as before; and that the English sheep-husbandry received, soon after, its second great impulse, through Bakewell's creation of the New Leicester breed; by the use of which race it became possible to fatten an animal in one year, and give it full maturity in two years, whereas formerly it required four. You are aware, too, that the New Leicester race, with its extraordinary power of imparting its qualities to other races, has modified all the other English breeds. Long wool and fat mutton became the chief characteristics of English sheep-husbandry; as did the worsted industry, employing the long wools, become the predominant branch of the English wool-manufacture. This change had an astonishing influence upon the value of lands in England and Scotland. Sir Walter Scott, whose practical eye served him as much as his imagination, well illustrates this in the introductory chapter of the "Black Dwarf." He represents a South Highland sheep-farmer and his old shepherd discoursing at a wayside inn upon the changes from the times of the short-woolled blackfaces, since the long-woolled sheep had come in:

"'Ill would your father hae liked' [says the old shepherd to the farmer] 'to hae seen that braw sunny knowe a' riven out wi' the plough in the fashion it is at this day. It was a bonny knowe, and an unco braw shelter for the lambs in a severe morning like this.'

"'Ay,' said his patron; 'but ye ken we maun hae turnips for the lang sheep, billie, and muckle hard work to get them, baith wi' the plough and the howe.' . . .

"'Aweel, aweel, maister,' said the attendant, 'short sheep had short rents, I'm thinking.'

"Here my worthy and learned patron [Mr. Jedediah Cleishbotham] interposed, and observed, 'that he could never perceive any material difference, in point of longitude, between one sheep and another.'

"This occasioned a loud horse laugh on the part of the farmer, and

an astonished stare on the part of the shepherd. 'It's the woo' man, — it's the woo', and no the beasts themselves, that makes them be ca'd lang or short. I believe if ye were to measure their backs, the short sheep wad be rather the langer-bodied o' the twa; but it's the woo' that pays the rent in thae days, and it had muckle need.'

"Odd, Bauldie says very true, — short sheep did make short rents, — my father paid for our steading just threescore punds, and it stands me in three hundred, plack and bawbee."

This long extract would be inexcusable did it not illustrate the point which I wish to enforce; viz., that high-priced lands and long or mutton sheep go together. The Eastern States must revive their declining sheep-husbandry, not by restoring the old merinos, but by adopting the English system. The great Thiers said, "The agriculture of France cannot dispense with sheep;" neither can the agriculture of New England and New York. The land *must* be kept up. There can be no reliance upon commercial fertilizers until there is more honesty in commerce. It is beyond dispute that grain crops cannot for long periods be profitably grown, except by combining them with some sort of stock growing. Cattle raising for beef is out of the question at the East since the opening of the winter-grazing lands of the far West. The most experienced stock-raisers of the country inform me that even Kentucky must abandon cattle raising for beef. Great Britain has 34,532,000 sheep, on 77,284,184 acres, which realize an annual product of the value of \$150,000,000. Here is a demonstration that, on the highest-priced agricultural lands in the world, sheep husbandry is not only profitable but indispensable. You are all aware that, by the combination of sheep husbandry with wheat culture, lands in England which in the time of Elizabeth produced on an average six and a half bushels of wheat to the acre, produce now over thirty bushels, and that the fertilizing influence of the sheep on the wheat lands is regarded by the most recent agricultural writers of England as the main object of her sheep husbandry. I will not repeat what I have elsewhere given, — the conclusive testimony of Mr. Chamberlain, Mr. Geddes, Mr. Stilson, and others on this point, — because the individual experience of most of you will supply sufficient examples.

