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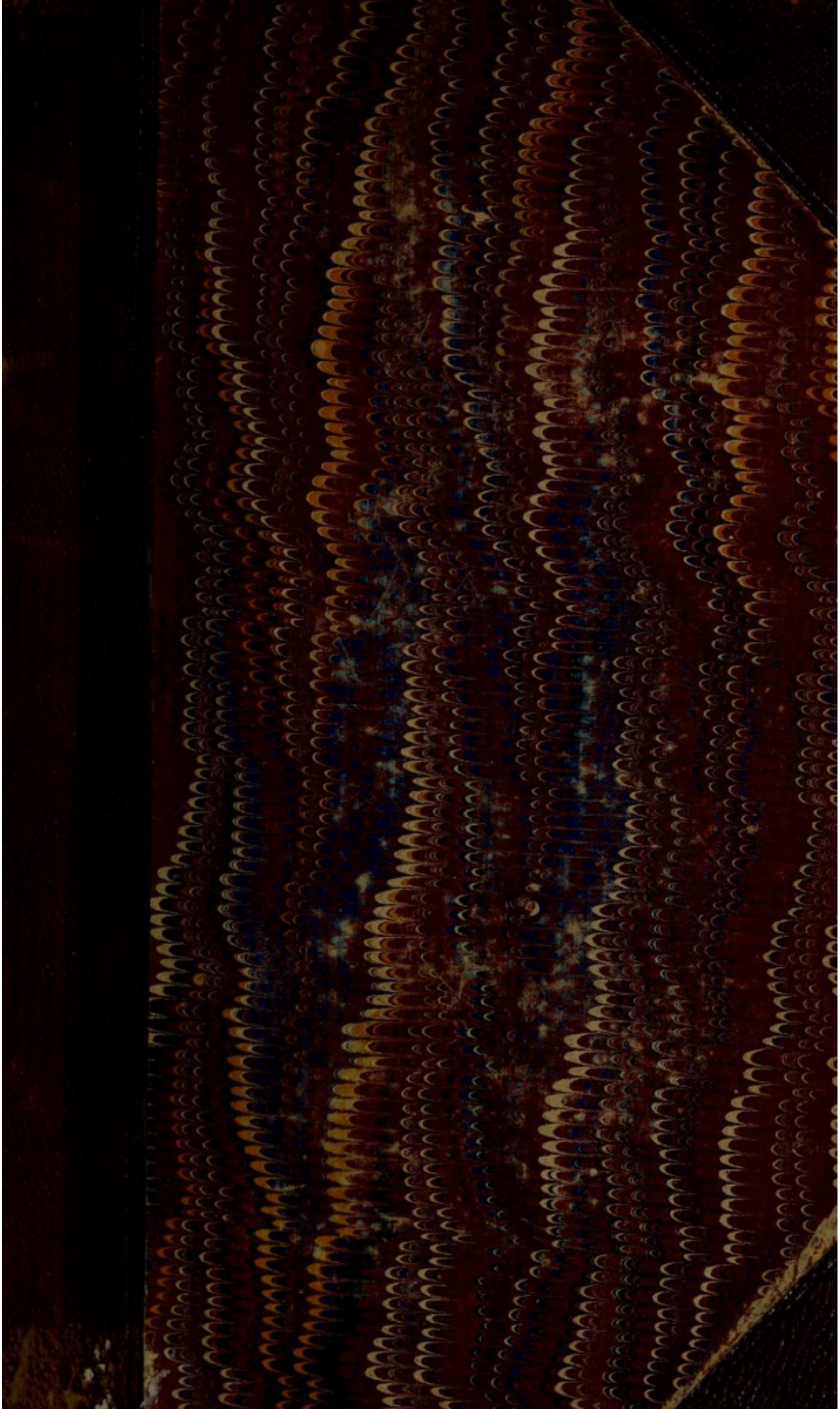

ORIGIN AND GROWTH

OF

SHEEP HUSBANDRY

IN THE

UNITED STATES.

WITH SOME REMARKS

ON

ANGORA FLEECE.

WASHINGTON:
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1880.

45TH CONGRESS, 3d Session. } SENATE. { Ex Doc. No. 25.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

COMMUNICATING,

In answer to a Senate resolution of June 17, 1878, *information on the subject of sheep-husbandry.*

JANUARY 14, 1879.—Read, referred to the Committee on Agriculture, and ordered to be printed.

To the Senate of the United States:

In answer to a resolution of the Senate of the 17th of June last, requesting the Commissioner of Agriculture to send to the Senate certain reports on sheep-husbandry, copies of the same with accompanying papers, received from the Commissioner of Agriculture for this purpose, are herewith transmitted.

R. B. HAYES.

EXECUTIVE MANSION, *January* 13, 1879.

UNITED STATES DEPARTMENT OF AGRICULTURE,
Washington, January 9, 1879.

SIR: In compliance with the resolution of the Senate of the 17th of June, 1878, I transmit herewith a report upon sheep-husbandry in the South, prepared in this department, and likewise a copy of a published document on the same subject, by John L. Hayes, secretary of the National Association of Wool Manufacturers.

I have the honor to be, very respectfully, your obedient servant,

WM. G. LE DUC,
Commissioner of Agriculture.

The PRESIDENT.

SHEEP-HUSBANDRY IN THE UNITED STATES.

ITS ORIGIN AND GROWTH.

The early settlers of America brought with them the domesticated sheep of their respective nationalities; Spanish sheep were introduced in Mexico, English into Virginia and Massachusetts, and Dutch races into New York. The Spanish were evidently not Merinos, but producers of coarse wools suitable for carpets, probably the Chaurros. The Eng-

lish were long-legged, narrow-chested, light-quartered, coarse-wooled animals, by no means the highly-bred stock of English coarse-wools of the present day. The lowland sheep of Holland bore many of the characteristics of the English. The compact, short-limbed, heavy-fleeced animal of recent improvement was not then in existence, whether English or Spanish. They were small, agile, wild, slow in maturing, and their flesh was not highly esteemed as food.

While sheep have been bred in this country for more than two hundred and fifty years,* it is only within the present century that improved breeds have been introduced, with the exception of isolated cases of partially-improved animals, as the original Leicesters (Bakewells) of President Washington, and the Merinos imported by Mr. William Foster, of Boston, who gave them to a gentleman to keep, by whom they were "kept" and eaten! In 1801 four Spanish rams were embarked for the United States by M. Dupont de Nemours, chief of a French commission to select sheep in Spain under the treaty of Basle, and a banker named Delessert, but only one lived to reach New York. It went to Delaware, and was used effectively in producing valuable grades. Yet the founding of the improvement which ultimately produced the American Merino bears the date of 1802, when our minister to France, Mr. Livingston, sent home two pairs of French Merinos (originally Spanish Merinos which had been modified by a course of breeding) from the imperial flock at Chalons. In the same year our minister to Spain, Colonel Humphreys, brought home with him 21 rams and 70 ewes from the best flocks of the fine-wools of Spain. From these and subsequent importations,† aided by three-fourths of a century of skillful breeding, came the best race of Merinos now extant, which has modified, in greater or less degree, more than nine-tenths of the flocks of the country, changing the natives or scrubs of different origin into Merino grades, doubling the weight and value per pound of their fleeces, and transmuting fibers little better than the carpet-wools of nomadic sheep-husbandry into the fine and soft material for clothing fabrics and the longer staple of Merino combing-fleeces.

The improvement was rapid. In 1810 one of Mr. Livingston's yearling rams weighed 145 pounds and bore a fleece of 11 pounds 11 ounces; and his full-blood ewes averaged fleeces of 5 pounds 13 ounces, 60 per cent. more than his best common ewes, and the maximum weight was 8 pounds 12 ounces, while the first cross made an improvement amounting to fully 50 per cent.

Recent as is the improvement in this country, it is nearly as old as in Europe.‡ Great Britain tried the Spanish sheep, but the demand for mutton, and the necessity for worsted wool, gave impulse to progress in another direction, upon a foundation of original Leicesters and Lincoln and Southdown blood. The first year of the present century found that country dependent on Spain and Portugal for foreign wool; and of the meager importation, amounting to only 8,609,368 pounds, these countries sent respectively 6,062,824, and 1,731,934 pounds, while Germany sent 412,394 pounds, and the Netherlands 141,739 pounds. Such is the growth of the wool manufacture in Great Britain, that in 1877 no less

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*Sheep were brought to Jamestown, Va., in 1609.

‡The heaviest were made by Consul William Jarvis, in 1809, amounting to nearly 4,000 in number.

†The Spanish Merino was brought into Saxony by the Elector in 1765; into Hungary, by Maria Theresa, in 1775; into France in 1776. George III introduced them into England in 1785. The Rambouillet or imperial flock of France was established in 1786.

than 405,949,161 pounds of wool were imported—forty-seven times the receipts of seventy-five years ago.

As late as 1820 the value of British exports of wools and manufactures of wool was only £5,989,622; in fifty-two years such exports reached the sum of £32,383,273; of which worsted contributed £20,905,163, and cloths, formerly the main lines of exports, only £6,991,718. This explains the necessity for England's adherence to combing-wool races, while her crowded factory population equally necessitate the mutton product which is the concomitant of these worsted works.

RECIPROCITY OF GROWTH AND MANUFACTURE.

In this country, rapid growth of the manufactures of wool has been concurrent in point of time with the principal development of such industry in the mother country; and considering the fact that this maternal ancestor attempted to strangle the infant industry—and nearly succeeded in accomplishing the infanticide after the war of 1812—and the additional fact that hostile legislation at home, as well as frequent changes of such legislation, has at times crippled its energies and retarded its progress, the growth of wool manufacturing in America is a greater wonder than its progress in Britain. During ten years prior to the war with that country there was no industrial interest so prominent in the public eye as this manufacture. Domestic manufacture in the family by the hand-loom began to give place to the associated effort and improved machinery of the factory. The fame of the new Merinos flew from farm to farm, and as fleeces grew heavier and prices advanced, the finest rams of this stock commanded in some cases a thousand dollars each; factories were built and surplus farm labor was diverted to the mill, raising the price of rural labor, making a market for superabundant produce and inspiring hope and confidence, resulting in 1810 in a product of wool manufactures of the value of $25,608,788. After the war, in a gush of conciliation, the bars of the customs were let down, importations became excessive, prices were prostrated, panic ensued, the mills were stopped, and this magnificent beginning was quenched in failure, so that the product of 1820, years after, had become only $4,413,068. Its rate of increase has since been variable as tariff-legislation has fluctuated. The figures for 1830 are $14,528,166; for 1840, $20,696,999; 1850, $43,207,545; 1860, $61,894,986. Then comes a period of magnificent progress. In seventeen years twofold more was accomplished than in sixty preceding, whether in value of product, quantity of wool used, or increase in skill in manufacture and variety of fabric. An advance was made that rendered possible the magnificent display of native woolens at the Centennial Exhibition, which astonished our European competitors, and opened the eyes of thousands in our own country to an advance in skill in workmanship and excellence of goods of which few had any conception.

This progress is indicated in part by the census returns of 1870, showing a product of woolen goods of $155,405,358, and of worsteds a total of $22,090,331. In 1860 these totals were respectively $61,894,986 and $3,701,378. The increase in quantity of wool used for woolen goods was from 83,608,468 to 154,769,095 pounds domestic and 17,311,824 pounds foreign for worsteds, 3,000,000 pounds domestic in 1860 to 13,317,319 domestic and 3,836,982 foreign in 1870. The product of carpets was $7,857,636 in 1860, and $21,761,573, with an increase in wool used from 8,843,691 to 25,139,999 pounds. The value of hosiery was $7,280,266 in 1860 and $18,411,561 in 1870, with an increase in pounds of wool from 2,927,626 to 5,304,655.

Since 1870 the increase has been about 25 per cent. We now manufacture about five times as much as in 1840, and more than three times as much as in 1860. Our recent importations of wool are less than 50,000,000 pounds per annum, and our home production four times as much. In brief, we manufacture four-fifths of all goods made of wool which enter into consumption, and what is better, we use home-grown wools for four-fifths of that manufacture.

Instead of increasing the cost of clothing and carpets, by the national policy of producing them at home, prices are lower than in 1860. Instead of wearing the shoddy of cast-off European clothing, our goods are firmer and stronger and more durable than foreign importations. Had our factories no existence, the extra demand of 46,000,000 of wool-wearing people would advance the price of clothing throughout the world. Had they no existence, wool-growing would likewise have no status, as the history of this industry, the tendencies of our rural economy, and the genius of our people all show that the success of wool-raising and wool-manufacturing is correlative and inseparable. If manufacturing declines in this country, wool-growing will retrograde; if wool-growing recedes, the prosperity of manufactures will be impaired. *There never will be an export of wool from this country under any probable circumstances.*

The superiority of American wools, in soundness, strength, and length of staple, gives our manufactures an advantage of great value. The inventive genius of our people has already obviated much of the competition of European rates of labor. Our factories are rapidly acquiring the secrets of peculiar and popular foreign styles and fabrics, and even improving upon them and inventing new processes and textures.

Fancy cassimeres were until recently entirely of foreign production. Now the world-famous establishments of Sedan and Elbœuf are equaled or distanced. A bit of M. Boujeon's goods, taken from the inside of a collar of an overcoat worn by a gentleman from Paris, was the inspiration of the Crampton loom, on which fancy cassimeres are now woven, not only in the United States but also in several countries of Europe. These goods were at the Centennial Exhibition, and the Swedish judge, Mr. Carl Amberg, a practical wool manufacturer, was compelled in his admiration to say to Mr. Hayes, the secretary of the Wool Manufacturers' Association, "You know that the best fancy cassimeres in the world have been made at Sedan and Elbœuf in France. If these goods were placed by the side of the Elbœuf cassimeres, you could not tell one from the other, and the goods could not be bought at Elbœuf for the prices marked here." These goods were made from American wool.

The worsted coatings, differing from the fancy cassimeres in being made from combed instead of carded wool, are a recent triumph of our manufacturing skill. These goods obtained notoriety in the Paris Exhibition of 1867, and have since been produced successfully here; and as an incidental result another industry has been created, the combing and spinning of worsted yarns, of which an exhibition was made at Philadelphia by companies representing $1,500,000 of annual production, which obtained an award showing them to be superior to yarns from the best Australian wools, being "kinder, more elastic, and stronger."

Inventions for producing felt fabrics, by two Americans, Williams and Wells, after repeated failures of the French in the same direction, are used on both continents for almost innumerable forms of goods.

In flannels, America has already surpassed Europe, making goods of a better quality, because as well made of better wool. For twenty years European flannels have been driven from our markets, and we now export them to Canada, and may soon be able to make a market for them

in Europe. The yarns from these flannels are more closely twisted, the goods shrink less, and are more highly finished and smoother in face. Even the opera flannels are now made here, from American wools, which produce a softer fabric than Australian fleece.

Commendable progress has been made in competition with France in the finer styles of ladies' dress goods, such as delaines, serges, and merinos. There is a single corporation—the Pacific Mills—in Massachusetts with a flooring area larger than a forty-acre farm, with facilities for manufacturing a million yards of these goods per month, giving employment to more than five thousand laborers, largely women and children, with a monthly pay-roll of $160,000.

But the greatest of American inventions and progress in the manufacture of wools is in the production of carpets. Even Brussels, Wilton, and Axminster, of home production, are taking the place of foreign goods. The imports of carpets in 1875 amounted to but $2,643,932, while the production of mills of the United States during that year amounted to $32,316,168—the monthly manufacture equal to the yearly importation.

A few years more of success will perfect processes, reduce prices of manufactured goods, and open the markets of the world to the surplus of manufacture, without reducing either the value of labor or of wool to the level of foreign rates, or to the point of abandonment as unprofitable in competition with other labor.

As the manufacture has advanced or declined, so has the production of wool. If prices have fallen rapidly, as in 1868, when in consequence of decline and panic in the markets of the world, and the sale of an avalanche of military goods, our markets were glutted, the immediate result has been a sacrifice of sheep by millions, not less than four millions in the year named, mainly for hide and tallow. It may have been unwise, but the American people are impulsive, and prone to change a business at whatever loss that does not assure a present profit. There are a few wiser operators who act on the principle of buying when others are selling out.

After the first era of rapid increase, from 1802 to 1812, succeeded the fall of manufactures, and as a result the destruction of sheep-husbandry. Slowly recuperation began the retrieving of this national loss, until in 1836 there may have been seventeen millions of sheep in the country, mostly in the Northern States. In that year a canvassing of the flocks of the country was made, with all attainable official data from the States, by Messrs. C. Benton and S. F. Barry, the ultimate result of whose labors is given in the following table:

States.	Number of sheep.	Pounds of wool.	Value of wool.
Maine	622,619	2,023,512	$1,021,873
New Hampshire	465,179	1,511,832	763,475
Vermont	1,099,011	3,571,786	1,803,751
Massachusetts	373,332	1,213,297	612,715
Rhode Island	81,619	265,262	133,957
Connecticut	255,169	829,299	418,796
New York	4,299,879	13,974,606	7,057,176
New Jersey	250,000	812,500	410,313
Pennsylvania	1,714,640	5,572,580	2,814,153
Delaware	150,000	487,500	246,187
Maryland	275,000	893,750	451,343
Virginia	1,000,000	3,250,000	1,641,250
Ohio	1,711,200	5,561,400	2,808,500
Kentucky	600,000	1,950,000	984,750
Total	12,897,638	41,917,324	21,168,246

In 1836 the imports of wool slightly exceeded 12,000,000 pounds.

Numbers of sheep had increased in 1840, according to the census return, to 19,311,374; in 1850, to 21,723,220; in 1860, to 22,163,105. These figures were not quite up to the actual numbers, as is now known, but much nearer the reality than the returns of wool, which were quite too low, averaging but 1.84 pounds per head in 1840, 2.42 in 1850, and 2.73 in 1860. In 1870 the census returned 28,477,951 upon farms; while the estimates of this department for all sheep in the country was 31,851,000, and their aggregate value $74,035,837. The present numbers, assumed to be about 36,000,000*, exhibit wonderful improvement in quality and quantity of wool by a strong infusion of blood of the American Merino, aided in a very limited degree by breeding from the best English mutton breeds.

Taking into account with the fleece wool of annual shearing the wool of the yearly increasing numbers of lambs killed and sheep butchered for mutton, the supply of United States wools approximates 200,000,000 pounds. It has not been estimated annually in this department, but the commercial estimates, possibly a little high, do not greatly exaggerate the quantity.

* The estimates from returns in January, 1876, are as follows:

States.	Number.	Average price.	Value.
Maine	525,800	$2 78	$1,461,724
New Hampshire	239,900	2 60	623,740
Vermont	461,400	2 82	1,301,148
Massachusetts	60,300	3 60	217,080
Rhode Island	24,500	3 75	91,875
Connecticut	92,500	3 70	342,250
New York	1,518,100	3 30	5,009,730
New Jersey	128,300	4 46	572,218
Pennsylvania	1,607,600	3 09	4,967,484
Delaware	35,000	4 00	140,000
Maryland	151,200	3 65	551,880
Virginia	422,000	2 58	1,088,760
North Carolina	490,000	1 54	754,600
South Carolina	175,000	1 80	315,000
Georgia	382,300	1 57	600,211
Florida	56,500	1 90	107,350
Alabama	270,000	1 75	472,500
Mississippi	250,000	1 75	437,500
Louisiana	125,000	1 80	225,000
Texas	3,674,700	2 09	7,680,123
Arkansas	285,000	1 85	527,250
Tennessee	850,000	1 92	1,632,000
West Virginia	549,900	2 17	1,193,283
Kentucky	900,000	2 97	2,673,000
Ohio	3,783,000	2 78	10,516,740
Michigan	1,750,000	2 53	4,427,500
Indiana	1,092,700	2 14	2,338,378
Illinois	1,258,500	2 48	3,121,080
Wisconsin	1,323,700	2 44	3,229,828
Minnesota	300,000	2 20	660,000
Iowa	560,000	2 30	1,288,000
Missouri	1,271,000	1 82	2,313,220
Kansas	156,600	2 31	361,746
Nebraska	62,400	2 77	172,848
California	7,061,000	1 52	10,732,720
Oregon	1,074,600	1 76	1,891,296
Nevada	72,000	2 00	144,000
Colorado	600,000	2 00	1,200,000
The Territories	2,600,000	2 30	5,980,000
Total	36,240,500	.....	81,363,062
Grand average of prices	.....	2 25	.....

The following table has been prepared from estimates of Mr. James Lynde, of New York:

Years.	Washed.	Rocky Mountains.*	Texas.	Southern.	Aggregate.
1867	140, 000, 000	11, 000, 000	7, 000, 000	2, 000, 000	160, 000, 000
1868	150, 000, 000	16, 000, 000	8, 000, 000	3, 000, 000	177, 000, 000
1869	134, 000, 000	17, 250, 000	7, 000, 000	3, 000, 000	162, 250, 000
1870	130, 000, 000	23, 000, 000	7, 000, 000	3, 000, 000	163, 000, 000
1871	110, 000, 000	25, 000, 000	8, 000, 000	3, 000, 000	146, 000, 000
1872	120, 000, 000	27, 000, 000	9, 000, 000	4, 000, 000	160, 000, 000
1873	125, 000, 000	37, 200, 000	9, 000, 000	3, 500, 000	174, 700, 000
1874	120, 000, 000	44, 500, 000	10, 000, 000	3, 500, 000	178, 000, 000
1875	125, 000, 000	52, 000, 000	12, 000, 000	4, 000, 000	193, 000, 000
1876	110, 000, 000	70, 250, 000	13, 000, 000	5, 000, 000	198, 250, 000
1877	117, 000, 000	70, 250, 000	14, 000, 000	7, 000, 000	208, 250, 000

* Including Pacific slope.

The following record of the quarterly average prices of Ohio clothing wool (the best average product of American merino grades), as sold in the Boston market during the last seventeen years, is furnished by Mr. George William Bond, of Boston:

Years.	January.			April.			July.			October.		
1860	$0 60	$0 50	$0 40	$0 52	$0 45	$0 40	$0 55	$0 50	$0 40	$0 50	$0 45	$0 40
1861	45	40	37	45	37	32	40	35	32	47	47	52
1862	------	------	------	------	------	*50	------	------	*47	------	------	*58
1863	------	------	*62	------	------	*76	------	------	*73½	------	------	*70
1864	------	------	*74¾	------	------	*79	------	------	*83⅛	------	------	*1 03¾
1865	1 02	1 00	96	80	80	75	75	73	65	75	75	65
1866	70	65	50	65	60	48	70	67	60	63	60	56
1867	68	53	50	60	55	50	55	49	45	48	46	40
1868	48	43	38	50	48	45	46	45	43	48	48	45
1869	50	50	48	50	50	48	48	48	47	48	48	46
1870	48	46	44	48	47	46	46	45	43	48	48	45
1871	47	46	43	50	52	47	62	60	55	63	62	58
1872	70	67	66	80	80	76	72	70	65	66	60	57
1873	70	68	65	56	53	48	50	48	44	54	53	47
1874	58	54	47	56	56	47	53	53	46	54	54	47
1875	55	56	47	54	52	46	52	49	46	48	50	42
1876	48	52	42	46	49	40	38	35	31	45	40	38

* Average price.

The Boston record of Ohio wool prices, from the same source, is, from 1840 to 1861, as follows:

Years.	Fine.	Middle.	Long.	Years.	Fine.	Middle.	Long.
1840	$0 45	$0 36	$0 31	1851	$0 41	$0 38	$0 32
1841	50	45	40	1852	49	45	40
1842*	------	------	------	1853	55	50	43
1843	41	35	30	1854	41	36	32½
1844	42	37	32½	1855	50	42	34
1845	36½	30	26	1856	55	47	67
1846	34	30	26½	1857	56	47	41
1847	47	40	30	1858	53	46	36
1848	32	28	24	1859	58	47	35
1849	41	37	32	1860	54	47	37
1850	47	42	36	1861	45	45	50

* Price all around, 33½ to 35 cents.

While the prices of fine wools have declined all over the world, those of coarse and long wools have appreciated, and the great increase of weight makes a much higher average value per fleece and gives a better profit to the farmer than could the former style and price of wool.

TRANSITION IN SHEEP-HUSBANDRY.

There are those who jump hastily at conclusions, from insufficient premises, who point to the undoubted fact that numbers of sheep are of late decreasing in the region west of the Mississippi and north of the Ohio, and assume boldly that sheep-husbandry is unsuitable to that region and destined to be displaced. It is asserted that on lands worth $50 per acre sheep cannot be profitably kept. On the other hand, it is in England declared, from long experience on land worth $200 to $500 per acre, that fertility cannot be profitably sustained without sheep.

There is always a grain of truth in popular impressions, even though ill-founded. The explanation of the difficulty is found in the fact that sheep-husbandry is not limited to *wool-growing*. It is undoubtedly true that *wool* can be produced more cheaply on government land, or on rich prairies obtainable for $1.25 to $2.50 per acre, than on high-priced lands near to markets. The competition of fruits and dairy products tends to drive wool-growing to the wall. "Wool-growing" has been driven from England; it has been expelled from every department in France except the mountain districts, and mutton and wool production has taken its place. The predominance of Merinoes has made the transition from wool to mutton slower in France than in England, yet, under the necessities of the case, none the less sure; and, strange to say, under the breeding of Rambouillet the Merino itself has become substantially a mutton sheep, very large in size, very coarse and long in fiber for a Merino, heavy in carcass, with an increased aptitude for taking on flesh, and an earlier maturity. But this process of muttonizing a Merino has not been fast enough; the English Leicester and Cotswold have been employed to facilitate the process.

The government, which for ninety-four years has kept a Merino-breeding establishment,* with tendencies and results as above, has also a national *bergerie* at Haut-Tingry (Pas-de-Calais, on the English Channel), established in 1859, for the purpose of breeding Leicesters and their crosses upon Merinoes; and large numbers of these cross-bred flocks are now found in the regions of the northwest and plains of the north. Then there are native coarse-wooled sheep, also cross-bred with Merinoes, abundant in Brie, Bergundy, Champagne, Provence, Reussilon, and other districts, that are among the most profitable flocks of France. It is even claimed that some flocks have equaled the Leicester and Southdown in fatness and earliness of maturing, while their fleeces are scarcely less valuable than that of the Merino.

The French have thus yielded to the necessity of making meat the first consideration, and in doing so have been wise in their refusal to

*The importance attached to sheep-breeding by the French Government is further shown in *L'Ecole de bergers* located at the national *bergerie de Rambouillet*. This institution is intended to train young men in the management of flocks. It is open to pupils from all parts of France. Every applicant for admission as an apprentice must pass examination in his own commune, and must show that he was sixteen years old on the previous 1st day of January; some moral and sanitary requirements are demanded as in the other schools. All the pupils are boarded gratuitously, receiving the same fare as the rural population of the country. They sleep near the sheep-folds in regular turn. Their course of instruction lasts two years, and no charge of tuition is made. The chief shepherd exercises them in the management of all operations of sheep-husbandry, lambing, weaning, castrating, pairing, gestation, parturition, shearing, folding, feeding, slaughtering, preparation for market, &c. They are taught the best treatment of sick animals. They also cultivate the land. If their primary instruction is defective, it is supplied by special teaching. Their instruction is tested and completed by the subdirector. After two years of pupilage, if they pass a satisfactory examination, they receive a certificate, with a premium of 300 francs.

sacrifice the wool required by their peculiar styles of manufacture, and have thereby gained, not the coarse fiber of great length produced by the mutton breeds, but that having much of the fineness of Merino wool, with a material increase in length. Their breeders have demonstrated, perhaps more successfully than any other nation, that improvement in intrinsic value of fleece and increase in meat production may keep pace with each other. The climate, soils, and agronomic conditions of this country have contributed to this result.

Sheep-husbandry in this country is now undergoing the transition which has produced the changes indicated above in foreign countries. It is beginning to yield to the governing force of circumstances, of climate, soils, status of agriculture, and home demand for meat and wool, in the formation of types of sheep suited to existing requirements of our rural and manufacturing economy.

In the Ohio Valley and Middle and Eastern States the idea of keeping sheep year after year for wool alone is antiquated and fossiliferous. It is like raising calves in New England to be fed four winters for beef-making in competition with the winter feeding with the boundless plains of the Southwest. It is a logical sequence from blue grass and Short Horns that Kentuckians discard or modify the Merino. Early maturity, rapid conversions of forage into meat, quick returns, are a necessity of sheep-husbandry in fertile and cultivated districts, which is driving to the distant West the business of producing wool without regard to meat. Mutton breeds are increasing in all this region, and the Merino is receding, and the latter is so disproportionate to the former in numbers that the present effect is to decrease the aggregate of flocks.

There are several considerations tending to such a change. The rapid increase of population, the increasing price of beef, the inferiority of pork in healthfulness and nutrition (it has been found difficult to keep the hog from dying before he is ready for the knife), and the increasing demand for good mutton, all tend powerfully in this direction. The flesh of the sheep is the best meat in the world; it is also the poorest. A lean, thin sheep, Merino or scrub, that has outlived its usefulness as a wool-bearer, and been cut down by the relentless knife as a cumberer of the pasture-ground, and consigned to the pot in the vain hope of macerating its toughened fibers, affords an unsavory and unpalatable meat, which has taught many to loathe the very name of mutton and abominate its very smell. On the contrary, not the aromatic flavors of venison, the gamy richness of wild fowl, or the sweet juices of a Short-Horn sirloin can surpass the virtues of Southdown marrow and fatness. It is sweeter to the palate, digestible with greater facility, and more nutritious than any other variety of food. Even the first crosses of such animals upon Merinoes work a wonderful improvement in the quality of the flesh. Among the prime results of cross-breeding are increase of size, fecundity, early maturity, and early fattening. A greatly desired result is thus easily attained.

The increase of mutton-eating is indicated by the rapid extension of sales in all our large markets. The British, presumed to be a nation of beef-eaters, rather deserve to be regarded as pre-eminently mutton-eaters. The prices of mutton have advanced more rapidly in England than those of beef. Prices in this country have also greatly advanced.

Another consideration is the increase of price of worsted wools, which has been advancing, as compared with fine wools, for many years. The great demand of our manufacturers at the present time is for such wools, which they have been forced to meet in some degree by new machinery suited to the use of the comparatively long fibers of half and three-

fourths grade Merinos, by which a large portion of the wool of Ohio and Michigan is substituted for real combing wool. Carpets, blankets, flannels, and ladies' dress goods, and much of the wear of gentlemen, require the wool of mutton breeds and cross-bred flocks, of which more can be used, with the present tastes of consumers and tendencies of manufacture, than of the short cloth wool of the pure Merino.

There is a necessity of sheep-husbandry for meat production, now beginning to be acknowledged in the Central States, as an ameliorator of the soil. While dairying, and the shipment of its products, withdraws rapidly from the soil its needed phosphates and other valuable elements, and reduces its fertility, the feeding of sheep tends directly to the enrichment of the soil. As the numbers of sheep diminish, in districts oldest and most systematic in their agriculture, the yield of wheat declines. As sheep became a more prominent element of English farming, the yield of wheat increased, until 28 bushels per acre are produced. The turnip, which feeds the sheep that manures the field that yields this wheat, is deemed "the sheet-anchor of British husbandry." Our wheat yield averages but 12 bushels, and never will yield more without the aid of meat production as a permanent element of farm economy. The superiority of sheep to other animals in this connection, even upon the farming lands of highest price, is thus attested by Mr. William Brown, of Scotland:

> Not only in quality and variety, but proportionately to any other country in the world, Britain feeds the largest number of sheep. Irrespective of adaptability of physical characteristics, the mere fact that of all animals this is easiest fed, gives perhaps the largest returns in the shortest time, and is a first-class fertilizer of the soil, is sufficient reason for such prominence.

Mr. George Geddes, of New York, than whom no man in the country is better acquainted with the practical aspects of this question, writes concerning it:

> It is not easy to see any good reason why the older sections of our country, having great cities and manufacturing centers for markets, should not follow the example of England in this matter. It has been proved by the best of tests, that of actual trial, that our soils and climate are well adapted to these heavy sheep. Nothing of uncertainty on this subject remains but the uncertainty of our national legislation. A policy of free trade in wool and woolen goods would for a while destroy our purchasers of wool, and ruin both branches of the business. If the existing revenue laws can be allowed to remain, we may reasonably hope that at least the present prices of our wool will be continued to us; and, if so, we can continue to expand the production. The business will, in the older parts of the country, be a close one, yielding very small direct profits, but indirectly so very valuable, as the means of making manure to raise grain crops, that it will go on; and more economy in food, housing, and general management will come in due time as skill increases, and the mutton-producing sheep and the growing of grain will go hand in hand.

He gives an example which may be taken as a test of the capabilities of the best farming districts for profitable sheep-husbandry. In 1840, Mr. William Chamberlain, of Red Hook, Dutchess County, New York, bought a worn-out hay-farm of 380 acres. It yielded but 17 loads of hay the next season; 40 acres of rye produced 400 bushels; from 25 acres of corn were harvested but 500 bushels; and the remaining land pastured only a span of horses, two pairs of oxen, and a cow. It was too poor to produce red clover. The commercial manures were comparatively useless, wood ashes were better, but no means of recuperation were successful till sheep were tried, which converted corn, hay, straw, leaves, and weeds into manure, until, in 1866, the farm produced 800 loads of hay (600 tons), 40 acres of corn yielding 50 bushels per acre, 30 acres of wheat averaging 15 bushels per acre, 30 acres of oats, 8 acres of roots, the pasturage of 300 sheep and oxen and cows required for

work, and milk and butter on the farm. In aid of this result he had the manure of 300 sheep, fattened the previous winter, on which he made $300 clear profit, besides the fertilizer. He used the manure at first, spreading it thinly to make it go the further, to render possible the growth of clover. Similar statements are among the records of this department, with similar results, which show that the sheep is as valuable in this country as in Europe for sustaining and increasing the fertility of the soil.

An important branch of this industry, and one that many have found quite profitable on lands worth $100 per acre, is the raising of early lambs.

New Jersey, lying between the two largest markets in the country, which feed a population of 2,000,000, is famed for the high prices of all feeding material; and yet this branch of sheep-husbandry flourishes there as in no other State in the country. Her flocks, consisting mainly of ewes, are yearly changed. Selected in August for their thriftiness and adaptation to breeding, from flocks driven from Pennsylvania or Ohio, and costing from $3 to $6 per head, they are pastured in early autumn; usually served by Southdown rams; fed well during winter; their clips sold early in spring; their lambs turned off in May and June, at $4 to $8 each; and the mothers, in the mean time, fattened to follow their offspring early in summer. Thus, within twelve months, fleece, lamb, and mutton are converted into cash, and from $6 to $10 per head received for feed and care, besides a supply of valuable manure. Here are quick returns and good profits. The breed is the common grade Merino stock of the country, selected with reference to size, thrift, and constitution; the lambs are cross-bred, partaking largely of the Southdown superiority in quality, and of the aptitude of cross-breds for fattening readily. Both sheep and lamps are disposed of promptly. No feed is wasted in keeping the vital machinery in working order, and losses from old age and epizootics are avoided. This is the prominent feature in New Jersey sheep-farming; it yields a present profit, and insures future fertility.

Some counties in Southern New York and Eastern Pennsylvania pursue a similar course, to some extent, with similar results; some flocks yielding a gross increase of 200 per cent. upon original cost, within twelve months. A flock of 68 ewes, in the summer of 1868, was turned upon Virginia wheat stubble, seeded with clover, and, without other feed or care, over 100 lambs were sold in May, 1869, at $5 per head, realizing nearly $300 above the cost of the ewes, in addition to the original stock and wool on hand. A gentleman in New Kent County, Virginia, writes me that he keeps 100 common ewes; breeds to Southdown; sells an average of 80 lambs annually, at $4 each, and obtains enough for wool to pay all expenses of keeping, while the benefit received by his land is equal to the interest on its value, leaving the receipts for lambs as interest and profits on investment. Another, in Clarke County, Virginia, tried Merinoes and Cotswolds. Both breeds did well, but, while the Merino lambs brought $2 each, the Cotswolds were worth $4, and the prolificacy of the Cotswolds was far greater.

The circumstances which envelop this industry in the United States are rather like those obtaining in France than those influencing British breeding, in the fact that our improved sheep are high-bred Merinoes and our common stock largely modified by Merino blood. Our manufactures, also, our tending toward the French type, and our hope of commanding the future markets of the world depends upon our quick invention, facile skill, and deft manipulation, so necessary to the lighter fabrics of taste and fancy, in which excellence has already been attained. For providing the wool requisite for such work there is no

better foundation than the Merino. As we have inventive genius, and the predominance of this style of flocks, all that is needed is skill in cross-breeding with combing-wool rams to produce any kind of wool desired for tasteful and high-priced goods. With practical judgment in feeding, with reference first to quick production of meat and incidentally to the best results in wool, the business of sheep-husbandry should become far more profitable than as at present conducted, and more generally extended throughout the densely-settled districts of the United States.

ROCKY-MOUNTAIN SHEEP-WALKS.