Permit me to give one or two fresh illustrations upon this point in hand, furnished me by practical farmers. The farmers of Connecticut in former times, it would appear, had a full appreciation of the fertilizing influences of the sheep. In the town of Goshen, in Connecticut, according to my informant, the public roads were anciently laid out eight rods wide; and in these roads it was the custom to pasture in common the sheep belonging to the individual proprietors of the town, which were taken care of by a man and a boy, at the expense of the town authorities. The yarding of the sheep for each night, in order that the benefits of the manure might not be lost, was let out at the town meeting. On the evening of the 27th of May, just preceding the famous cold summer of 1816, it came the turn of a certain farmer to yard the sheep for the night. He had no field fenced which would hold the sheep, —some eight hundred in number,—except a field planted with corn, which had already come up. Preferring to sacrifice the corn to losing the manure, he turned the flock into this very field. On that night the frost cut off all the corn in the town, and the sheep had cut off our farmer's, who congratulated himself, in the morning, that he was no worse off than his neighbors. He soon found that he was better off. The sheep by cutting off the top shoots had saved the plants from being killed by the frost, and the droppings from the sheep in one night had so enriched the field that it produced the largest crop of corn that had been grown in the town for years.

The valley of the Connecticut furnishes a more instructive illustration of the beneficial influences of sheep husbandry upon crops. I refer to the system of sheep-feeding for mutton and manure, in connection with the tobacco culture, &c., profitably pursued in that valley. For the purpose of obtaining definite information, I addressed inquiries to several practical farmers engaged in this pursuit in that region. Among others, to Mr. J. F. C. Allis, of East Whately, Mass., whose statement is so instructive that I give it at length, in his own words:—

“ We feed from two hundred to six hundred sheep; buying in the fall, and selling in the spring. We have bought, directly after shear-

ing, of Michigan farmers, and had the sheep pastured till November. By early selecting and buying, we are more sure of getting the best sheep, and more easily obtain all wethers, and usually at minimum cost. Merinos crossed with long-wool sheep weighing from 90 to 110 pounds, from three to five years of age, are the kind we select, as they take on fat easily, and their mutton is preferred in New York and Brighton markets. Long-wool sheep, as we think, are not good feeders: they do not take on fat so easily; and, although they cost more, will not sell higher when we are ready to market them.

" We keep our sheep under cover, and commence to feed lightly about December 1st, yarding them close, from forty to fifty in a pen; always keeping them well bedded with wheat and rye straw, or coarse hay. We commence to feed the sheep light with grain, gradually increasing till they eat one quart each, daily: we seldom give more; the object being to give them all they will eat, without cloying.

" In 1871, we fed two hundred sheep from December 1st, and eighty-five more from December 24th, and sent them to Brighton market. April 10, 1872. We fed 725 bushels of corn, with 15 tons of hay. From 1865 to 1873, Massachusetts-Connecticut River Valley farmers fed from eight to ten thousand yearly, mostly coming from Michigan, some from Ohio; but Michigan merinos crossed with long-wooled sheep are considered the best feeders.

" During those years, sheep for feeders found a ready sale; and agents from tobacco-growers would take from one to two months in marketing flocks, and would *car* them here one thousand to two thousand at a time.

" Since 1873, owing to financial causes and their effect, and almost always lower markets for the same class of mutton in the spring than in the fall, the number fed has gradually decreased, till last year only about two thousand were fattened. Farmers were satisfied to feed when they would receive pay for grain, considering the manure would pay for hay and care of sheep. During the best year of feeding, sheep would sell in the spring for double the price paid in fall; the average price one-third more. Since 1873, more caution has been taken, the pressure of time being too hard for profitable sheep-feeding.

" The cause for feeding so many sheep for their mutton in this valley is the high value of sheep manure for tobacco-growers, it having the effect on our light soil to produce dark-colored silky leaf, of good burning quality, suitable for wrapping fine cigars; the tobacco burns white, and has a good sweet flavor, perhaps owing to the potash it derives from the manure. So valuable do we consider this sheep manure that

we have shipped, since 1870, from West Albany, from fifty to one hundred and fifty cords; costing from eight to ten dollars a cord, every spring. On our light soils, called pine-lands, after raising crops of tobacco, 2,000 pounds to the acre, we have sown wheat; yielding 30 bushels, plump berry, and heavy weight of straw, on land which without this dressing of manure is fit only for white beans. We of late years feed with our sweetest and finest hay, and mix with our corn one-third cotton-seed meal; by so feeding, our sheep fatten more easily, being more hardy and better conditioned, besides increasing the value of the manure and rendering it more full of plant food.

"Farmers in hill-towns, and some in the valley, are keeping ewes for raising lamb for early spring market; and those farmers who have good pasturage for fall market realize for lambs, of from 40 to 70 pounds, from \$8 to \$10 each.

"This branch of sheep husbandry will undoubtedly increase among farmers, who will keep from fifteen to thirty head, notwithstanding the difficulty of good pasturage and the worry and destruction caused by dogs.

"Sheep, invariably, are the best that are penned in November and December coming direct from pastures. Having only had light feeding of grain, they *eat* better and are more hearty feeders. The Connecticut-River-fed sheep have a ready sale, at full market rates, in early and late spring, both in Brighton and New York markets.

"Fattening wethers for market would rapidly increase, if the spring market could be more relied upon. Perhaps this reliance will come from the increasing foreign demand for good mutton."

The reference in the above statement to the nuisance of dogs leads me to say, that no more important subject can come before this Agricultural Congress than the recommendation of legislative measures to remove this almost fatal obstacle to sheep husbandry in thickly-settled districts.

We see in the Connecticut Valley the introduction of the system so largely pursued in Scotland and Ireland, of raising sheep in one district to be fattened in another. Sixty thousand sheep are often sold in a day at a single fair in Ireland, for this kind of exchange. Facilities are being opened to our Northern farmers for obtaining sheep for fattening, or stocking their farms, at greatly reduced rates. Mr. Farnham, an enterprising native of Vermont, informs me that he has succeeded in establishing an

express line, for live stock, from Little Rock, Arkansas, to New York. He proposes to bring by this line fifty thousand sheep from Texas, this fall, to the Connecticut River, to be fed in winter; and believes that from that source the farms of New Hampshire and Vermont will, at no distant time, be sufficiently stocked with sheep, the impediment of late years being the difficulty of purchasing animals at reasonable prices.

I do not recommend for New England any enterprise in sheep husbandry on a large scale. My intelligent correspondent above quoted indicates the modest scale upon which only this industry can be advantageously conducted. It has been wisely said, "Farmers, as a rule, should not go into sheep husbandry to the neglect of other things. Let sheep be one of the products of the farm, not the only product: a few sheep well cared for will prove profitable to every farmer; while a large flock would become, in nine cases out of ten, a source of annoyance and expense." For this modest addition to the resources of ordinary farming, where city markets are accessible, I think there is no question that the long-woolled mutton races are best adapted. They best give the three dividends, — wool, mutton, and lambs. They thrive best in small flocks. The enormous clip of Canada wool is produced from small flocks, rarely exceeding fifty head. The wool, from six to about seven pounds to the animal, for a series of years, will bring good prices; as, unlike merino wools, it does not encounter competition with the product of the cheap pastoral lands in the Southern Hemisphere. Averaging at least 150 pounds in gross live-weight, the animals will sell for six cents a pound, when ordinary New England sheep sell for four or four and a half. The lambs have brought this year in the Brighton market from \$10 to \$12. The town of Hingham near Boston, under my observation, has conspicuously verified the profitableness of the Cotswolds, — the race at present most in vogue. One farmer realized \$1,000 from the produce of one hundred ewes, and many smaller flocks produced in the same proportion. The green and clean pastures now seen in this old town are in striking contrast with

their waste and ragged look before the Cotswolds were introduced.

The mention of this breed leads me to question the wisdom of the preference which is generally given in our Eastern States to this race over the Leicesters. The farmers in Maine, whom I met at the session of their State board of agriculture, regarded the Leicester as less hardy in their climate than the Cotswolds. On the other hand, Mr. Motley, the well-informed lecturer on sheep-husbandry at the Bussey Farm connected with Harvard University, who has grown the Leicesters very extensively, regards them as perfectly hardy in the climate of Eastern Massachusetts. The mutton of the Cotswold is coarse, and considered in England better adapted for the working man's than the gentleman's table. The mutton of the Leicester is deemed by its English breeders to be fully equal to that of the South Downs. Our famous Kentucky mutton comes from sheep in which the Cotswold has been qualified by the Down and merino blood. But it is rather in the interest of the worsted manufacturers, with whose wants I am familiar, that I desire that the Leicesters should be more generally cultivated. Their wool is finer and more lustrous than that of the Cotswold, and it is fitted for a greater variety of worsted fabrics. The Cotswold wool brought high prices during the war, when strong rather than fine-combing wools were in demand: it is serviceable for buntings, saddle girths, worsted epaulets, and trimmings, and for the whites in Brussels carpets; while the Leicester, with its fineness and lustre, is better fitted for alpacas and figured dress fabrics, a larger use. The Canada wools formerly consisted principally of Leicester fibre. They have materially declined in value, through the recent introduction of Cotswolds. The Bradford Chamber of Commerce recommends the Leicester as the best sheep for worsted combing-wools; and Mr. Walworth, the most experienced and skilful expert in combing wools in this country, indorses this opinion. To this it may be added, that the experiments at the famous scientific Rothamsted farm of England have established the fact, that the Leicesters rank first in the production of the highest