From Mexico to the British Possessions, from the Missouri River to the Pacific Ocean, an area of more than a thousand million of acres* (not including Alaska) has been for ages the home of countless numbers of the buffalo, of the antelope, and on the higher elevations the Rocky-Mountain sheep and the Rocky-Mountain goat. Relatively, few are the acres that do not supply some form of vegetation for herbivorous animals. Their bones lie bleaching on plain and mountain slope, flecking with white the landscape at every view, from the lowest levels up to the timber line. While Mount Washington, at an elevation of 5,000 feet, is barren rock, with scarcely a vestige of vegetable life, the scores of peaks of the Sierra Madre, up to 10,000 and 12,000 feet, abound with grassy slopes and shady nooks, dense with a luxuriant growth of grass. At 7,000 feet the climate and herbage combine to furnish the advantages of the dairy region of Northern New York. At so high a latitude as the plains of Laramie the pasturage is a wonder of freshness and abundance. Like an inland sea of emerald, the range stretches from horizon to horizon, relieved only by straggling patches of motley color of bovine herds, or white specks of scarcely distinguishable flocks.†

* Little more than two per cent. of this area is land now in farms, as the following table shows:

States and Territories.	No. acres in farms.	No. acres not in farms.	No. acres in total area.
Kansas	5,656,879	46,386,681	52,043,520
Nebraska	2,073,781	46,563,019	48,636,800
California	11,427,105	109,520,735	120,947,840
Oregon	2,389,252	58,586,108	60,975,360
Nevada	208,510	71,529,090	71,737,600
Colorado	320,346	66,559,654	66,880,000
Utah	148,361	53,916,682	54,065,043
New Mexico	833,549	76,735,091	77,568,640
Washington	649,139	44,147,021	44,796,160
Dakota	302,376	96,293,752	96,596,128
Montana	129,537	91,877,103	92,016,640
Idaho	77,139	55,151,021	55,228,160
Arizona	21,807	72,884,433	72,906,240
Wyoming	4,341	62,640,727	62,645,068
Indian	.....	44,154,240	44,154,240
Total	24,252,122	996,945,317	1,021,197,439

† Prof. Cyrus Thomas, the topographer of Hayden's survey, in a communication to this department, has said:

"There is probably no finer grazing region in Wyoming than this. The southeastern part is literally carpeted with a compact growth of rich and nutritious grasses, kept constantly fresh by the water of the numerous mountain streams. The rainfall is also greater than in any other part of the Territory, and it seems to be on the increase. Notwithstanding the elevation of these plains, the winters are comparatively mild and open, the fall of snow being light, and stock is wintered without shelter, and with very little feeding. Large flocks of sheep and cattle have passed the winter here with no other feed than the uncut grass of the valleys and plains. Hay in abundance and of the best quality can be obtained along the creek bottoms at nominal expense."

Here are mountain basins, parks large enough for a principality, and plains carpeted with herbage that stretch eastward five hundred miles. The valleys of countless rivers, meandering for hundred of miles, are in many cases miles in width, with taller growths, offering to the first mower that appears thousands of tons of wild hay. Even the bluffs of many of these streams are rounded and grass-grown, and many of the long slopes, especially of the more northern portion of the mother range, are simply rolling mountain prairies.

In a small section of this great domain, the North Platte Valley, flow tributary streams, draining and watering a pastoral region that has been estimated at 40,000,000 acres. Some of the larger are, on the north, the Blue Water, Cold Water, Hill Creek, Raw Hide, Muddy, Willow, Shawnee, State, and Sweet Water; and, on the south, the Ash, Pumpkin, Larran's, Dog, Horse, Cherry, Chugwater, Sybelle, Big Laramie, Caster, Cottonwood, Horseshoe, Elk Horn, La Prele, Boisee, Deer Creek, Medicine Bow, Rock Creek, Douglas, North, South and Middle Forks, These streams and their feeders would make a formidable list; but similar lists would be required for the Arkansas, the Canadian, the Colorado, Columbia, Sacramento, and many others. Ten years of exploration, by three separate expeditions, at a cost of one to two millions of dollars, have surveyed and mapped but a small portion of this Territory. Much has been written of these resources, and more is still unknown of the details of the wealth of pasturage yet unutilized. Of course, there is much that is thin and sparse, much that is covered with sage, and among the mountains bare and frowning surfaces of rock.

A competent practical authority, Mr. Elihu Hall, of Illinois, has furnished the department a list of fifty-seven genera and one hundred and forty-three species of grasses growing on the eastern side of the principal range, of which fifty-two are not found east of the Missouri, belonging exclusively to the plain and mountain region. The relative distribution of the twelve more important species is thus presented, with their habitat:

	Plains.	Mountains.
	Per cent.	*Per cent.*
Andropogon furcatus	40	16
Andropogon scoparius	20	10
Sorghum nutans	20	12
Sporobolus heterolepis	12	1
Buchlœ dactyloides	5	5
Bouteloua oligostachya	0	10
Spartina cynosuroides	2	2
Festuca ovina	0	20
Festuca macrostachya	0	5
Bromus kalmii	0	8
Poa serotina	0	8
Stipa viridula	0	5

Andropogon furcatus, *Andropogon scoparius*, and *Sorghum nutans*, by their abundance in all the eastern portions of the district, are the leading species, and at present comprise at least three-fourths of the grazing resources of that portion of the country. Next in importance follows *Sporobolus heterolepis*. This species is peculiarily palatable to cattle, and they are seen roving over rich pasture of other species in search of it. This is also said to be the winter forage species of Kansas, where it abounds, affording the rich winter pasturage of the farmers and herders of that State. It flourishes chiefly on the moister portions of the plains, and many local areas are almost exclusively occupied by it.

The increase of sheep-husbandry in sections of this great area has been more rapid during the past ten years than in any other era or portion of the country. It produces now about the same amount of wool that

was clipped from all the flocks of the country in 1860. California alone produces as much as the census reported in 1850 for the United States entire. In ten years, from 1867, the year of the enactment of the present tariff, the increase in wool of the Rocky Mountain areas has been fourfold, and the product can still be immensely enlarged.

The cost of keeping sheep per head, under judicious management, in the main range of the Rocky Mountains, has been popularly estimated for several years past at thirty cents. Estimates of cost of products must be received with caution, as results vary with the incidents and accidents of pastoral experience and the judgment and energy of proprietors. It is safe to say that the field for sheep-husbandry here is continental, pasturage free to the first comers in the unoccupied and unsurveyed public domain, and the cost includes only the original stock, a small stock of fixtures and material, representing a "plant" of inconsiderable magnitude, and a minimum amount of labor and care.

SHEEP-HUSBANDRY IN THE SOUTH.

The sixteen States lying between Delaware and Missouri and between the Ohio River and the Gulf of Mexico had a population in 1870 of 13,877,615; and two-thirds of all engaged in occupations—industrial, mercantile, professional, or other—were in some rural avocation.* They have an area more than twice as large as that of the original thirteen States, larger than the actual area in farms in the United States, and almost a fourth of the entire area of the national domain. Nearly half of this acreage, amounting to more than two hundred million acres, is in wild pasturage of more or less value for subsistence of farm stock, and much of this herbage is unutilized to-day. Sheep do well in this region, which comprises all the climates and soils of the temperate zone. There is no portion of it unsuited to sheep-husbandry. Some of the finest samples of Saxon wool have been produced, even in its lower latitudes, without sensible deterioration of fiber from excessive heat.

The business of wool-growing was initiated at a very early day; Washington, Jefferson, Custis, and other eminent citizens felt a personal interest in it, and took a prominent part in the introduction of improved breeds of sheep. John Randolph did not represent public opinion when he said he would at any time go a mile out of his way to kick a sheep. Yet the increase of numbers and advancement in breeding have not been commensurate with these resources and successful beginnings.

What reasons can be assigned for progress so slow? Many, perhaps, but one will suffice; the preponderance of cotton and the absorbing interest in its culture. With an agricultural system so limited it is not strange that sheep-husbandry has assumed so little importance. Under the circumstances, with the prevalent aversion to diversity of rural production, progress has been considerable, demonstrating the dominating force of great natural resources in rural industries. The peculiar advantages of Texas long since attracted the attention of the world, and wool-growing has divided with beef production the labors and profits of its rural economy. The other fifteen States give this industry much less prominence, but together they support nearly twice as many sheep as Texas. The numbers in these States, as reported in the census of 1850,

* In 1870, the proportions of persons in agriculture to those in all occupations was as follows:

States.	In all occupations.	In agriculture.	States.	In all occupations.	In agriculture.
Delaware	40,313	15,973	Mississippi	318,850	259,199
Maryland	258,543	80,449	Louisiana	256,452	141,467
Virginia	412,665	244,550	Texas	237,126	166,753
West Virginia	115,229	73,960	Arkansas	135,949	109,310
North Carolina	351,299	269,238	Tennessee	367,987	267,020
South Carolina	263,301	206,654	Kentucky	414,593	261,080
Georgia	444,678	336,145	Missouri	505,556	263,918
Florida	60,703	42,492			
Alabama	365,258	291,628	Total	4,548,502	3,029,836

were 6,635,076; in 1860, 7,050,834; in 1870, 6,703,221. At the present time the aggregate is assumed to be about ten millions.

There is another element in the extension of wool-growing which is beginning to be active and influential—the advance in the manufacture of wool. It should act more powerfully in the future. With a small beginning in 1850 it has nearly doubled during each decade. At this rate of progress consumption will soon be upon the heels of production, and the future of the wool industry in both branches will be assured. The worsted industry has not yet obtained a footing in the South, but the manufacture of "woolens" has made satisfactory advances since 1850, as shown by the following arrangement of figures of the national census:

Number of establishments, of hands employed, and of sets of cards.

States.	Establishments.			Hands employed.			Number of sets of cards.	
	1870.	1860.	1850.	1870.	1860.	1850.	1870.	1860.
Delaware	11	4	8	399	114	140	30	8
Maryland	31	27	38	337	381	362	60	44
Virginia	68	45	121	278	494	668	116	50
West Virginia	74	.....	.....	316	.....	.....	132	.....
North Carolina	52	7	1	249	253	30	78	23
South Carolina	15	1	.....	53	92	.....	25	10
Georgia	46	11	3	563	383	78	72	30
Florida	1	.....	.....	1	.....	.....	1	.....
Alabama	14	6	.....	41	198	.....	24	14
Mississippi	11	4	.....	116	285	.....	17	13
Louisiana	2	1	.....	29	60	.....	12	4
Texas	20	2	1	100	43	8	29	4
Arkansas	13	.....	.....	31	.....	.....	17	.....
Tennessee	148	1	4	428	10	17	177	1
Kentucky	125	37	25	683	437	318	208	83
Missouri	156	11	1	718	70	25	258	15
Total	787	157	202	4,332	2,770	1,646	1,256	299
Aggregate of the United States	2,891	1,260	1,559	80,053	41,360	39,252	8,336	3,209

Quantity and value of wool and other material used.

States.	Wool used.				Value of all material.		
	Domestic, 1870.	Foreign, 1870.	1860.	1850.	1870.	1860.	1850.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Dollars.*	*Dollars.*	*Dollars.*
Delaware	533,732	12,455	140,000	393,000	392,614	75,807	204,172
Maryland	500,291	450	1,055,272	430,300	233,924	267,355	165,568
Virginia	741,000	1,200	1,131,000	1,554,110	317,800	389,204	488,899
West Virginia	673,003	.....	.....	.....	307,051	.....	.....
North Carolina	255,693	.....	504,500	30,000	166,497	151,005	13,950
South Carolina	55,696	.....	250,000	.....	22,238	60,000	.....
Georgia	620,937	.....	1,008,600	153,816	268,176	260,475	30,392
Florida	550	.....	.....	.....	150	.....	.....
Alabama	196,500	.....	264,435	.....	57,338	80,790	.....
Mississippi	154,790	.....	270,597	.....	70,566	119,849	.....
Louisiana	50,325	.....	69,150	.....	19,047	31,300	.....
Texas	278,045	.....	81,900	30,000	86,817	25,980	10,000
Arkansas	115,330	.....	.....	.....	55,782	.....	.....
Tennessee	1,030,153	.....	10,000	6,200	503,737	5,225	1,675
Kentucky	1,639,367	.....	1,452,500	673,900	831,628	510,902	205,287
Missouri	1,979,671	.....	191,400	80,000	849,313	56,745	16,000
Total	8,825,083	14,105	6,429,354	3,351,320	4,182,678	2,034,637	1,135,943
Aggregate of the United States	154,767,095	17,311,824	83,608,468	70,862,829	96,432,601	36,586,287	25,755,991

Quantity and value of all products of woolens manufactured.

States.	Products.				Value of all products.		
	Cloth, cassimeres, and doeskins.	Flannels.	Jeans.	Yarn.	1870.	1860.	1850.
	Yards.	*Yards.*	*Yards.*	*Pounds.*	*Dollars.*	*Dollars.*	*Dollars.*
Delaware	276,332	750	590,000	20,500	576,067	153,035	251,000
Maryland	64,490	31,327	4,610	72,100	427,596	605,992	295,140
Virginia	276,610	19,235	3,000	5,800	488,352	717,827	841,013
West Virginia	59,623	135,445	89,306	116,382	475,763	.....	.....
North Carolina	100,000	1,690	153,452	.....	298,638	291,000	23,750
South Carolina	.....	.....	13,000	.....	34,459	80,000	.....
Georgia	119,574	.....	177,155	40,000	471,523	464,420	88,750
Florida	.....	.....	.....	.....	500	.....	.....
Alabama	.....	.....	.....	107,800	89,998	191,474	.....
Mississippi	.....	.....	.....	2,087	147,323	158,507	.....
Louisiana	.....	.....	.....	.....	30,795	45,200	.....
Texas	10,000	.....	.....	400	152,968	38,796	15,000
Arkansas	.....	.....	.....	.....	78,690	.....	.....
Tennessee	4,158	3,919	145,692	79,002	696,844	8,100	6,310
Kentucky	41,585	63,232	1,244,578	21,440	1,312,458	845,226	318,819
Missouri	94,610	171,200	137,920	289,525	1,256,213	143,025	56,000
Total	1,046,982	426,798	2,558,713	755,036	6,538,187	3,742,602	1,895,782
Aggregate of the United States	63,340,612	58,965,286	24,489,985	14,156,237	155,405,358	61,894,986	43,207,505

In the change in agricultural industry so long heralded, from an absorbing specialty to varied culture, from an extensive and exhausting to an intensive and enriching system of husbandry, which change is slowly but it is hoped surely in operation, farm animals have an important part to act, and sheep especially. Even as an initial movement in this direction, as a pioneer in recuperative agriculture, the sheep will be found useful on the outskirts of the farm, among the weeds of neglected pasture, in the wastes overgrown with blackberry and other vines. The sheep will feed down and destroy much that occupies the place of nutritious grasses, and will subsist upon a much larger variety of plants than the horse or the ox. As a fertilizer, the manure of sheep in its intrinsic quality and its distribution and prompt utilization among the roots of grasses is unequaled. This has been so long and so notably manifest that the sobriquet of "goldenhoof" for the ovine animal has become proverbial. In England the sheep is the main dependence in the fertilization of the soil for the wheat crop. If the mutton returns barely suffice to pay the field value of the turnip crop, the manure is deemed a liberal profit. Good farmers in this country understand the value of the sheep as a means of soil improvement.

BREEDS PREFERRED.

The common or scrub stock of Texas is of Mexican origin; in the other States a mixture of stocks derived originally from England and France, and modified since by chance crosses with improved individuals of all the existing breeds. There has long been a tendency among the more enterprising wool-growers to improvement of wool by the use of Merino rams of good quality. It has of late been most active in Texas, and has increased both weight and fineness of fleeces. There is still great opportunity for such improvement. When it is found that by two or three crosses the yield can be doubled in quantity and greatly enhanced in price, nothing but indifference and neglect will prevent the improvement.

Where sheep husbandry is conducted on farms as a regular element of the farm economy by enterprising cultivators, the preference is generally for the mutton breeds—the Cotswold, or the Kentucky sheep, which is a modified Cotswold, taking the first place, and the Downs coming next, either the true Suffolk or Southdown or the families modified by Leicester blood, such as the Hampshires or Shropshires.

As early as in the beginning of the present century some of the best sheep in the country were found in Virginia. Washington, in his time, had collected a variety of fine animals at Mount Vernon from the sheep of England and other countries, and among them was a Persian ram, large and symmetrical in form, and bearing coarse wool of great length of fiber. Combined with Leicester blood, a flock was formed for which a claim was finally made to be considered a distinct breed, known as the Arlington. It was bred and owned by Mr. Custis. Hon. Robert R. Livingston, who shared with Mr. Jarvis the honor of being the first importers of Spanish Merinoes, expressed the opinion that this wool "possessed every ingredient which is esteemed in combing wool. It was fine for the sort, soft, silky, and beautifully white. It is admirably calculated for hose, camblets, serges, and other fine worsted fabrics." Mr. Custis claimed that some of these fleeces carried wool fourteen inches in length.

Mr. Custis owned another flock for which he claimed wonderful characteristics, and gave a specific name, the Smith's Island sheep. He sheared twice a year, and got from his best sheep four pounds at each clip. He described this flock with great enthusiasm, but the Merino breeders of the time took exception to his comparison with that breed, which in Livingston's flocks yielded eight pounds, while the French Merinoes of the national flock of Rambouillet sheared twelve or thirteen. What was the origin and what the end of this Smith's Island flock is unknown to the writer, but the account of it given by its owner is interesting:

I come now to speak of Smith's Island wool, a discovery from which will arise the happiest effects to my country, and yield the most grateful sensations to myself. This island [the property of Mr. Custis] lies in the Atlantic Ocean, immediately at the eastern cape of Virginia, and contains between three and four thousand acres. The soil, though sandy, is in many parts extremely rich and productive of a succulent herbage, which supports the stock at all seasons. About one-half of the island is in wood, which is pierced with glades running parallel with the sea, and of several miles in extent. These glades are generally wet, and being completely sheltered by the wood on either side, preserve their vegetation in a great measure through the winter, and thereby yield a support to the stock. Along the sea-coast are also abundant scopes of pasturage, producing a short grass in summer, which is peculiarly grateful to the palate of most animals, and particularly to the sheep. The length of this island is estimated at fourteen miles, which gives that variety and change of pasture so necessary to the system of sheep-farming. Within it are various shrubs and plants which the animal appears to browse on with great relish, particularly the myrtle bushes, with which the island abounds. The access to salt also forms a material feature in the many attributes which Smith's Island possesses.

The origin of the Smith's Island sheep cannot be precisely ascertained, but they are supposed to be the indigenal race of the country, put thereon about twenty years since, and improved by the hand of nature. When we compare Smith's Island wool with the native wool of the country at large we are lost in astonishment at the wonderful interposition of Providence in our behalf, which serves to show what benefits we enjoy, and how little we have estimated the gifts. The Smith's Island wool is, without question, one of the finest in the world, and has excited the praise and astonishment of all who have seen it. To recapitulate the various opinions given of its merits is unnecessary. It only remains to be judged in Europe, whither a specimen has been sent, to determine its value when compared with the famous Merino, hitherto the unrivaled material in the woolen manufacture. The Smith's Island is a great deal longer than the Spanish, being in full growth five to nine inches in length, and in some instances more. In quantity it is also vastly superior, as the sheep yield twice as much and in some instances more; and, lastly, the size and figure of the animal admits of

MERINO RAM "SEVILLE" (INFANTADO).

no comparison, being highly in favor of the Smith's Island. The only remaining question is the texture. If the Merino is finer in grain, the Smith's Island is so fine as to answer every purpose to which the other can be appropriated, and so much larger in quantity as to yield a better profit to the breeders. No cloth which the Merino manufactures will be disgraced by the introduction of the Smith's Island; and many fabrics manufactured by the one at a great price can be manufactured of the Smith's Island at much less. The Smith's Island is as white as snow, and perfectly silky and soft to the touch, and of delicate grain.

The present preferences for improved sheep, which should soon breed out of existence by judicious crosses the scrub stock of all this region, are very marked and confined to a few breeds. For the prairies of Texas, the wire-grass pastures of the coast, and the pastures of the mountain glades, including by far the greatest proportion of the pasture area described, the breed required is undoubtedly—

The American Merino.—The original of this breed, the best fine-wool sheep for this country in the world, was imported seventy-six years ago, a little later than the initiation of the improvement resulting in the now famous French, Saxon, and Silesian Merinoes. It is only about one hundred years since the beginning of the dispersion of Spanish sheep. The best Spanish flocks of that day would be discarded to-day by sheep-breeders in this country, or in France or Germany. The improvement has been great in each country, and the tendency invariably in the same direction—compactness of carcass, greater size and weight, and fleece of longer but not finer fiber. The French is the heaviest, with fleece of longer and coarser fiber. The American is bred for compactness of frame, hardiness, a dense and heavy fleece of medium length and fineness, and has been improving constantly for the past twenty years. The advance of the past ten has added materially to the weight of fleece, both in the grease and when scoured. It is not uncommon for a ram fleece to weigh thirty pounds and scour eight, an accomplishment scarcely attained even in the days of Hammond. The improvement of the Mexican and other common coarse wools of Texas and the Rocky Mountains, and the consequent increase in weight and value of the wool of those regions, has been very rapid of late, the result of infusion of pure blood of the American Merino. A good type of the latter is presented in the accompanying engraving.

The Cotswold.—This breed is a favorite in the South on account of its size and hardiness, though few flocks there are up to the present standard of perfection. In its purity it is one of the largest of the English breeds, though the improved race is smaller than the originals, on account of the influence of the Leicester element in its amelioration. As a breed it is of great antiquity. It has gained in fleece and form, and comes to maturity earlier, is more prolific than the Leicester, and has greater strength of constitution; is often fattened at fourteen months, yielding fifteen to twenty pounds per quarter, and twenty to thirty if kept till two years old. The fiber is 6 to 8 inches in length, and sometimes much longer; is strong, somewhat coarse, and of good color. The mutton is superior to that of the Leicester, with a smaller proportion of fat, and the sheep are also superior to that popular breed in weight of wool, size, hardiness, and vitality. They are possessed of good figure, have a large head, well set on, a broad chest, a well-rounded barrel, and a straight back. They are often used for crossing upon other breeds, and for obtaining early market-lambs, both in this country and in Europe.

The Southdown.—For early lambs, in the vicinity of cities, this breed is generally preferred. Some prefer the larger Hampshire Downs to the true Sussex, the original Southdowns, which have probably the purest blood of any British race. While they have been greatly improved,

progress has been unavoidably in one direction, and not by violent and radical changes. It has doubtless been carried on solely by selection. In the production of the Hampshires and Shropshires, members of the Down race, there has been an infusion of Leicester and other blood to give greater size and aptitude for fattening. This is in harmony with the idea dominating in the Shorthorn improvement in cattle, of the most meat in the shortest time. This breed has displaced the old flocks in Berkshire, Hants, Wilts, and Dorset, in England. The statistics of 10,000 Hampshires during three successive years showed the average yield of lambs to be 91 per cent. and the mortality of ewes 5½ per cent. per annum. The wool is of good quality, but short staple, weighing 4½ pounds fine fleece. February lambs at English fairs in summer realize 55 to 72 shillings per head, say $16 to $18. The accompanying engraving represents an imported Hampshire ram.

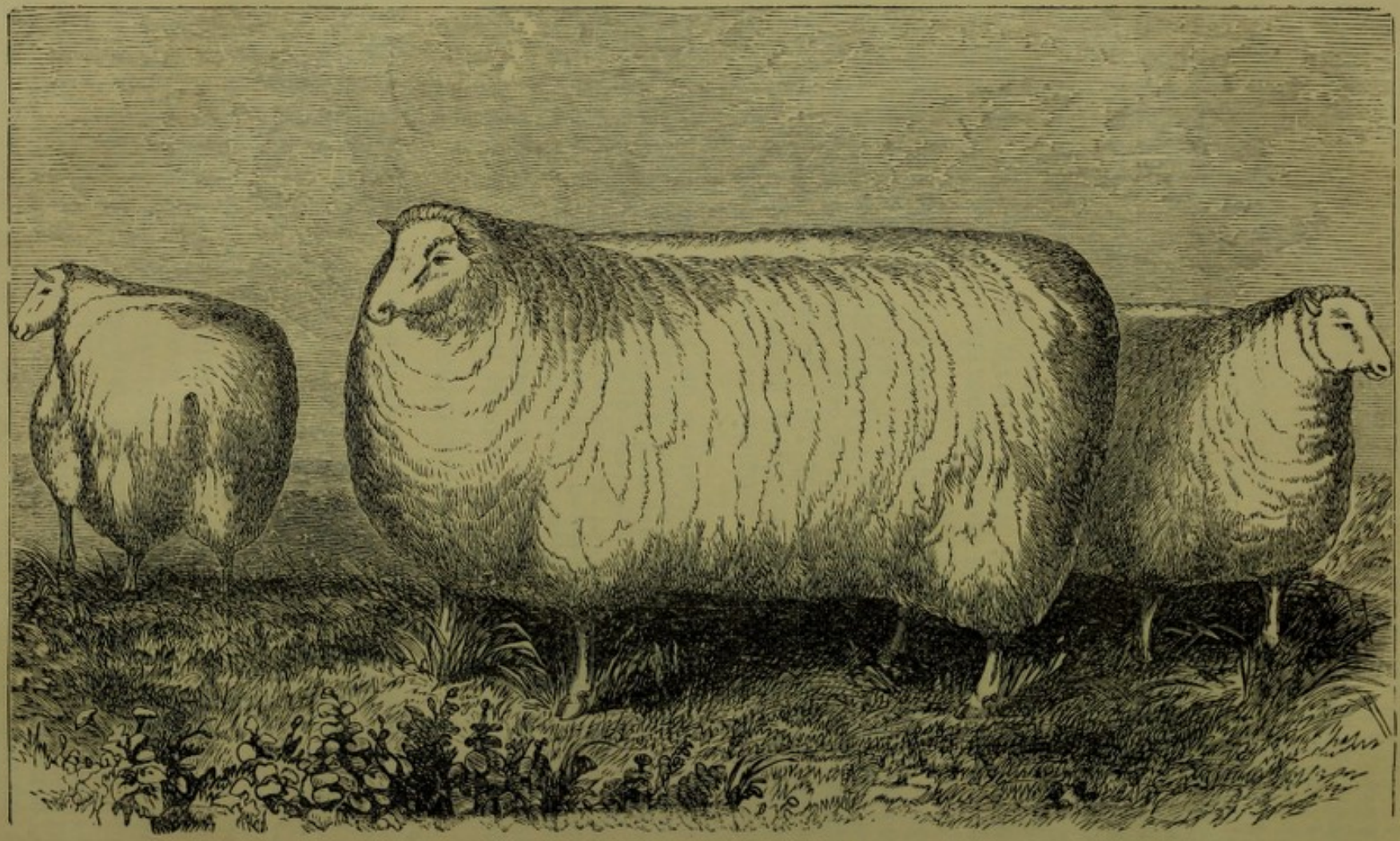
The improved Kentucky.—Not only have the established English mutton-breeds been disseminated through the South and bred successfully, but some claims are made for the establishment of new breeds, having the characteristics of mutton-sheep. Perhaps the most prominent result of such mixing of blood is the "improved Kentucky sheep," originated by Mr. Robert W. Scott, of Frankfort, Ky., which have had a good degree of popularity for many years.

The base of this improvement was a flock of thirty common ewes, known as "natives." To give fineness of fiber and thickness of fleece, as a first requirement, a Merino ram was used. The cross-bred ewe lambs were at a year old bred to an imported Leicester of large size, symmetrical form, and heavy fleece of long wool. To insure activity and hardiness, and finely-marbled mutton of high flavor, an imported Southdown was used upon the ewes of this class with satisfactory results, the originator claiming that the wethers of this cross were "the delight of the epicure, while the value of the fleece was not diminished, as much being gained by increasing the fiber to the square inch as was lost in the length of them." The next ram used was a three-fourths Cotswold and one-fourth Southdown, a large sheep with a thick fleece. Then followed two pure-blood Cotswold and a full-blood Oxfordshire of remarkable softness and silkiness of fleece. With such a history up to 1853 a fine mutton-sheep was an inevitable result, and equally inevitable a tendency to variation and out-cropping of ancestral characteristics so multifarious, adverse to uniformity in transmission of the desired qualities, and fixity of type requisite to the establishment of a permanent breed. Mr. Scott then bent his efforts to this object, and claimed in 1869 that he had secured essential uniformity through the means used. An engraving of the sheep is here presented.

The multiplication of animals of pure breeds, preferably those above named, for breeding purposes, and of flocks of high grades for the production of mutton, will be coincident with the cultivation of grasses and other forage plants, and with the improvement of farms. There is much testimony in official correspondence to the practicability and profit of grass culture, of which the following is an example from G. T. Allman, of Giles County, Tennessee:

> Cultivated grasses do well on all lands. All stock well sheltered will do better on one-third less feed. Not one farmer in seventy-five provides protection for sheep. Where there is suitable grazing sheep do well. Ewes pay two dividends a year, one in wool and one in lambs. Practical men tell me that sheep pay 25 per cent. more profit than any other stock on the farm. There is more pleasure and profit in handling improved breeds of all kinds of stock than in the inferior breeds; this has been my fifty years' experience and observation.

HAMPSHIRE DOWN RAM "CHANCELLOR."



IMPROVED KENTUCKY SHEEP.

The following is from W. S. Dodson, of Jackson County, Mississippi, on the Gulf coast:

Grass culture is growing in importance to our farmers, and as a concomitant sheep-raising will receive more attention than has hitherto been bestowed upon it. The reporter pays taxes on 2,000 sheep, and his experience shows that the best sheep for the Gulf coast are the one-half and one-fourth grade Merino, produced by the cross of the pure Merino buck and the native scrub ewe.

There is an inclination to attempt improvement in many quarters, without accurate knowledge of the elements of success, by persons who have not yet learned how difficult it is to keep "new wine in old bottles." Mr. J. J. Thompson, of West Virginia, hints at this difficulty:

We have been trying to improve our breed by crossing some of the imported varieties on the common stock of the country; results are, however, not very encouraging. Perhaps housing the flocks in winter and giving them more attention might be followed by better success. The experiment of clearing a large area of our land and laying it under pasture, made of the tame grasses, has never been made. I have no doubt such an enterprise would prove profitable. I think it would be the best disposition that could be made of our hills and hollows. When our hills are cleared of timber and immediately sown in grass, without being plowed, they produce fine pastures.

THE STATISTICAL INVESTIGATION.

A circular was sent to correspondents in January last, by the Commissioner of Agriculture, of which the following is an extract:

The loss of the South by the waste of unpastured grass is immense. The value of one textile, cotton, is fully understood in this section; there is another, wool, commanding a much higher price, and produced almost as cheaply, pound for pound, which is not appreciated as its importance deserves. The Georgia Bureau of Agriculture makes the net cost of growing wool in Georgia but six cents per pound, which is less than the cost of producing cotton in that commonwealth. Millions of dollars could be added to the aggregate industry of the South by the general extension of wool-growing.

A prominent aim in the investigation was to show the immense area of unoccupied land, covered mostly by more or less open forest-growth, comparatively clear of underbrush through the agency of annual fires, and green with vigorous growth of wild summer grasses, not of the highest nutritive value, yet capable of sustaining millions of sheep and producing millions of annual revenue. Other large areas of so-called worn-out lands thrown out of cultivation are capable of utilization to some extent as pasture-ground.

The comparative value of these grasses, the kinds prevailing in different sections, the changes by which superior genera are displacing those less valuable, suggested a further inquiry.

Statements of individual flocks were also solicited, showing manner and cost of keeping and resulting profits.

Other returns were sought, upon which averages might be based, tending to illustrate practical points more accurately than by a few individual estimates. The principal of these points are as follows:

1. Proportion (percentage) of surface, exclusive of area actually cultivated, yielding grasses suitable for pasturage for sheep.
2. Average number of sheep such pasturage is capable of sustaining during the summer months.
3. Average number 100 acres would sustain in winter.
4. Number of months in winter in which some extra feed is required.
5. Average weight of fleece in annual shearing.
6. Average value of fleece per pound.
7. Average number of lambs from 100 ewes.
8. Average percentage of lambs lost by disowning, exposure, or other causes.

9. Percentage of sheep (exclusive of lambs) lost annually by disease, theft, dogs, wolves, or other causes.

10. Percentage of sheep destroyed by dogs alone.

These returns, carefully tabulated, after the correction of obvious errors and the elimination of estimates not bearing the impress of accuracy of judgment—inevitable blemishes of general returns upon industries that are either new or of minor magnitude—present the following average results in tabulation:

States.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Delaware	10	50	20	4	3.9	28	92	19	8	4
Maryland	25	47	19	4	3.7	28	95	20	10	7
Virginia	42	55	22	3.5	3.3	27	95	19	12	6.5
West Virginia	50	60	20	4	3.7	32	90	16	10	4.5
North Carolina	52	53	23	3	3	26	90	20	13	6
South Carolina	50	50	22	3	2.9	25	91	21	15	8
Georgia	55	55	25	3	2.9	27	93	20	14	8
Florida	60	50	22	2.5	2.7	23	89	22	18	8
Alabama	57	55	24	3	2.8	26	96	23	13	7
Mississippi	50	60	25	3	2.9	25	92	22	14	8
Louisiana	45	70	30	2.5	3.2	22	95	20	11	5
Texas	75	70	33	2.5	3.5	21	90	15	9	4
Arkansas	65	60	30	3.2	3	27	94	18	12	7
Tennessee	45	62	27	4	2.9	31	90	20	13	6
Kentucky	40	90	29	4.2	4	31	97	21	9	4
Missouri	42	80	28	4.2	3.5	28	95	23	11	6

Area of wild pasture.—The area of the States south of the line of Pennsylvania and the Ohio River includes 570 million acres, of which three-eighths are in farms, or 211 million acres, and little more than one-fourth the farm area is actually cultivated. About one-tenth the entire area may be considered in use agriculturally; the remainder, after deducting lakes and rivers, roads, and town-sites, and a very small area of sand or rock wastes, is productive of plant-growths in great variety. The forest-lands of this broad belt are estimated to aggregate 270 million acres, or 47 per cent. of the whole area. A large proportion of these forests are pine, notably those of the belt of 100 to 200 miles from the coast, open to sun and air, comparatively free from undergrowth interferring with the natural grasses, which abound in variety and quantity according to the degree of fertility of the soil.

This southern country is four times as large as France; it is ten times the size of Great Britain; it includes soils varying from the granitic to the latest alluvial; it is favored with variety in climate resulting from a range of fifteen degrees of latitude and 6,000 feet of elevation. Making liberal deductions for cultivated lands, water, town-sites, and wastes, the uncultivated lands will reach an aggregate of not less than 393,000,000 acres, nearly sixty-nine per cent. of the area; and of this, after throwing out of consideration dense forests of deciduous trees yielding no pasturage worthy of note, the area of wild pasturage—a portion in the west of prairie, a part on the mountains of glades, the pine lands, and old fields, some very good, and much comparatively poor—amounts to 233 million acres, or forty-one per cent. of the whole southern area. This is equal to the area of France and Prussia together, with a better climate and more fertile soil, producing grasses that are unused sufficient to produce more than all the wools that Americans can wear. On the basis of these returns, excluding all extravagant views, the following estimates are presented, the reasonableness and moderation of which intelligent readers can judge.

States.	Total area.	Uncultivated lands.	Wild pasturage.
	Acres.	*Acres.*	*Acres.*
Delaware	1,356,800	700,000	70,000
Maryland	7,119,360	4,000,000	1,000,000
Virginia	24,545,280	16,300,000	6,846,000
West Virginia	14,720,000	10,500,000	5,250,000
North Carolina	32,450,560	22,500,000	11,700,000
South Carolina	21,760,000	14,300,000	7,150,000
Georgia	37,120,000	26,000,000	14,300,000
Florida	37,931,520	17,000,000	10,200,000
Alabama	32,462,080	19,400,000	11,058,000
Mississippi	30,179,840	18,000,000	9,000,000
Louisiana	26,461,440	13,775,000	6,198,750
Texas	175,587,840	145,000,000	108,750,000
Arkansas	33,406,720	23,580,000	15,327,000
Tennessee	29,184,000	18,000,000	8,100,000
Kentucky	24,115,200	16,330,000	6,532,000
Missouri	41,824,000	28,000,000	11,760,000
Total	570,224,640	393,385,000	233,241,750

Value of this pasturage.—An impression has prevailed that this section is not suited to grass-growing. It is a great mistake. The most exacting labor and greatest expense in all the processes of cotton-culture are incident to the destruction of grasses. Every year a portion of the cotton acreage is abandoned to the all-conquering "General Green," after a desperate defense, in which every plow and hoe is brought into requisition. Many a cotton-planter is destroying grass all summer, and feeding his mules and horses with baled hay brought from the West in winter; but such dependence is very exceptional now, and never has been general. Away from railroad lines, if hay is not cured, corn forage and winter grazing of small grains constitute the only reliance for feeding.

A correspondent in Chowan County, North Carolina, Mr. L. W. Parker, writes that "our farmers are spending all their time, talent, and money in killing the grass that would make them rich if properly cured. Cattle and sheep get little other forage than that of wild grasses as a rule, and work-horses in many districts are wintered mainly upon the wild-grass hay." Mr. J. A. Kimbrough, of Tippah, Mississippi, says that in his vicinity such summer luxuriance exists that "enough wild grass, swamp and crab grass could be mown every summer to winter large numbers of sheep."

Mr. J. M. D. Miller, of Tishemingo, Mississippi, says:

I have been in nearly every State, and know this is the best sheep country I have ever seen anywhere. Sheep are always in good condition, and nearly always fat enough for the table. During the winter there are grasses enough on the small streams to support them without any feed. There are 50,000 acres in this county that can be used free of cost, or the land can be bought for $2 per acre. The county is undulating and well watered, perennial springs abound, and sites for manufacturing are numerous.

Mr. W. E. Kendall, Fort Bend, Texas, writes:

About one-fourth the area of our county is cultivated. The remaining three-fourths produce fine grasses, well adapted to sheep pastures, and yet there is not a flock of sheep in the county worth mentioning, and but three or four citizens own sheep at all.

Mr. H. I. H. Bensing, Bowie, Texas:

Sheep-raisers say that this is the best sheep country they ever saw. None of them have ever lost any sheep from any causes whatever, except from the ravages of wolves. An almost ever-green pasture gives more than abundance of food, and there is plenty of water. The whole county, except what is under cultivation (about one acre in fifty), is one complete pasture.

Mr. E. L. Walker, Stephens, Texas:

The mesquite grass is not killed by frost. In August and September the drought stops the growth, but the grass is cured by the sun, retaining its nutriment. In this state it is considered most valuable by stock-men, the cattle getting more nutriment in the same weight of feed. There is also a "winter mesquite," growing all winter, with shrubs and herbs, which sheep prefer.

Mr. William F. Hicks, Lonoke, Arkansas:

Our county is level prairie, timbered, and well adapted to sheep-walks, with an abundance of nutritious grasses; but we have never tried sheep-raising as a business, which I believe could be made very profitable.

Mr. S. W. Cochran, Union, Arkansas:

Thousands of acres and thousands of tons of valuable forage are wasted annually for want of being utilized in this county. Horses, mules, cattle, and sheep are healthy, and keep sleek and fat for eight months in the year on our range, and thousands more might.

Mr. L. Orto, Bradford, Arkansas:

All this county not in cultivation is covered with a luxuriant growth of all kinds of wild grasses that grow in the Southern States, with the exception of the mesquite. The river bottoms are covered with dense cane-brakes capable of sustaining thousands of horses, cattle, sheep, and hogs during the winter months without any cost except salt and the herding.