amount of wool to the hundred pounds live-weight, of any variety of English sheep. These observations should be qualified by the remark, that in many of the so-called Cotswolds of the present there is a large infusion of Leicester blood.

Let me not be understood to discountenance the growing of crosses of the Cotswold or Leicesters with the American merino. This so-called half-bred wool is in great demand at the present day for worsted coatings and certain classes of dress-goods, this wool being worth to-day, owing to this demand, 45 cents; while Leicester or Canada fleece sells for 40 cents only. This may be temporary. The mutton of these half-breeds, according to Mr. Allis before quoted, is in high request. The half-bred flocks are preferred, as I am informed, by the highly intelligent and experienced growers of the important sheep district of New York, —the Genessee Valley, —possibly owing to the present high prices of their wool.

Long-combing wools and mutton sheep may be grown anywhere in New England or New York, if the deficiency of natural pasturage is supplied; that is, there is no necessary obstacle in the soil, as there is said to be on the prairies and alkali lands of the Plains and California. The disadvantage of natural infertility in the soil of New England may be counterbalanced by nearness to city markets. But certain districts are pre-eminently fitted by nature for these sheep. The limestone soils are peculiarly congenial to them. There can be no more favorable districts than such as are found in Kentucky and Middle Tennessee, where the nourishing blue-grass on limestone soils affords permanent pastures, and the sheep require no feeding except when there is a fall of snow. Upon these pastures, where one acre will feed three sheep, the Leicesters thrive even better than their ancestors did on the rich clay-lands of Kent.

The districts in this country most noted at present for this branch of sheep husbandry are Trumbull and Warren Counties in the Western Reserve, Ohio, with the adjoining counties in Pennsylvania, ranking first; next in the order of prominence, the part of Ohio south of Lake Erie, the blue-grass counties in Kentucky, a district in Middle Tennessee, a district in North-

ern New York bordering on Canada, and the portion of Michigan on the Lake Shore. Vermont ought to go more extensively into this industry (which she has commenced); as she has a fertile limestone soil, and easy access to market for mutton and lambs. Delaware and Western Virginia are entering quite successfully into this industry. Southern sheep experts consider the range of the "fair Blue Ridge of the South as one of the most favored spots in America" for the class of wools in question. In still lower latitudes, on the rich bottom-lands of the southern coast, we find a new, or rather very ancient, variety, — the broad-tailed sheep of Syria and of the Bible, — producing a long wool and excellent and early-maturing mutton. The South possesses, besides, an invaluable lanigerous animal, with a combing fibre, — the Angora goat, which is found in absolutely pure flocks, perfectly acclimated, in Virginia; while the mountains of the Appalachian chain furnish a climate and sustenance corresponding to those existing in its native *habitat*.

The question arises as to the domestic demand for the products of the mutton and long-woolled sheep. Of English combing wools, our consumption is not far from eight million pounds. The United States produces from three to four million pounds, so that about one half of our supply must still be obtained from Canada and England. We ought not go abroad for a pound of these wools. The demand for mutton is illustrated by the consumption in a single locality. In the year ending last May, 272,000 sheep and lambs were slaughtered at the Brighton abattoir. Twenty thousand sheep and lambs were brought to that market from Kentucky. When our people are educated to eat mutton, as they will be through a supply of a better article, ten times as much will be consumed as now. The danger is that we shall have a scarcity, and not a surfeit, of mutton. Europe threatens to drain us of what little we have. Steamers from Boston have carried to Europe 4,174 sheep since January 1: 185, in the first three months; in April, 788; May, 680; June, 588; and July, 1,933. So rapidly is this traffic increasing that the Cunard line is removing their state-rooms to accommodate their ovine passengers.