Mr. A. M. Gibson, Blount, Alabama:

This county consists of alternate valleys and mountain table-land (dry and rolling), elevation from 400 to 1,000 feet above the Gulf. The table-land has miles of unbroken forest, woods open, very little undergrowth, and affords unlimited and excellent pasture. It is annually burned over. Where the undergrowth is dense it would take about 400 acres to support 100 sheep; out in the open woods 100 acres would be amply sufficient. I have tried land that we had ceased to cultivate (which is immediately set with wild grass) and found one acre sufficient for one cow, or three sheep, in summer. I have seen many sheep-producing regions both in Europe and America, and I consider this as the best country for sheep-raising within my knowledge.

Mr. William P. Rice, jr., Lowndes, Alabama:

There are old prairie farms here, that have become almost entirely worthless for ordinary farming purposes, which would be valuable for sheep pasturage if properly set with Bermuda grass, which seems to thrive on such lands.

Mr. H. Hawkins, Barbour, Alabama:

We have no winter or meadow grass. We have plenty of grass in the cultivated fields, but the fields must be plowed more than once to produce a good crop, which will be either the "crab-grass" or the "crow-foot," common all over the county where the land is cultivated.

Mr. C. F. Sherrod, Lowndes, Mississippi:

Lands are generally cleared and in cultivation, but any one can do well, who has a taste for such a pursuit, if he will take 400 acres of land, put one-fourth in Lucerne, one-fourth in Bermuda grass, one-fourth in clover, and one-fourth in small grain (wheat and oats), and alternate the clover and small grain. Lucerne will yield three cuttings of one and a half to two tons each; clover two cuttings of about one to one and a half tons each; Bermuda grass will allow constant grazing from the middle of April to the middle of November, and the small grain will furnish all that is required for feed. Land can be bought at $10 to $12 per acre.

Mr. C. B. Davis, Lawrence, Tennessee:

Such is the peculiar character of the soil that it affords a bountiful supply of forage all the year, except about one month or two at the most for sheep, and these lands can be bought for from 50 cents to $1.50 per acre; title good. A man with a small capital could get rich here in a few years.

Mr. J. J. Thompson, Putnam, Virginia:

The experiment of clearing a large area of our land and laying it under pasture, made of the tame grasses, has never been tried. I have no doubt such an enterprise would prove profitable. I think it would be the best disposition that could be made of our hills and hollows. When our hills are cleared of timber, and immediately sown in grass without being plowed, they make fine pasturage.

Mr. J. W. Perrin, Abbeville, South Carolina:

Lespedeza striata has sprung up on uncultivated lands, driving out all other grasses, and affording excellent pasturage for sheep from April to November.

Mr. S. H. Davidson, Sharpe, Arkansas, writes concerning "barren grass":

Its full value as pasturage has never been tested with regard to the number of animals of any one kind it is capable of supporting. It is a fact, however, that notwithstanding it has been used to some extent in certain localities for grazing and fattening large numbers of beeves annually, there is no perceptible diminution, but rather an increase in the quantity of the growth, and a corresponding improvement in the quality.

Mr. W. M. Barnitz, Roanoke, Virginia:

There are not over 1,500 sheep in our county, according to the report of the State commissioner of agriculture, and this is a county with thousands of acres of mountain and upland eminently suitable for sheep-walks, where 200,000 sheep might be raised without any extra amount of feed being made, and this source of wealth would leave us comparatively free from debt and taxation.

Mr. J. F. P. Kruise, Menard, Texas:

The proportionate area of grass land is very large and well adapted to sheep. It comprises fully 97 per cent. of the whole breadth of the county, which embraces 1,200 square miles. Only about 60,000 acres of this area can ever be made available for culture. The remainder is hilly, of a stony, gravelly character, well covered with wild grasses, and eminently fitted for the healthful keeping of sheep.

Mr. Ozias Ruark, Newton, Mississippi:

We have but a few thousand sheep, yet we have over 400,000 acres of unimproved land in this county, yielding a supply of rich grass sufficient to pasture at least 1,000,000 sheep from early spring until late in the fall, without money and without price. Do you ask what use we make of this grass? Why, set it on fire and burn it up.

The mountains of Western North Carolina, at elevations that would be barren in the White Mountains, yield luxuriant burdens of grass, of which the State geologist, Prof. W. C. Kerr, says:

These grasses escape from cultivation and propagate themselves everywhere. I have seen a field near 5,000 feet high that was seeded some twenty years ago with timothy, and has not been under fence in fifteen years, which has still a good "set" of grass. Oats grown at this place weighed forty-two pounds to the bushel. In the higher parts of the mountains (above 4,500 feet) there are three species of perennial grasses which send up their new shoots, or stools, in November, and remain green all the year; so that cattle and sheep require little care even in winter, except in case of a deep fall of snow, which does not happen more than once in eight or ten years. The new Japan clover, as it is called (*Lespedeza striata*), has spread over the whole of this region. I have found it in a few cases on the tops of mountains four to five thousand feet high.

Dr. J. M. Brome, Saint Mary's, Maryland:

There is one section of this county, eight or ten miles square, abounding in fine natural pasturage, where sheep-husbandry has been abandoned in consequence of the dogs.

Mr. J. R. Bryan, Fluvanna, Virginia:

Our broom-straw fields afford passable pasturage. The climate is favorable, and my own flock, though small in number, is really a fine one.

Mr. L. Ballard, Monroe, West Virginia:

Cannot say how many sheep can be kept on the acre, but 100 acres of ordinary good blue-grass sod will fatten 30 to 35 three-years old cattle.

Mr. M. M. Benbow, Clarendon, South Carolina:

It would be difficult to find a better range, yet there are not more than 100 sheep in this county.

Mr. M. Kemp, Marion, Georgia:

With proper attention sheep might be made profitable, as the grazing lands are very fine for the purpose.

Mr. S. W. Cochran, Fulton, Arkansas:

Nine-tenths of this county is one vast pasture of rich and luxuriant grass throughout the summer, and weeds and shrubbery that sheep are very fond of about for eight months in the year. Thousands of tons of valuable forage is wasted annually for want of being utilized. Horses, cattle, and sheep are healthy and keep sleek and fat for two-thirds of the year on our ranges. Judging from the small flocks we have, sheep would do well here.

Mr. L. Orto, White, Arkansas:

All the county not in cultivation is covered with a luxuriant growth of all kinds of wild grasses. The river bottoms are covered with dense cane-brakes, capable of sustaining thousands of cattle, horses, and sheep. They cost nothing in the way of feed, winter or summer.

Mr. J. F. Sellers, Perry, Arkansas:

Diseases among sheep almost unknown. The wild range here is excellent, both in winter and summer, and if sheep were herded they would need no feed except what nature furnished.

Mr. S. H. Davidson, Sharp, Arkansas:

Very little attention paid to stock-raising and wool-growing. We have a grass called "barren grass," which has not yet been tested, but appears to improve in quality and quantity the more it is grazed upon.

Dr. A. Harris, Dyer, Tennessee:

Our river and creek bottoms are covered with a hardy grass that affords fair grazing summer and winter. There is also a great deal of switch-cane that keeps green all winter. Sheep are very fond of it. Thousands of sheep might be grazed on these bottom lands, winter and summer. Sheep do well here, need very little feeding, not much subject to disease of any kind, and breed well.

Mr. R. McNeilly, Dickson, Tennessee:

In mild winters sheep can live here without feed, and require but very little, if properly cared for, in our average winters. Sheep grow very fat on wild pasturage, and are ready for the butcher in early spring. With proper attention this county is well adapted to sheep-culture.

Mr. J. R. Martin, Roane, Tennessee:

There is no country better adapted to the raising of sheep than East Tennessee. Orchard-grass grows finely, and is considered as equal to blue-grass; I believe it will yield one-third more pasturage, and will do well on any soil. There is not a finer stock-growing country in the United States, none possessing finer water or a more healthy climate. All we want is plenty of orchard-grass.

Mr. O. F. Young, White, Tennessee:

The eastern portion of our county is on the Cumberland Mountains, where sheep-growing could be made profitable. The pasturage (a mountain grass I do not know the name of) is abundant from the 1st of April to the 1st of December. There is also a swamp grass on which they can live during mild winters.

Mr. J. Stewart, Shelby, Tennessee:

The best of all grasses, though not a winter grass, is the Bermuda. Too much cannot be said of it as a pasture. For successful sheep-raising in the South, we want this grass alone. We have no winter grass.

Dr. A. W. Hunt, Perry, Tennessee:

In this county there are about 5,328 head of sheep, when we should have at least 300,000. There are 40,000 acres of improved and 97,205 acres of unimproved land, all of which grows wild grasses and forage plants in abundance.

Mr. J. W. Bowen, Smith, Tennessee:

No better grass county in the State. Every hill and valley can be covered with a rich blue-grass pasture. Always plenty of pasture for sheep in summer and for feed in winter.

Mr. J. W. Boyd, Knox, Tennessee:

An immense number of sheep could be kept on our hills from April to December, and would be in splendid condition to be kept through the winter. They might be made the most profitable stock kept by thrifty farmers.

Dr. J. R. LaRue, Butler, Kentucky:

The natural pasturage is very poor on account of the dense forests; hence, under existing circumstances, sheep are kept at a loss.

Mr. J. A. Brents, Clinton, Kentucky:

Sheep, when cared for, do well, and are profitable. Many flocks are not fed the year round.

Mr. W. T. Pace, Metcalfe, Kentucky:

The natural pasturage is very fine, and might be grown for 12½ to 15 cents per pound; thus far, however, farmers have not been inclined to go into this business.

Mr. J. B. Evans, Monroe, Kentucky:

With attention, sheep could be raised profitably. Immense ranges and no particular use for them.

Mr. C. B. Combs, Barton, Missouri:

The top of the Ozark Range is well suited for grazing purposes. Ten head of sheep would not be a large number per acre.

Mr. O. Ruark, Newton, Missouri:

We have but a few thousand sheep, though there are over 400,000 acres of unimproved land in the county, yielding a supply of rich grass sufficient to pasture at least 1,000,000 sheep from early spring till late in the fall. Sheep should be fed and attended to in this county during the months of November, December, January, February, March, and part of April.

Mr. H. Fresenriter, Pemiscot, Missouri:

Our unimproved lands are mostly covered with cane, which affords good pasturage for sheep, and the same lands furnish a good grass for winter pasture for cattle as well as sheep. Our people are taking more interest in sheep raising than formerly.

Mr. J. W. Steele, Platte, Missouri:

Some of our woodlands are beautifully set with blue grass, which grows as luxuriantly as in Kentucky. Some fine flocks of sheep have been introduced into this county, the fleeces of some weighing from 8 to 12 pounds.

Mr. A. Badger, Vernon, Missouri:

Our present stock of sheep and cattle do not consume one thousandth part of the growth of grass. Three-fourths of a ton of good hay from an acre is lost every year.

How many sheep will this natural pasturage carry? This may not be a very practical question, as the economy of advanced agriculture requires a proper balance in the distribution of farm animals, and renders it certain that all this waste of herbage will never be utilized by sheep alone. It is difficult to answer practically, because of the vast difference not only in the capacity of different areas, but in the value of pasturage in different seasons of the year. Most of the natural grasses are succulent and abundant only in spring and early summer; others afford a scanty winter pasturage; hence the number of sheep, if unprovided with cultivated forage in winter, would be limited to the winter capacity of the range. Returns on this subject, of course, exhibit great differences, due to the widely differing character and abundance of food-yielding plants of the districts reported, and also in a measure to the judgment of the reporters, whose views on this point must be largely theoretic, though based upon such experience and observation as they could bring to bear upon it. On this account it is deemed best to exclude all extravagant estimates, and err upon the side of moderation, if at all, making due allowance for unreported areas, and in Texas a very liberal discount for the wide expanse of dry plains in the northwest. Taking, therefore, the figures of the preceding table, averages so low as to challenge the criticism of the enthusiastic, the reader will be able to realize the wasted resources of this pasturage, and change the estimates, if he

chooses, to suit his own views. Upon this estimate the wild pasturage alone would support four times as many sheep in summer as are now to be found in the United States, and in winter about twice the number of flocks of the country.

States.	Acres.	Sheep in summer.	Sheep in winter.
Delaware	70, 000	35, 000	14, 000
Maryland	1, 000, 000	470, 000	190, 000
Virginia	6, 846, 000	3, 765, 300	1, 506, 120
West Virginia	5, 250, 000	3, 150, 000	1, 005, 000
North Carolina	11. 700, 000	6, 201, 000	2, 691, 000
South Carolina	7, 150, 000	3, 575, 000	1, 573, 000
Georgia	14, 300, 000	7, 865, 000	3, 575, 000
Florida	10, 200, 000	5, 100, 000	2, 244, 000
Alabama	11, 058, 000	6, 081, 000	2, 653, 920
Mississippi	9, 000, 000	5, 400, 000	2, 250, 000
Louisiana	6, 198, 750	4, 339, 125	1, 859, 625
Texas	108, 750, 000	76, 125, 000	35, 887, 500
Arkansas	15, 327, 000	9, 196, 200	4, 598, 100
Tennessee	8, 100, 000	5, 022, 000	2, 187, 000
Kentucky	6, 532, 000	5, 878, 800	1, 894, 280
Missouri	11, 760, 000	9, 408, 000	3, 292, 000
Total	233, 241, 750	151, 612, 325	67, 420, 545

In this calculation no reference is had to the feeding resources derived from cultivated forage crops, or sheep-breeding as an adjunct of intensive culture. In England there are sixty sheep upon every one hundred acres of the total area, even including the sites of towns and the hunting preserves of the aristocracy, while the production of beef, milk, cheese, and cereals upon a large proportion of the whole area is almost a necessity of national existence. The same proportion of sheep upon these southern lands would exceed 300,000,000. These figures, if never realized here either in pasture or farm sheep-husbandry, afford a hint of the great capabilities of this region in mutton and wool production.

Necessity of winter-feeding.—The fourth column in the table gives the average number of months in which feeding is required. It does not mean that sheep must be fed continuously or exclusively, as in the North, during the time indicated. On the contrary, there are few of the flocks of this region that are now, as a matter of fact, fed at all. When some provision for winter forage is made, it is not in barns, as in the North, with supplies of hay and straw, but rarely with any shelter whatever, being simply a provision for winter-grazing upon wheat, rye, or oats, or fields of cultivated grasses, and sometimes in lambing time a little corn or a feed occasionally of pease. Cotton-seed is used to some extent, and other products peculiar to these latitudes, among them "China berries," the fruit of the China tree, *Melia azederach*, which Mr. John T. Wingfield, of Wilkes, Ga., claims to be equal in value to corn for feeding sheep in winter.

There can be no doubt of the advantage of much supplementary feeding facilities in the winter months. The profits of sheep-husbandry depend upon uninterrupted and equal alimentation; irregular or insufficient feeding causes loss in both flesh and wool that cannot be repaired by subsequent care. In the wool it produces unevenness of fiber that reduces its value more than the loss in quantity.

In Florida, Louisiana, and Texas the period during which some additional provision for winter-feeding would be desirable is placed at two and a half months; in South Carolina, Georgia, Alabama, and Mississippi, three months; in Arkansas, a week longer; and in the western portion of North Carolina and Virginia, three and a half; in Delaware,

Maryland, and West Virginia, four months; in Kentucky and Missouri, a little more than four. But in all this region the cost of all needed provision, mainly furnished by winter grazing, is far less than half that of northern feeding for the same length of time.

The writer has seen flocks of sheep on the northern border of this vast sheep-range in West Virginia browsing in fair condition through the sheltering thickets in the depths of winter, when the ground was covered with snow. Farther south, many a flock is turned out to receive no attention, and perhaps scarcely to be seen, until the following spring. From the testimony that abounds upon the non-attention to winter-feeding a few extracts are given. Mr. S. Corley, of Lexington, S. C., says:

"Sheep do not need much provision as to stabling during the winter. A good shelter in the early spring to protect the young lambs when dropped would save many that otherwise die from exposure. A farmer tells me his sheep are now in good condition in the woods, feeding on silver grass (which is not killed by cold), and that they have not eaten a quart of pease or other solid food this winter, showing that the small cost of growing wool, in this case at least, is equal to that of Georgia.

Mr. M. D. Sanford, Catoosa, Georgia:

Extra forage for three months is necessary for flocks not convenient to good ranges, but, excepting when the ground is covered with snow, they are generally wintered on fields of grazing or winter oats, not wintered at large.

Mr. S. P. Odom, Dooly, Georgia:

Those that have from 400 to 1,500 head allow them to run at large until about the middle of March, at which time they are penned for the purpose of marking the lambs.

Mr. John W. Curry, Manatee, Florida:

About four months in the year sheep would do very well (from March 1 to July 1); then the rainy season sets in, and sheep would have to be driven to some place for shelter. This season lasts until the latter part of September, and the water remains on the ground until the last of November.

Mr. G. A. Northington, Autauga, Alabama:

I do not think sheep are ever fed in this county at all. If they are, it is only for a short time in the latter part of February and first of March.

Mr. J. B. Wilbanks, De Kalb, Alabama:

I asked one man what it cost him during the winter to keep a flock of seventy head. The answer was, "Not over five dollars." Sheep do better running at large than if kept penned and fed.

Mr. J. H. Kraudier, Austin, Texas:

Most sheep-raisers provide some shelter in winter, and some provision is made for feed, such as hay, cotton-seed, &c., some corn, and of late years sorghum-seed. Semi-annual shearing, except with long-fleeced sheep, is not considered profitable.

Mr. George W. Walker, Robertson, Tennessee:

Farmers who raise sheep keep them up, and during the summer and fall they have the run of the clover-fields, herds-grass, and blue-grass lots. In the winter they graze upon the wheat and rye meadows, with a little corn, say one ear a day for about 100 days. They are sheltered under sheds around old tobacco barns, and consequently they do not cost much. They are not raised for money, but merely for convenience or domestic uses.

A very small proportion of flock-owners give adequate care and improved pasturage, and obtain results liberal in proportion. One of the most notable and successful of these is Mr. Tom Crutchfield, near Chattanooga, Tenn., who claims a profit of 60 per cent. per annum on mutton sheep of the Cotswold style. Of course a liberal supply of forage is essential to profit with such stock. As a type of the improved sheep husbandry of the future, having in view the joint production of mutton and wool, his winter treatment of his flock is given:

My bucks are taken from the ewes about the 1st of December, and are lotted to themselves, getting extra attention, going back to the ewes about the middle of August; the balance of the flock runs upon the winter-grazing oats all the winter and until the

middle of March or first of April. This spring they were not taken off the oats until the 1st day of April. If, during the time they are grazing on the winter oats, there is a great deal of rain, and the ground becomes soft, they are removed to the meadow or grass-lot, where there is sod, and taken back to the oats as soon as dry enough. When taken from the grazing oats in March or April, in order that it may mature its crop of grain, they are turned to orchard or blue-grass lots until June or July, when they go either to the meadow or oats fields after harvest, where they remain until turned into the grazing oats again in October or November. They are fed no grain or hay unless the ground is covered with snow or an extremely cold spell freezing up everything. In February or March, when the ewes are lambing, I take them close to the house, where I can watch and care for their lambs. When lambing, if they are limited in pasture, they receive an occasional feed of shelled oats or corn, as it may be needed. I have had trouble this season from my ewes being too fat, and being unable to bring forth their lambs. My entire herd have access to *open shelter and salt at all times.*

There are indications that the importance of shelter is beginning to be appreciated. In Texas there are stock-owners who provide sheds for protection against storms. In some sections of North Carolina the most enterprising proprietors give increased attention to shelter in inclement weather. About one-third of the Kentucky counties report some preparation for shelter against extreme cold; in Maryland, and in the Panhandle counties of West Virginia, such care is not uncommon; and in Tennessee and Missouri its necessity is beginning to be seen.

Average weight of fleece.—It is useless to attempt a close comparison of the weight of fleeces of different periods. It is certain that there has been considerable increase of weight as a result of the use of Merino rams of pure blood upon the coarse-wooled ewes of Mexican origin in Texas and the mixed races of the other States. The census returns are not quite complete in the enumeration of sheep, and in the returns of wool the deficiency is still greater. Whether the omissions are sufficiently uniform to allow of comparison with trustworthy results, or whether errors may be eliminated, is somewhat questionable. In the census of 1840 there were returned from Louisiana fewer pounds of wool than of numbers of sheep, but there were fourteen counties with 30,261 sheep that *returned no wool.* In Florida, Mississippi, Alabama, Georgia, and Virginia there were omissions to report wool in counties returning sheep. There were repeated instances of underreturns of wool, and in a few instances others obviously too large for the number of sheep. This failure to report is very injurious to the reputation of the South for wool-growing, giving a false impression of the average weight of fleece as compared with Northern States, in which the greater prevalence and interest in wool-growing secure a nearer approach to accuracy in returns. In 1840 the census gave no Southern State an average of two pounds of wool. Virginia and Kentucky approached that average, and none of the others reached one and a half pounds.

A comparison of the averages deduced from the census returns induces the belief, in view of the irregularities presented, that in several of the Southern States the wool was very incompletely reported. The averages were as follows:

States.	Wool, average per sheep.			States.	Wool, average per sheep.		
	1870.	1860.	1850.		1870.	1860.	1850.
Delaware	2.57	2.66	2.10	Alabama	1.58	2.09	1.80
Maryland	3.36	3.16	2.51	Mississippi	1.24	1.89	1.80
Virginia	2.37	2.41	2.20	Louisiana	1.18	1.60	1.00
West Virginia	2.89	.....	.....	Texas	1.75	1.98	1.30
North Carolina	1.73	1.62	1.63	Arkansas	1.33	2.02	2.00
South Carolina	1.25	1.83	1.70	Tennessee	1.68	1.82	1.70
Georgia	2.02	1.85	1.70	Kentucky	2.39	2.48	2.00
Florida	1.41	1.96	1.00	Missouri	2.70	2.21	.....

The returns of 1870 from Texas evidently include only the sheep of settled farming districts, the great flocks of Western and Southern Texas mostly escaping observation. Nueces returns 82,368; Webb, 71,730; Zapata, 34,960; and Duval, 34,325; and no others as many as 20,000. The total was only 714,351, a small proportion of the actual number then in the State. The wool reported was but 1,251,328 pounds, or 1.75 pounds to each sheep, while the commercial estimate of Texas wool at the same date was 7,000,000 pounds. A comparison of these returns by counties presents an impossible difference in weights of fleece. While there are no less than twelve counties reporting sheep without returning a pound of wool, one of which had eleven thousand sheep and another five, the range of average weights in other counties runs from one-fourth of a pound in Comal to eight and a fourth in Calhoun.

The counties reporting a less number of pounds of wool than there are sheep are Bexar, Caldwell, Cherokee, Comal, Cook, Ellis, Fayette, Freestone, Gonzales, Harris, Harrison, Henderson, Jefferson, Lamar, McMullen, Montgomery, Navarro, Newton, Robertson, San Augustine, Shelby, Stephens, Travis, Upshur, Uvalde, Walker, and Woods; on the other hand, Calhoun averages 8.25, La Salle 5.25, and seven others between three and four pounds. Of course there are no sheep yielding but one pound of wool in Texas or any other State, and of the forty-five counties returning not less than one or more than two pounds, there may not be one of them that does not actually exceed an average of two pounds.

In Georgia several counties in 1870 make returns of wool that are evidently very nearly accurate, viz: Chatham, Columbia, De Kalb, Dougherty, Early, Hancock, Mitchell, Richmond, Screven, and Upson, and none under three pounds per fleece, the latter above four. But no practical man can believe that there are sheep that yield less than one pound each in Brooks, Burke, Camden, Glynn, and Houston. The estimated real average weight of fleece, as found in the fourth column of the table, gives a far more accurate idea of the yield of wool than can be gathered from the census figures. The heaviest fleeces at present are those of Kentucky, Maryland, and Delaware, where mutton sheep of mixed blood are numerous. The average in these States compares well with those of the prominent wool-growing States of the North; and a little improvement of blood and increase of skill and attention in management may make the average of the entire South as good.

Value of wool.—Column 6 gives the estimates of average value of wool. It ranges from 21 cents in Texas to 32 cents in West Virginia. With the exception of Texas and a few districts which produce a surplus, the wool of this region is mainly consumed by local factories, which in some cases slightly increase the price otherwise obtainable. Exchanges of cloth for wool are often made at these factories. The New York quotations for Texas wools in January of the present year were:

	Free of burs.	Burry.
Fine and medium	24 @ 26	16 @ 21
Coarse	18 @ 22	14 @ 16

Kentucky and Tennessee come next to West Virginia in price.

Proportion of lambs raised.—The number of lambs produced show that there is no loss of fecundity even if flocks are left to take care of themselves. The range of averages (column 7) is from 89 lambs to 100 ewes in Florida to 97 in Kentucky. With superior care one lamb to each ewe may be depended upon, as in other wool-growing regions, among grade Merino flocks; with mutton sheep of 100 to 130. Mr. Crutchfield, of Tennessee, obtained 120 to 130 from his flock. Column 8 gives the estimated proportion of the lambs lost by exposure and disease. Coming in winter

or early spring, with very little care to prevent dropping in the severity of winter, and often none at all to save the tender creatures from fatal exposure, the wonder is that so large a proportion is saved. Nothing but the extreme mildness of the climate prevents a much greater loss, which is still too great and much of it preventable. Except in Texas, Arkansas, and West Virginia, no percentage is less than 19, ranging from that figure to 23. It is smallest in States in which exist large flocks under systematic management. Mr. L. M. Allen, Coryell, Texas, says:

I have raised a lamb for every ewe in the flock when I had 600 mixed sheep. A small flock will raise more lambs than a large one in proportion, and all ewes do better than the same number in a lot of mixed sheep.

Proportion of sheep lost.—The percentage of loss of sheep by disease, dogs, or thieves is large enough in all wool-growing countries to reduce materially the possible profits of sheep-husbandry. Column 10 gives the estimates of States, showing the smallest loss in Delaware and Texas, and the largest in Florida and the Carolinas. Upon the estimated present number of sheep, 9,887,600, the average loss is 10.7 per cent., or 1,057,275. The loss from dogs is about half of this, or 5.2 per cent., representing half a million sheep per annum, with a value of about $1,000,000—a tax paid by a few promoters of a useful infant industry to encourage the extension of a race of mangy curs too worthless for valuation, yet costing other millions to feed, taking bread from the mouths of the half-fed children of the poor. The numbers of sheep in the several States, with the number annually lost, on the bases of these returns, is as follows:

States.	Estimated number in 1878.	Losses from all causes.	Number killed by dogs.
Delaware	35,000	2,800	1,400
Maryland	151,200	15,120	10,584
Virginia	422,000	50,640	27,430
West Virginia	549,900	54,990	24,745
North Carolina	490,000	63,700	29,400
South Carolina	175,000	26,250	14,000
Georgia	382,300	53,522	30,584
Florida	56,500	10,170	4,520
Alabama	270,000	35,100	18,900
Mississippi	250,000	35,000	20,000
Louisiana	125,000	13,750	6,250
Texas	3,674,700	330,723	146,988
Arkansas	285,000	34,200	19,950
Tennessee	850,000	110,500	51,000
Kentucky	900,000	81,000	36,000
Missouri	1,271,000	139,810	76,260
Total	9,887,600	1,057,275	518,011

There is probably no obstacle to the rapid extension of this industry so serious as the risk of loss by dogs. It is nearly universal, and everywhere deprecated by wool-growers. Legislatures have been appealed to in vain, and in an instance or two of restriction of the evil by taxation, cowardly legislators have yielded to the howl of popular clamor for repeal. A few of the many references to this subject by correspondents are appended:

Mr. Irving Spence, Worcester, Maryland:

Sheep husbandry is profitable in our county, and would be very much so were it not for the destruction by dogs, which makes the experiment precarious, and sometimes disastrous.

Mr. Lewis Ballard, Monroe, West Virginia:

The most serious loss of old sheep is from dogs; probably 20 per cent. of all kinds of sheep are lost annually by dogs, wolves, foxes, and bad keep.

Mr. James C. Brown, Barnwell, South Carolina:

Were it not for dogs your correspondent could have 200 sheep well kept in his farm, without any extra forage except the natural pasturage. And thousands could be kept in this county.

Mr. H. M. Hammett, Cobb, Georgia:

Sheep-raising has but little attention from our farmers, from the fact that if a man gets a good flock started, he does not know what night some cur or hound will kill them all. Sheep-raising can never be successful until we get rid of the dogs.

Mr. R. H. Springer, Carroll, Georgia:

It is a lamentable fact that the legislature of the State of Georgia has expended more money in trying to pass a dog law than all the sheep in the State are worth. Our county presents more valuable and numerous resources for this branch of industry than any other in my knowledge. No farmer, however, will venture on the expense of sheep husbandry as long as every man in the county is allowed to have as many *starved, worthless curs* as he wishes. The dogs are obliged to live, and will kill and eat all stock they can find, hogs and cows not excepted.

Mr. W. W. Abney, Jasper, Mississippi:

We generally lose one-half. Three-fourths of these are killed by dogs. I have about 25 dogs and no sheep, but would have 100 head of sheep soon if dogs were kept down.

Dr. Joseph A. Leech, Lee, Mississippi:

The people think more of dogs than of sheep; every family, black and white, have from five to six dogs. I have four, and no sheep. If it was not for dogs I could have 1,000 sheep at a cost of about $10 per year.

Mr. L. N. Rhodes, Cross, Arkansas:

Our legislature of 1874 passed a dog-tax law, but the people generally were so much opposed to it that the next legislature repealed the act.

Mr. L. W. Hampton, Cocke, Tennessee:

Our legislature, two years since, passed an act for the protection of sheep, by making it a privilege to keep a dog for which the owner had to pay $1 per head. This had the effect of killing a great many worthless curs, and consequently farmers were taking an interest in improving the stock of their sheep by crossing with improved breeds. Our supreme court has, however, decided the law unconstitutional; therefore, sheep-raising will be greatly retarded, if not entirely destroyed.

Mr. J. T. Richardson, Montgomery, Tennessee:

There is no use trying to raise sheep on wild pasturage. Sheep that are turned out on the woods and commons get but a meager subsistence, and are eaten up by dogs that straggle over the commons. I have found by thirty-seven years' experience one can raise sheep profitably if he will attend to them and keep them in inclosures.

Mr. John M. Hine, of Carroll, Georgia, started about thirty years ago with 15 sheep, mostly ewes. Several times his flock had increased to 40 or 50 head, and as often was nearly swept away by dogs; at one time but one solitary wether was left. He finds the cost of keeping sheep very little. The profit of the flock he estimates at between $25 and $30 per annum.

Mr. M. Chapman, Charles, Maryland:

Our farmers are powerless against dogs and tender-hearted legislators. The only hope we have is in the general government.

Mr. P. S. Early, Carroll, Virginia:

Sheep-culture is very poor for the farmers here. As the dogs have killed so many sheep, the attention is turned t o cattle.

Mr. H. B. Williams, Mecklenburg, North Carolina:

Sheep-raising might as well be abandoned until legislative protection from the dog can be secured.

Mr. J. M. Barnett, Person, North Carolina:

If there were any protection from dogs, sheep-raising would improve fast, as there would be many farmers to engage in it.

Mr. J. K. Simpson, Polk, North Carolina:

As long as there is no good dog-law, sheep husbandry cannot flourish.

Col. A. W. Shaffer, Wake, North Carolina:

Sheep-raising virtually has been abandoned. If the expected dog-law be enacted, sheep and wool will become the leading articles of production.

Mr. J. Robinson, Wayne, North Carolina:

The raising of sheep might be made most profitable if it received but half the attention the raising of dogs does.

Mr. L. Harrill, Wilkes, North Carolina:

Sheep are an unprofitable investment. The annual increase is canceled by the loss from dogs. Farmers do not provide properly for their sheep.

Dr. T. Long, Yadkin, North Carolina:

The dog eats up the profits of sheep-raising.

Mr. J. M. Hine, Clayton, Georgia:

The dog is the only hinderance to sheep-raising.

Mr. J. Simmons, Pickens, Georgia:

Good county for sheep-raising, but dogs and utter neglect are the drawbacks.

Mr. E. W. Rose, Upson, Georgia:

The only barrier to a most successful sheep-raising is the dog.

Mr. J. T. White, Taylor, Georgia:

The only cost is shearing and putting the wool in the market. But few sheep are kept, as sheep husbandry is under the control of the dog.

Mr. E. M. Thompson, Jackson, Georgia:

But for the dogs the profits from sheep would be very large.

Mr. Kenneth Clarke, Chickasaw, Mississippi:

Since the war sheep-raising has been discouraged by thieves and dogs. This county affords excellent natural advantages for wool-growing.

Mr. J. A. Kimbrough, Tippah, Mississippi:

The advantages of a most bountiful pasturage and good climate are more than canceled by the ravages of the dog.

Mr. S. G. French, Washington, Mississippi:

Sheep husbandry is discouraged by dogs and thieves, as nearly half the sheep are lost from these causes.

Mr. William T. Lewis, Winston, Mississippi:

Many farmers are abandoning sheep-raising, as it will not pay on account of the great losses from dogs, wolves, and thieves.

Rev. D. A. Campbell, Richland, Louisiana:

Sheep would do well if undisturbed by dogs and given proper attention.

Mr. H. Arrington, Newton, Arkansas:

A fine wool-growing country. Dogs are the only disadvantage. Diseases are rare. Cotton culture is declining and sheep-raising attracting attention.

Dr. T. C. Miller, Sebastian, Arkansas:

This is a natural sheep country. Require but little feed winter or summer. Dogs troublesome occasionally.

Mr. J. H. Earle, Ballard, Kentucky:

The dogs have so discouraged sheep-raisers that at present scarcely enough wool is raised to supply the county with knitting-yarn.

Mr. Wm. H. Tolman, Bracken, Kentucky:

Sheep-raising has been almost abandoned on account of the dogs. A ripe experience teaches that the Cotswold crossed with the Southdown produces the hardiest and most profitable sheep for this climate.

Mr. R. Waters, Oldham, Kentucky:

Three times as many sheep as are now in this county could be profitably kept. Yet notwithstanding a dog-law, the farmers cannot prevail against the sheep-killing dogs.

Mr. J. J. Gilbert, Owsley, Kentucky:

Sheep-raising has become unpopular—the losses from destruction by dogs make it unprofitable. Not half the usual number are now in this county.

Mr. W. L. Scroggs, Dade, Missouri:

The tax on all dogs, more than one to each tax-payer, has perceptibly diminished the number of worthless curs.

Mr. W. S. Goodman, Lawrence, Missouri:

Sheep-raising is very much neglected on account of heavy losses caused by dogs.

Mr. A. K. Denny, of Boyle County, Missouri, has the courage to tell the plain truth upon the dog question, as follows:

It is a humiliating confession to make, yet it is true, that as a State we have not reached that advanced civilization which will promptly give to the sheep, that innocent, defenseless, most useful animal, that protection which its position as a food and clothes producing animal demands. Our legislature very readily passes most stringent laws for the protection of the fish in our waters, the squirrels of our forests, the rabbits in our fields, and all kinds of birds of the forest and field and those that soar above the earth, but when it comes to their best friend, one they cannot possibly do without, they become paralyzed with fear, and proceed with a politician's caution and are careful to pass no law that would wound a voter's feelings or hurt a high-born dog.

DISTRIBUTION OF GRASSES.

The returns of the varieties of forage plants for wintering rarely give botanical names, and many fail to give the common names. The difficulty with popular names is the confusion caused by synonyms. This is especially troublesome with such names as crop-grass, crab-grass, wire-grass, and sedge, which in some cases are so identified by description or scientific name as to show that several different plants are returned by the same name.

The most abundant are, in abandoned fields, Broom-sedge, *Andropogon Virginicus;* in the tide-water lands, the country of the *Pinus Australis*, or long-leafed pine, Wire-grass; in the cultivated fields, Crab-grass (*Eleusine Indica*), Crowfoot (*Dactyloctenium Egyptianum*), and *Leptochloa mucronata.*

In Texas the Mesquite prevails (the bearded, curly, and running varieties), and the Game-grass, *Tripsacum dactyloides.*

The Japan clover, *Lespedeza striata*, is encroaching upon the old-field domain of the Broom-sedge with great rapidity. It is reported from

North Carolina to Mississippi, but not from beyond the Mississippi, the most western locality, as reported, being the southwest corner of Mississippi. It is generally deemed a cause of congratulation that it has limited the range of the Broom-sedge. The Bermuda grass is also spreading very rapidly, much to the regret of cotton-planters, because so persistent in its staying qualities, yet to the positive delight of others more interested in stock-growing than in cotton.

The cultivated forage-plants, Red Clover (*Trifolium pratense*), Lucerne (*Medicago sativa*), Orchard-grass (*Dactylus glomerata*), Timothy (*Phleum pratense*), Red-top (*Agrostis vulgaris*), and many others, are successfully experimented with, rather than generally grown, as the South has given little attention to hay production. The entire amount of hay reported in sixteen States in the census of 1860 was 1,872,827 tons; in 1870, 1,783,922 tons. The State of New York in 1870 returned 5,614,205 tons, more than three times as much as these sixteen States.* There is at present an apparent tendency to a more general cultivation of these plants for hay-making. There is no difficulty in growing red clover in the more tenacious soils, and lucerne does well in the better class of more friable soils. Orchard-grass is in high repute, and is already well established in many dairy farms of the slopes and plateaus of the mountain system, which has never had its proper agricultural prominence under the cotton régime.

Sedge is mentioned in returns from 197 counties. The mention of other plants is numerically in the following order: Crab-grass, blue-grass, wire-grass, Bermuda-grass†, prairie-grass†, white clover, mesquite, nimble will, red-top, Japan clover. Were all the principal grasses of all counties fully reported, it is quite probable that some change in this order might be produced.

Partial lists of the plants occupying the wild pasturage reported are herewith given in the order of their numerical prominence in county returns, by common local names:

MARYLAND.—Blue, sedge, white clover, crab, red-top, poverty, fox-tail, June, salt marsh.

VIRGINIA.—Blue, crab, white clover, sedge, wire, red-top, broom-straw, greensward, swamp, herds, fox-tail, June, sheep-clover, pea-vine, hen's nest, bullrush, flag, sheep-sorrel, water, poverty, cross-weed, woolly-headed clover, marsh, plantain, hog-weed, chickweed, lawn, evergreen, ox-grass, aromatic shrubs, rib-wort.