It is evident, from this brief review of our national resources in sheep husbandry, that what Milton calls "the fleecy wealth" of this country has hardly commenced its development. The encouraging signs for the future are the attention which sheep culture has received of late from many of the State boards of agriculture; the appeals of the great statesmen of the South in behalf of this industry; and, above all, the recent invaluable reports upon this special subject from the eminent official agriculturists, Mr. Dodge, of the Department of Agriculture, Mr. Janes of Georgia,* and Mr. Killebrew of Tennessee, whose lessons I have not aspired to supplement, but only to confirm.

It was my intention to discuss in detail the resources of the United States for the wool manufacture. The time I have already occupied will limit me to a very brief summary, and to an illustration, by samples of fabrics, of the skill we have attained in the manufacture. The most important of our resources for the wool manufacture, raw material, I have already described. We export no wool; and the whole of the 28,000,000 pounds at present produced is consumed at home. The command of domestic wool is as necessary for the home manufacture as water is for a mill. We should cease manufacturing if we were compelled to import all our wools. These wools supply nine-tenths of the raw material consumed by the nine thousand sets making card-wool fabrics. And the wool for its purpose is certainly unsurpassed, and I believe unequalled, by any in the world. Our deficiencies are superfine wools, of which but little is required, and carpet wools, which are grown only in barbarous countries, and a partial deficiency of combing wools. Of woollen machinery we had in 1870 10,073 sets, including those for carpets and worsteds (the number having remained nearly stationary since), which produced in that year fabrics of the value of \$217,578,824. As to the character of this machinery, we have all the best machines in use abroad; and,

* To Mr. Janes, Commissioner of Agriculture of the State of Georgia, and President of the Agricultural Congress at its late session, must be awarded the honor of initiating, by his excellent report, the present movement in sheep husbandry at the South.

in the exact language of one of the most eminent experts in Europe, in a letter addressed to myself: "The greatest part of your own invented machinery is superior to the English, German, or French machinery." In adaptation to its purpose, in strength with lightness, and in perfection of workmanship, I believe no textile machinery in the world will compare with ours. Not the least of our advantages are the intelligence and taste of our people, which compel us to excellence in our fabrication. An intelligent Belgian says: "It is a grave error to suppose that any thing is good enough for America. The American is intelligent and of good taste: no other than good merchandise, of honest and elegant fabrication, is used or in request by him." The testimony of the same foreigner, the official reporter on woollens at the Centennial to the Belgian government, will be received as an impartial statement as to the general character of our woollen fabrics. He says:—

"I ought to avow that I was astonished to see the rich, the interesting collection of cloths and stuffs of the American manufacturers. In carefully examining these superb displays of the 'Pacific,' the 'Washington,' the 'Missions,' the Pontoosuc Woollen Mills, and of many other important manufacturers, no impartial person could fail to recognize and frankly avow that the United States may be placed in the rank of the first manufacturers of the world."

To prove these assertions, but more to make known to you the uses to which our various domestic wools are applied, I place before you a few samples of American wool manufactures.

[A series of excellent samples of American wool fabrics were here exhibited, and their characteristics explained.]

In conclusion, the speaker, pointing out the American bunting, with which he closed the illustration of domestic fabrics, observed: The flag in general symbolizes our political independence; the one before you specially illustrates our industrial independence. Before the war, — to our shame be it spoken — there was not a strip of bunting floating over a national ship or fort which had not been made in England. The war taught self-reliance to the South as well as the North. We resolved to make our own flag. And we improved upon the making: for

the stars were formerly made separately, and sewed on; but now each star symbolizing a State, — each, thank God! shining with equal splendor in our political firmament, — all the symbolic stars are woven imperishably into the web of the “union.” The emblem of the nation represents not only its independence, political and industrial, but the *inter-dependence* of its parts. How distinct and contrasting are the hues of the red, white, and blue! Not less distinct are the three great productive agencies of the country, — its agriculture, manufactures, and domestic commerce; not less distinct are our great geographical sections, — the North, the South, and the West. Each color in the stars, bars, and field, enhancing even by their very contrast the vividness of the separate hues, is needed to fill the eye with harmony as well as splendor. So do agriculture, manufactures, and commerce; so do the North, the South, and the West, even while working strictly in their separate spheres, — react one upon the other; enhancing each other’s power, reflecting each other’s splendor, and making that perfect and harmonious whole, — the national prosperity.