WEST VIRGINIA.—Blue, white clover, red-top, timothy, pea-vine, fox-tail, wire, swamp, rich weed.

NORTH CAROLINA.—Sedge, crab, wire, herds, blue, white clover, Bermuda, greensward, Japan clover, bull, pea-vine, fox-tail, crow-foot, wild onion, willow, brown, sheep-clover, water, crooked, old-field, burr, Egyptian clover, wild rye, winter, orchard, evergreen, mountain fern, rich weed, beggar lice.

* States.	1870.	1860.	States.	1870.	1860.
	Tons.	*Tons.*		*Tons.*	*Tons.*
Delaware	41,890	36,973	Mississippi	8,324	32,901
Maryland	223,119	191,744	Louisiana	8,776	52,721
Virginia	199,883	445,133	Texas	18,982	11,865
West Virginia	224,164	.....	Arkansas	6,839	9,356
North Carolina	83,540	181,365	Tennessee	116,582	143,499
South Carolina	10,665	87,587	Kentucky	204,399	158,476
Georgia	10,518	46,448	Missouri	615,611	401,070
Florida	17	11,478			
Alabama	10,613	62,211	Total	1,783,922	1,872,827

† Indefinite, but in most returns probably the blue-stem or other *Andropogon*.

SOUTH CARODINA.—Crab, sedge, wire, Bermuda, Japan, clover, crow-foot, brown sedge, wild clover, nut, mountain, sedge, yellow clover, wild rye, water, deer, silver.

GEORGIA.—Sedge, Bermuda, crab, crow's-foot, Japan clover, swamp, wild oats, broom, wild goose, universal, cane, gopher, water, nimble will, gama, meadow, blue, pea-vine, colt's-foot, wild clover, herds, mountain.

FLORIDA.—Wire, wild oats, sedge, crab, smut, water, pond, swamp, palmetto, broom-sedge, negro head, prairie.

ALABAMA.—Sedge, crab, wild clover, Bermuda, mountain, winter, nimble will, reed woods, marsh, wild oats, herds, hedge, piney woods, beggar lice, swamp, glade, broom-sedge, crow-foot, Johnson's (Bermuda), barren, ox millet.

MISSISSIPPI.—Sedge, crab, Bermuda, wire, nimble will, white clover, pine woods, water, broom-sedge, *Lespedeza striata*,* fox-tail, crow-foot, wild oats, wild pea, yellow clover, swamp, switch, cane, winter, sheep-sorrel, bent, drop-seed, barren, bull.

LOUISIANA.—Crab, white and red clover, Bermuda, sedge, swamp, goose, broom-sedge, woods, nimble will, crow-foot, May, rye, sweet-scented vernal, summer.

TEXAS.—Mesquite (bearded, curly, and running), sedge, prairie, Bermuda, carpet, salt, crow-foot, wire, bunch, evergreen, buffalo, turf, verene, Yazoo, gama, blue, nimble will, calamus, wild clover, broom-sedge.

ARKANSAS.—Sedge, prairie, crab, nimble will, wire, barren, pea-vine, fox-tail, crow-foot, wild rye, white clover, feather, winter, bunch, swamp, woods.

TENNESSEE.—Sedge, nimble will, crab, blue, swamp, white clover, mountain, barren, wire, beggar lice, winter fern, fox-tail, pea-vine, sorrel, switch, bull, bear, herds, buffalo, orchard, velvet, spear.

KENTUCKY.—Sedge, blue, crab, red-top, pea-vine, barren, nimble will, fox-tail, white clover, broom-sedge, white-top.

MISSOURI.—Prairie, blue, sedge, nimble will, wire, buffalo, barren, June, blue-stem, rush, joint, red-top, bunch, fox-tail, white clover, gama, seed-tick, dog-hair.

Some correspondents give botanical names. The following is an extract from the return of Wilkinson County, Mississippi, sent by Mr. D. L. Phares, of Woodville:

Fox-tail (*Alopecurus geniculatus*), some species of bent grass (*Agrostis*), drop-seed grass (*Muhlenbergia*), wire-grass (*Aristida*), Bermuda grass (*Cynodon dactylon*), crow-foot (*Dactyloctenium Egyptiacum*, *Eleusine Indica*, *Leptochloa mucronata*), the last three very common in cultivated fields. Cane or reed (*Arundinaria gigantea*) and *A. tecta* are both very abundant in a large portion of the county; some of the inferior Poas, several Panicums and Letarias; gama grass (*Tripsacum dactyloides*) is not abundant. Several Andropogons or broom-grasses are very abundant; some inferior Sorghums are found sparingly. A species called smut-grass is common and valuable; I am not sure as to botanical name, perhaps *Manicurus granularis*. In some localities white clover (*Trifolium repens*) and other inferior species abound. Japan clover (*Lespedeza striata*) is becoming common in some places; also some inferior Lespedezas are common, and some valuable and inferior Desmodiums.

Mr. J. M. Sherman, Elizabeth City County, Virginia:

Some fifty varieties of wild grasses and forage plants have been collected and classified in this county, of which the most common and useful for pasturage are the following: Early pasture grass (*Poa annua*), sweet vernal grass (*Anthoxantheum odoratum*), chess (*Bromus secalinus*), wild oats (*Avena præcox*), wild rye (*Elymus Virginicus*), broom-grass (*Bromus ciliatus*), timothy (*Trifolium repens*), red top (*Agrostis vulgaris*), crab-grass (*Paspalum undulatum*), perennial bent grass (*Agrostis scabra*), spike-grass

*Japan clover reported in Choctaw, Lee, Newton, Smith, Clark, and Wilkinson Counties.

(*Trizopyrum spicatum*), broom grass (*Andropogon scoparius*), pasture-grass (*Agrostis purshii*), barn-yard grass (*Oplismenus panicum crus galli*), wire-grass (*Triticum repens*), dog-grass (*Triticum caninum*), blue grass (*Poa compressa*), marsh grass (*Spartina juncea*), Bermuda grass (*Cynodon dactylon*).

Bermuda grass is deemed one of the best grasses of the South. An analysis by Dr. St. Julian Ravenel, of Charleston, S. C., makes it nearly equal in value to timothy (*Phleum pretense*). It has been denounced a pest by cotton-planters, as it is from their point of view; yet it would seem to be a special interposition of nature, seizing upon cotton-culture farms needing recuperation, taking forcible and complete possession of them, and forcing the owner either to raise live stock or abandon the soil. Many a dilapidated estate, now being overrun by this grass, may with the aid of sheep be restored to higher fertility and greater net profit to the owner than ever. There are thousands of acres well set in Bermuda grass in the middle counties of Georgia, and it is extending its area in all the Gulf States. The late Mr. C. W. Howard, of Georgia, an eminent authority on southern grasses, and a long time correspondent of this department, once said it would live on land so poor as to be incapable of supporting valuable grasses; though its value is in proportion to the fertility of the soil. He held that if stock be kept away from it during the summer and autumn, although it might be nipped with frost, there would be sufficient grass underneath to feed stock during the winter. The following statement is from his article in the Report of Agriculture for 1867:

In Middle Georgia, Bermuda grass makes the best pasture. Probably no grass in the world gives an equal amount of grazing, winter and summer, as the Bermuda on good land. It is the dread of the cotton-planter, however, from the rapidity with which it spreads and the difficulty of extirpating it, and there are entire plantations in Middle Georgia overrun with it. These have been abandoned by the cotton-planters, and can be bought as low as $1 per acre in some cases. Many of these plantations have comfortable dwellings and out-buildings upon them, are healthy, and within easy reach of railroads. On land well manured or otherwise rich, Bermuda grass grows tall enough to mow, and makes an abundant and nutritious hay.

Mr. B. D. Lumsden, of Bibb, Georgia, in an address before the State Agricultural Society, in which he declared it the best grass grown there for pasturage or hay, and one of the best renovators of the soil, reported the price of Bermuda hay at Macon at $18 to $20 per ton, and claimed to have cut upon an acre and a half, at two cuttings, 10,000 pounds of hay. A neighbor sold the yield of thirteen acres for $399. He refers to the product of one acre in Greene County, on the farm of Dr. Moody, amounting to 13,393 pounds, costing 9 cents per hundred-weight; and to the product of eight tons per acre, with the aid of superphosphates, by Dr. Ravenel, of South Carolina.

Bermuda grass is propagated by roots and not by seeds. The smallest fragment of root will grow with the slightest covering of earth. A single shoot will sometimes run 10 feet or more in a single season on rich lands, each joint putting out roots. An agricultural journal of Alabama recommends the following mode of planting this grass:

Break the land well and harrow up fine; then cut your Bermuda sod into small lots, say one inch square. Drop these bits over the ground, 3 or 4 feet apart, and roll down level with a heavy roller. If your sod is scarce you may make your pieces much smaller than an inch square; every root with an eye in it will grow if put in the ground. In cases where no roller is at hand, the dropper of the sod may make it all right by treading upon each bit as he drops it. It is always best to start Bermuda in land not too poor; if in good condition, the grass will keep it so, and it spreads and covers the ground much more rapidly. If you cannot plow your pasture-land, you may still seed it to Bermuda by simply digging small holes (a blow with a grub-hoe will answer) and dropping the seed into them. It will spread over land that has never been cultivated, though of course with less rapidity. Bermuda grass cannot stand any great amount of shading, hence the pasture should be kept pretty clear of trees.

Dr. Janes, commissioner of agriculture for Georgia, claims that where Bermuda grass is properly appreciated by farmers, and the thin and rolling portions of their farms are covered with it, "Georgia will sustain a sheep for every acre of territory; and 37,000,000 of sheep will be worth to the owners in the aggregate $37,000,000 net per annum, or nearly double the present gross value of the cotton crop of the State." He says:

The most valuable and reliable grass, and one which is destined to aid largely in revolutionizing the system of agriculture in the cotton belt of Georgia, as well as to renovate the worn hills, is the Bermuda, perhaps the most valuable pasture-grass in the world, surpassing in nutritive properties and compactness of sod the famous Blue grass of Kentucky, having, according to the analysis of Dr. Ravenel, 14 per cent. of the albuminoids. A Bermuda-grass sod properly managed will afford an excellent pasture for cattle for nine months, and for sheep an entire year. There will be but little demand for dry forage in Middle and Lower Georgia, such is the mildness of the climate and the character of the spontaneous growth. But there is no difficulty in supplying excellent dry forage in any desired quantity and at a very small cost.

The well-known authority, Mr. Thomas Affleck, of Texas, after experience in importing over forty kinds of foreign grasses, ten or more from the far West, and test of the qualities of Texas grasses, found nothing to compare, for hay or pasture, with the Bermuda grass. "Of its value for growing," he says, "I must state further that it far exceeds that of any other grass within my knowledge, in abundant yield, in sweetness, and in nutritive qualities. On the common around this village there are cattle, horses, sheep, mules, hogs, goats, and geese innumerable all the year round, from the first evidence of renewed vegetation in the spring, and yet they are not all able to keep down this grass which covers the common; and during the summer, when it flourishes, much of the stock is in fair order."

The editor of the Southern Cultivator, Mr. W. L. Jones, thus alludes to this plant for summer pasture:

For strictly summer grazing, no grass compares with the Bermuda. It combines every quality that can be desired; will grow in any kind and quality of land, poor or rich (better of course on rich); is never killed out by drought or by close grazing; bears the hoof without injury, and does not impoverish the soil; on the contrary, land set in it will steadily become more fertile. It is highly nutritious and much relished by stock of all kinds. It furnishes pasture from May till November, and when on rich land and not close-grazed in summer and autumn, will furnish fair grazing through the early winter, the lower portions of the dense growth being protected from frost by the upper; and even the dead grass is eaten to some extent by cows, and is probably as nutritious as wheat straw. We said it was never killed by drought. It is of course checked in growth by long dry spells, but is ever ready to push again as soon as rain falls. Once set, it is perpetual; no reseeding; no replanting; no crowding out with other growth. We have often seen the ground well covered with it in localities where the land has been "thrown out" for fifteen to twenty years, and is grown up in pines 6 to 8 inches in diameter. But for being a pest in cultivated fields, Bermuda grass would be beyond value.

Guinea grass (*Sorghum halapense*). It is claimed that this plant was brought from the West Indies to South Carolina. It is propagated by roots. It is sometimes grown on good land to the height of 8 to 10 feet. It grows very rapidly, and is cut three or four times in the season. It is relished by the stock when green, and some make hay of it, by exercising care to cut it in a green state. In the Agricultural Report for 1849, Mr. M. D. Smith writes from Washington, Ark.:

To obtain a grass suited to our wants has long been a desideratum, and I believe, from an experience of seven years, that it has at last been discovered. This is the *Guinea grass*. It is a native of Africa, and was first imported into the island of Jamaica by the governor, as a bird-seed. It was there propagated, and became a very important article of provender and pasture for every kind of stock, considered second in value only to sugar-cane. It was introduced two years ago into Louisiana, where it was highly valued for soiling and for hay. On rich, dry ground it grows to the height of 8 feet, and may be cut 4 feet high four times in a season, yielding two tons per acre at each cutting. I consider it equal to the best cured corn-blades or

equal weight. It is best propagated by the roots, which resemble those of the *calamus*, each joint sending up a tuft of blades. The roots extend deep and wide, occupying all the ground as deep as the soil is loosened, and are equal to artichokes as food for hogs.

In 1873, the department procured from Jamaica about five bushels of the seed of this grass, which was distributed in the spring of 1874. It grows tall and rank, attaining the height of 8 or 10 feet, and when mature yields a coarse seed resembling millet. It grows throughout the island, from the sea to the summit of the mountain, and is the most abundant where the rainfall is heaviest. It is grown in bunches, like our buffalo-grass, and is propagated either by sets or by the seed. It spreads rapidly, and will soon cover thickly the surface of a field in which it is set. All kinds of domestic animals live and thrive upon it.

A correspondent of the Southern Cultivator, in 1873, referred to its former reputation as a pest of the cotton-fields and to a trial of it by livery stables of the vicinity, where it proved to be quite as satisfactory as any hay to be obtained. "One stable-keeper agreed to take all brought in, if it were 500 bales, asserting that it was not only the very best hay, but acted finely upon the bowels, keeping them in a much healthier condition than the ordinary hay. It sold readily at $30 per ton." It makes there a fine pasture by the middle of April, and on good lands a ton per acre can be cut by the middle of May, and about the same quantity at each monthly cutting through the season. "Though the grass dies down in winter, cattle and sheep do finely upon it; far down under the *débris* of the summer growth it remains sweet and tender all winter, and you often find a cow buried to her shoulders hunting it." The editor thus refers to his own experience with the *Sorghum halapense :*

It is certainly a pest in the same sense as Bermuda grass, possessing, like the latter, underground stems by which it is rapidly scattered if the land is plowed, and from which stems spring up above ground very rapidly when the previous growth is cut down. It comes up early in the season, and if cut down continues to shoot up during the summer with great rapidity. A few years ago we thought it valueless for stock-feed, our horses seeming not to relish it, but we have since dicovered that *if cut before the stems are fully formed*, or rather just as the latter begin to shoot up, stock relish it very much, and, judging from the condition of those fed upon it, this grass must be quite as nutritious as other grasses. For summer soiling we therefore recommend it; for grazing purposes we have no experience.

Our correspondent in Hillsborough County, Florida, Mr. W. F. White, after referring to the unsatisfactory character of native winter grasses, says: "We are planting guinea-grass and expect to make good pastures, after which they will be as good in winter as in summer."

A correspondent writing from Greensborough, Alabama, says "that it is largely grown in that section, and is best liked by those who have had the most experience with it."

Bush clover (*Lespedeza striata*) has come into notice within a few years. It is spreading naturally, encroaching upon the broom-sedge of the abandoned fields, and occupying the fence corners; and one correspondent in Georgia says it is successfully contesting the field with Bermuda grass. Yet it is not hard to destroy. It is relished by all kinds of stock, and its hay is eaten readily. It grows in the shade and upon the thinnest soils. B. D. Lamsdon, of Eatonton, Georgia, is of the opinion that "where the *Lespedeza striata* shall cover worn-out lands and pine thickets and rooted out our broom-sedge, which it is fast doing, and legislative action shall be taken in regard to the sheep's worst enemy, dogs, Middle Georgia will become a wool-growing section." He has been saving this *Lespedeza* hay for several years, and finds no hay more relished by stock, none commanding a more ready sale, and that it is sought after especially by keepers of milch cows, as it produces a rich milk and butter that "looks as if the cows had been running upon a

barley-lot." He says he has cured this hay at a cost of 10 cents per hundred-weight, and sold it at $1 and $1.10. He thinks land that will make 18 bushels of corn per acre will yield 3,000 to 4,000 pounds of hay, and that every hundred-weight will command the price of a bushel of corn, while costing much less. It is reported from different sections of each of the States from North Carolina to the Mississippi, and it appears to be everywhere enlarging in area.

Mesquite-grass (*Stipa spartea*), the bearded mesquite of Texas, is a wonderfully productive and nutritious plant. It flourishes on level plains of black prairie soil, on river bottoms, and invades the hard-trodden cow lots, where no other grass can flourish. It grows from 2 to 3 feet high, and matures in June. It is a valuable winter grass, resembling the famous blue-grass in that season. Mr. Affleck has said of it: "It is greedily devoured by the graminivorous animals generally in the winter season, but toward the 1st of March, or as soon as the spring sap rises in it, if there is any other grass to be had, they will not eat the mesquite, and it is suffered to mature its large crops of seed unmolested every year, which accounts for its rapid increase and migratory habits." Forty years ago it was stated that it would not be found east of the Colorado; now our correspondents report it nearly up to the Trinity, and it is possibly found east of that river.

Col. E. S. Graham, of Young County, Texas, reports:

> Stock-raisers from Northwestern and Eastern States regard one ton of mesquite-grass as equal to five of their common coarse grasses, and it is esteemed much more nutritious than Kentucky blue-grass. When completely browned and dried by drought, which usually occurs from the 15th of July to the 1st of September, the blades become green again from branches to tips in a few days after a heavy rain.

Three-fourths of the county reports from Texas include the mesquite in their list of grasses, and most of them give it the first place.

Mr. James A. Lewis, of Kanawha, West Virginia, once procured seed of the mesquite from Texas, and claimed that it did well in that climate, comparing favorably for pasture with Kentucky blue-grass, orchard-grass, clover, &c. As the term "mesquite" is popularly applied to several different grasses, it is not altogether certain that this was the bearded mesquite.

Gama-grass (*Tripsacum dactyloides*). This is very common in Texas, in black prairie and bottom lands. Mr. G. Lincocum, a correspondent, has said of it:

> It grows very strong in Texas. If one did not grub it up every year it would overrun our black prairie farms in a few seasons. It produces good cow-fodder. Horses do not like it unless mowed while quite young. A meadow properly set with this grass will not require renewing in a century. I have a meadow of 35 acres on black prairie soil, which consists principally of two grasses, being densely jammed on the ground. The gama-grass is not near so tough if mowed in June or September, at which season it is nice and tender, producing a quality of hay to which horses do not object, but eat it freely and thrive well on it. It produces immense quantities—I mean the mixed meadow—and is so easily procured that we have given up fodder-pulling altogether. Our horses eat it freely winter and summer.