APPENDIX.

CHARACTERISTICS OF THE IMPROVED AMERICAN MERINO.

BY WILLIAM G. MARKHAM, PRESIDENT OF THE NEW YORK SHEEP-BREEDERS' AND WOOL-GROWERS' ASSOCIATION.

OUR merinos, as originally imported from Spain, were bred for wool, and very little attention was given to their meat-producing qualities. In improving them, wool has been kept the main object in view, and mutton has been made an important consideration in their value. It has been the aim of breeders to produce sheep yielding the greatest percentage of profit in dollars and cents, rather than to produce any specific quality of wool or mutton.

Seventy years of well-directed efforts, by highly intelligent breeders, has brought out a type of merinos which may well be regarded the acme of their kind. These sheep are large, symmetrical in form, having robust constitutions, and thoroughly covered with a dense fleece.

The essential qualifications which indicate constitution are, — a compact round body; ribs well arched; roomy waist; back of medium length, and straight from shoulder to hips, sloping slightly to the tail, which is cut about an inch from carcass; broad across the loins; hips broad and long, thick through the thighs, and standing straight up and down behind; the shoulder deep, rising slightly from the back; bosom full, and projecting well forward; legs large, strong boned, straight, of medium length, and standing wide apart; head of medium size, broad, and rather short; a short, broad, wrinkly nose, thickly covered with short, silky, white hairs. The ram should have large, broad, and well-curved horns; the ewe, never. Neck of ewe, medium length, under which is a wide dewlap. The ram has a short neck, and well plated with heavy folds under side and across the breast, extending in slight corrugations over the neck. Fashion gives him well-defined wrinkles back of fore legs, running well up the side toward the back; folds at the buttock uniting with the edges of the tail, giving it broad appearance; wrinkles on the breech, extending across the thigh and flank, giving him a deep flank; the skin deep purple, soft, flexible, and loose

over the entire carcass, giving the sheep when first shorn a crinkly appearance, but not observable when in full fleece. The ram in full fleece weighs about 190 lbs., and the ewe about 115.

The *fleece*, particularly that of the ewe, should be uniform over the entire sheep, as to length, quality, and density. The wool, standing at right angles to the outer surface, and so firmly set as to present an even, compact surface, should be so filled with free white or light buff yolk as to make up 50 to 65 per cent of the entire weight of the fleece.

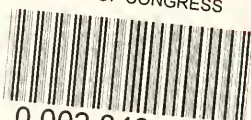
When the sheep are kept from storms during the fall and winter, the yolk should form a dark coating on the surface of fleece, so firm as to keep out dirt, hay-seed, &c.

The fleece should open freely to the skin, in layers or blocks, presenting a lustrous fibre, about $2\frac{1}{2}$ inches long, having a distinct crimp, uniform throughout its entire length, and sufficiently fine to enter into the manufacture of cassimeres, and such choice woollen fabrics as are made in our country, though usually not so fine as is required for the finest broadcloths.

The ram's fleece is about a quarter of an inch shorter than that of the ewe; staple not as fine, particularly on the wrinkles, often showing coarse hairs on the top of the neck wrinkles. By many breeders these are considered objectionable; by others, an indication of stamina or masculinity, as the heavy beard of a man would indicate more vitality than light, fine whiskers. Very few of our most celebrated stock-rams of the past or present have been entirely free from coarse hairs on the neck. The ram's fleece should weigh 28 to 30 lbs; the ewe's, 16 to 18 lbs. Many flocks of ewes, and even rams, are bred more wrinkly than I have described; and are regarded as possessing the desirable points in an exaggerated form, with a view of raising the low standard more rapidly.



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