Nimble Will (*Muhlenbergia diffusa*) is distributed throughout the South, and is favorably mentioned as a pasture-grass. Cattle and sheep eat it readily.

Water-grass (*Glyceria aquatica?*) is found growing in moist places in plowed fields, where it attains a height of 5 or 6 feet. The seed-stem is often a foot in length, heavy with rich seeds which stock devour with avidity. Three heavy crops of hay can be made from it, if cut in season, a ton or two per acre at a cutting. Some claim that horses prefer it to crab-grass or timothy.

Barnyard-grass (*Panicum crusgalli*). This grass, which has so poor a reputation in the North, is frequently mentioned in the South as a for-

age-plant of commendable value. It is also deemed valuable and utilized for hay in some portions of the West.

Broom-sedge (*Andropogon Virginicus*). The most frequently-mentioned plant in these returns is the "sedge." The *A. Virginicus* is doubtless generally meant; some speak of several varieties. It occupies millions of acres of old fields, which are taken possession of by it as soon as abandoned by the cultivator for fresh lands, according to the prevalent custom of the agriculture of this section. It is not a true sedge, but a grass of the family so abundant in the Missouri Valley region. As botanical names are rarely given, it is impossible to know whether a *Carex* or *Andropogon* is meant. In Barbour County, Alabama, *Carex cyperoidea* is reported, and *C. umbellata* in Wilkes County, North Carolina. It is sometimes known as Virginia beard-grass, and is a perennial of a purplish-brown color in flowering time, with stiff, branching stems 2 or 3 feet high in good land, surmounted by flower spikes, which, according to Professor Thurber, are "sometimes nearly concealed beneath sheaths, and often upon slender stems, are about an inch long, in pairs, and so clothed with very soft, dull-white hairs as to conceal the flowers." It is a common custom, when depended upon for spring forage, to burn the dead straw in winter; and, as it starts early, it makes abundant and early pasture. Many of our correspondents speak favorably of its utility for spring feeding.

Mr. Thomas Affleck, of Texas, once reported to this department as to winter grasses:

> The *Poa annua* here at times is almost rank in its growth, reaching a height of from 4 to 8 inches. Chickweed (*Stellaria media*), of which cows are very fond, as also sheep, covering the hill-lands where rich with quite a heavy growth. *Phalaris Americana*, a beautiful Southern grass, depicted in Celleste's work. *Hordeum pusellum*, of Nutt, a dwarf barley, or, as here called, "Texas rye," forming sweet grazing before the blossom drops. *Alopecurus geniculatus*, floating fox-tail of the English, almost as valuable as winter grass. *Trichodium laxiflorum*, hair-grass, also springs up. These are nearly all annual *winter* and *early spring* grasses. In the fence corners may be found a good bite of nimble will, and on poor spots of fox-tail. Within the last few years a creeping grass, somewhat in its habits like the Bermuda, has spread to a considerable extent over the open pastures. It is known by some as "Cuba grass," and is a *paspalum* or *digitaria*, I know not which; the sheep find sweet picking from it. On the seacoast, about Pass Christian and Pascagoula, I find a close good sod of another grass, of similar habit to the last named, of which I have not been able to determine the name; it makes a very pretty pasture, and grows well even in partial shade.

For the purpose of comparison, and to aid in the selection of grass found by experiment to be suitable to local soils and condition of culture, the following standard analyses, which are those of Professor Way, are given:

Grass.	Water.	Albuminoids or flesh-forming principally.	Fatty matters.	Heat-producing principles: Starch, gum, sugar, &c.	Woody fiber.	Mineral matter or ash.
Sweet-scented vernal	80.35	2.05	.67	8.54	7.15	1.24
Meadow fox-tail	80.20	2.44	.52	8.59	6.70	1.55
Tall rat-grass	72.65	3.54	.87	11.21	9.37	2.36
Crested dog's-tail	62.73	4.13	1.32	19.64	9.80	2.38
Orchard-grass	70.00	4.06	.94	13.30	10.11	1.59
Orchard-grass (seed ripe)	52.57	10.93	.74	12.61	20.54	2.61
Barley-grass	58.85	4.59	.94	20.05	13.03	2.54
Perennial rye-grass	71.43	3.37	.91	12.08	10.06	2.15
Italian rye-grass	75.61	2.45	.80	14.11	4.82	2.21
Timothy-grass	57.21	4.86	1.50	22.85	11.32	2.26
Annual spear-grass	79.14	2.47	.71	10.79	6.30	.59

These plants, cut at the proper time and air-dried, are analyzed with results as follows:

Hay.		Water.	Organic matter.	Ash.	Albuminoids.	Carbo-hydrates, &c., 11.	Crude fiber, I.	Fat, &c.
Meadow hay, medium quality		14.3	79.5	6.2	8.2	41.3	30.0	2.0
Red clover, full blossom		16.7	77.1	6.2	13.4	29.9	35.8	3.2
Red clover, ripe		16.7	77.7	5.6	9.4	20.3	48.0	2.0
White clover, full blossom		16.7	74.8	8.5	14.9	34.3	25.6	3.5
Lucerne, young		16.7	74.6	8.7	19.7	32.9	22.0	3.3
Yellow clover in blossom (*Medicago lupulina*)		16.7	77.3	6.0	14.6	36.5	26.2	3.3
Vetches in blossom		16.7	75.0	8.3	14.2	35.3	25.5	2.5
Pease in blossom		16.7	76.3	7.0	14.3	36.8	25.2	2.6
Italian rye-grass (*Solium Italicum*)	Cut in blossom.	14.3	77.9	7.8	8.7	51.4	16.9	2.8
Timothy (*Phleum pratense*)		14.3	81.2	4.5	9.7	48.8	22.7	3.0
Early meadow-grass (*Poa Annua*)		14.3	83.3	2.4	10.1	47.2	25.9	2.9
Crested dog's-tail (*Cynosurus cristatus*)		14.3	80.2	5.5	9.5	48.0	22.6	2.8
Orchard-grass (*Dactylis glomerata*)		14.3	81.1	4.6	11.6	40.7	28.9	2.7
Barley-grass (*Hordeum pratense*)		14.3	80.4	5.3	9.6	42.0	27.2	2.0
Meadow fox-tail (*Alopecurus pratensis*)		14.3	79.0	6.7	10.6	39.5	29.0	2.5
Oat-grass, French rye-grass (*Arrhenatherum avenaceum*)		14.3	75.8	9.9	11.1	35.3	29.4	2.7
Sweet-scented vernal grass (*Anthoxanthum odoratum*)		14.3	80.3	5.4	8.9	40.2	31.2	2.9
Spear-grass, Kentucky blue-grass (*Poa pratensis*)		14.3	80.6	5.1	8.9	39.1	32.6	2.3
Average of all the grasses		14.3	79.9	5.8	9.5	41.7	28.7	2.6

Experiments with the cultivated grasses, during a long period and in all the States, have demonstrated their practical success and high value in southern farm economy.

Tall meadow oat-grass (*Arrhenatherum avenaceum*).—This grass, known and appreciated in this country and in Europe, has been introduced into Georgia under different names. Its winter growth is scarcely excelled, unless by Italian rye-grass. It is said to do well under winter grazing. Mr. George H. Waring, of Habersham County, Georgia, from an experimental patch 10 feet by 90, obtained 210 pounds of dried hay, or at the rate of 5 tons per acre. It is not presumed to be equal in quantity to orchard grass by practical cultivators there.

Orchard-grass (*Dactylis glomerata*).—This grass, which is held in so high esteem in the best dairy districts of the country, is well suited to extreme districts of the South, and especially to the table lands and valleys of the mountain system. Mr. C. W. Howard has reported the conclusions, from his experience in Georgia, with regard to it:

> This grass succeeds at the South on lands having a clay subsoil as low down as the oak and hickory rolling country extends. In the flat sandy lands it is said not to perfect its seeds, and quickly dies out. It is of little use at the South as a hay-grass, but possesses great value as a winter pasture. It grows best in the shade, which result its name would indicate. It should not be grazed during the summer. All stock should be taken from it in June and not allowed to return to it until Christmas. It is not among the most permanent of artificial grasses. Hence it is proper to sow it with red and white clover, when these are used in a rotation, for the improvement of the soil. Orchard grass is proper to be mixed with clover, when the latter is to be cut for hay, as both blossom at the same time. Herds grass and timothy are much later than red clover, and therefore unsuited to be sown with it.

It is beginning to be recommended in that region as a soiling crop, sown with red clover, sowing 20 pounds to 12 of the clover per acre. Dr. L. D. Morse recommends this grass for Missouri as "the most abiding of all grasses"; it is sown to advantage with clover, grows quickly when cropped by cows and sheep, and makes good pasturage after a rest of five days from being fed close. It has been admitted in Kentucky

that, when grazed down by stock, it will be ready for grazing again in half the time required by blue-grass; and some have claimed that in summer it will grow more in a day than blue-grass grows in a week. A correspondent in Cobb County, Georgia, deems it the best cultivable grass for that part of the State (northwestern), which is of granite, claiming that it endures equally well hot and cold weather, wet and dry.

Lucerne (Alfalfa of California), *Medicago sativa.*—This is a most valuable forage plant for Southern culture. It is not very generally introduced except in an experimental way, and will not be until more attention is given to stock-growing. Mr. C. W. Howard declared that it grew as well in Georgia as in France, and deemed it the most valuable of all the forage plants for that region. He held that no forage-crop tested in Georgia could equal it in quantity, and none in the North could produce as much hay as lucerne in the South. His practice was to sow either in autumn or in February, harrowing in and rolling the surface, using about two pounds of seed to the acre.

If the future of sheep-husbandry in this latitude shall be characterized by skill and enterprise, combined with economy of management and wise forecast in avoiding risks of unequal and insufficient natural pasturage, lucerne will fill a prominent place in the necessary provision for regular and abundant feed, increasing many fold the possibilities of the business, enlarging immensely the numbers that can be supported on a given area. Bermuda and other grasses especially suited to high temperatures and capable of resisting droughts may share the attention of wool-growers; yet there must be large tracts in the Gulf States, and on the line of the Texas Pacific road through to the ocean, in which this forage plant may fill a place of high utility in the economy of wool-growing.

It is a deep and rich soil, into which the roots can readily penetrate. An Irish potato-patch, or a field of wheat stubble with a soft and friable soil, is frequently selected by careful cultivators. The richer it is made with manure the better (if the soil is not of the "inexhaustible" kind that is presumed never to need manure); it is plowed thoroughly, and if seeds of weeds abound, again and again, to turn under successive crops of troublesome plants. Those who covet the highest success thus obtain a deep and clean seed-bed, and sow in August 10 pounds of seed, and if the young plants are attacked by grasshoppers, a dressing of ashes or guano is given. It should neither be cut nor grazed until the next season, when three to five cuttings should be made.

PROFIT OF SOUTHERN SHEEP HUSBANDRY.

The profits of wool-growing in the Atlantic States, Delaware, Maryland, and Virginia, are derived largely from production of lambs for the neighboring markets of Washington and Baltimore, not to mention Philadelphia and New York, which are also quite accessible. The thrifty and enterprising farmer who keeps few sheep prefers the quick returns coming from lambs sold at four months old for higher prices than full-grown Merino grades.

The unenterprising farmer, who will not provide the requisite care and feed, had much better stick to wool-growing alone, for the mutton will be worthless. The broad acres of mountain ranges are also better suited to the exclusive production of wool. It is the testimony of many that half-breed Southdowns or Cotswold lambs, well cared for, will pay all expenses of the flock with meat, leaving the wool for profit. This section is peculiarly suitable for lamb-raising, not alone on account of

proximity to great cities, but from the cheapness of fertile lands and healthfulness of the climate. The Piedmont region, the Blue Ridge, and the valley of Virginia are remarkably well adapted to the production of the cultivated forage plants necessary for winter feeding, and the blue-grass and white clover pasturage in summer is abundant and enduring.

It has not yet become an important industry. Much fine pasturage in the mountain is as yet unutilized. The largest numbers of sheep are at present to be found in Culpeper and Fauquier, in the Blue Ridge region, and on the limestone soils of Southern Virginia, especially Scott, Russell, Washington, and Grayson.

Mr. John Carmichael, of Loudoun County, reports the value of spring lambs sent to Washington at $2.50 to $5, according to quality; that western ewes, bought in the autumn for breeding, cost $2.75; their lambs average $2.30, and their wool $1 more. The ewes are fattened and sold in the fall for $4 to $5. This makes the gross returns of the year about $8, or $5.20 above the cost of the ewe for feed and profits.

Mr. Thomas F. Rives reports for Dinwiddie County:

Captain Shelton has a fine flock of grade Southdowns. He sows rye and winter oats, thus supplying good winter pasture. His lambs are dropped in the early part of January and some in December. He generally has a lot of fat lambs in market by the middle of April, and always commands a good price for them, from $5 to $6 per head. Mr. Burgess is breeding up a fine flock of Cotswolds. He has provided good shelter for his flock, and his sheep are well cared for in all respects. Both of the gentlemen say that it pays them well.

Some of the difficulties in the way of extensive sheep-husbandry are given by Mr. William F. Jackson, of Amelia County, Virginia:

The large land-owner will tell you it pays 100 per cent. and beats farming to death, but says: "I have no fences; it would bankrupt me to fence my lands, and if I did, in ten days the dogs would kill all my sheep. I cannot go into the speculation; it might ruin me at once." There is some force in this, but it seems to me the venture might be more profitable and less hazardous by employing a herdsman without fences, except for inclosing them at night.

Mr. R. Turnbull, of Brunswick, Virginia:

Believing that there is money in sheep, I have determined to go into the business on a farm of 2,400 acres, in this county, in which I am interested. I have now on the farm a flock of 46 (which is the largest flock in the county) in fine condition, and I expect to increase the flock to 500 or 1,000.

Examples of small flocks which have been a success are numerous. In Northumberland County, Virginia, according to a former return of our correspondent, a flock of 68 ewes, costing $3 each, produced 100 lambs the first year, which brought $5 each in May, netting nearly $300 above original cost, with the original flock and the wool on hand. They were turned into a wheat stubble seeded with clover, and had no other food and little attention.

Mr. William P. Austin, of Lunenburg, Va., reports a flock of 48 kept on a cost of $10 per annum for shearing and feed, exclusive of pasturage and care, yielding an average of $93 per annum.

Mr. William B. Chalkley, of Chesterfield, has a flock of 40 worth $100, and has sold 24 for $60, and 150 pounds of wool for $34.50. The cost of the original 18 was $42, and the cost of keeping two years is estimated at $30. The gain is equivalent to $122.50, paying well for care and investment.

The following testimony to the profit of mutton production and lamb-raising is from department records:

Clark County, Virginia.—It is far more profitable to keep the different varieties of the mutton breeds than the fine wool or Merino breed in this portion of Virginia. I

say this from my own experience and that of many intelligent gentlemen with whom I have conversed. The Cotswold sheep and its crosses with the Southdown are less liable to lose their lambs than the Merino. The lambs are more vigorous and hardy; then add their early maturity, their fitness for market at eighteen months old, and their almost double value when in market, and you have advantages which far outweigh the additional amount of food which the mutton sheep may consume in proportion to his size. I have said nothing about the difference in the value of the wool, because I believe there is very little difference; if there is any, it is in favor of the mutton breed in this county. In January, 1869, I agreed to take from a gentleman in this county 100 Spanish Merino ewes to keep on the shares; he giving me one-half the lambs and one-half of the wool for keeping them until the fall of 1869. They were put in a field of 75 acres sod with 45 acres of woodland attached; the pasture was good and they fattened upon it. At the same time 25 ewes of Cotswold and Southdown were put in the field; the Merinos in the spring produced 56 lambs; the 25 Cotswold and Southdown ewes raised 24 lambs. The feed was the same, and the same care was bestowed upon each flock, for they were together all the time. All the Merino lambs were sold in October, 1869, at $2 per head, except five, which had the foot-rot so badly they could not be driven to market; the Cotswold and Southdown would have brought double the money per head. These views apply to this county, which is only fifty miles from Washington, D. C., and about eighty-five miles from Baltimore.

Prince George's County, Maryland.—Sheep need no shelter here except what woods or open sheds or tobacco houses afford. Seldom any grain is given them. My flock is small but choice. They have had this winter no grain, no hay, and no shelter, and are fat and healthy, with well-grown fat lambs of different ages, from ten days to two weeks old. They have run all the time on an old clover and timothy pasture, grazed close last autumn, except when the ground was frozen or covered with snow, when they had access to the rye field where the fodder shocks stand. Most of them are Southdowns, a few are a Cotswold cross. They will shear an average of over six pounds of wool, and have lambs living now in the proportion of six lambs to eight ewes, although some have been killed by dogs.

In the more Southern States wool-growing commands more attention than mutton production, and fine-wooled sheep are preferred. This must continue to be the case, except that an abundant supply of better quality of mutton is required for town consumption, and the demand would soon be doubled by such improvement in quality. Owners of small flocks will report a profit of 50 to 100 per cent. Still flocks increase slowly, and few give the business any attention. Some will say that wool costs nothing except the shearing, because sheep are allowed to run from one shearing to another without care. Such examples afford no criterion to judge of the actual profits of the business on a large scale. It will not do to say that grass costs nothing because it is wasted. The land that produces it costs money, and pays taxes, even if without fencing or the supervision of the proprietor. With such utter neglect of the business, there are no recorded data on which to base an accurate calculation of profits. It is much like the housewife's estimate of gains from her poultry-yard, which she confidently assumes to be all profit. She rarely extends her operations, however, beyond the requirements of a moderate store of pin-money. Thus, while one reports a doubling of capital yearly, another estimates a gain of 50 per cent., and a third no profit. One of the latter, our correspondent in Wilkes County, Mr. L. Harrill, declares that there is no profit in sheep; that the few there are small, degenerate animals, unprovided with clover or cultivated grasses, allowed to roam at large, the lambs left to live or die, and to the tender mercies of dogs if they live. And yet he thinks that with proper attention wool might be produced at a cost of 10 cents per pound instead of 20. Allowing for a little looseness of calculation, for a little enthusiasm on one side and disgust on the other, all these widely varying statements may be founded on fact, and yet it scarcely touches the real question of profit of sheep-husbandry as a business of such magnitude as to command the attention of an enterprising man. And yet these examples are instructive. If a flock, even a small one, can maintain itself summer and winter in aban-

doned fields and forests outside of farm inspection and observation, and ravenous dogs, hungry negroes, as well as equally hungry white men, and raise lambs enough to make good inevitable losses, giving the owner their fleeces each spring for the shearing, it is evidence that, with a business-like management, a larger flock might be expected to yield a handsome dividend,

A few extracts from correspondents will illustrate more fully the status of the business. Mr. Thomas W. Beatty, of Horry County, South Carolina, says:

A practical man assures me that three years ago he bought a flock of 30 head of sheep; that since that time they have yielded him an annual profit, in increase, wool and mutton, of 50 per cent. He has given them but little attention, except to put them in his field during winter, to protect the lambs from getting into low, flat woods during rainy seasons, and giving the old sheep a little forage at night, to make them seek the lot for protection against the depredation of the wildcat, which animal is very destructive of young lambs in the woods and near swamps. Most persons in this county give their sheep no attention except to drive them up in the latter part of May, clip the wool from the old ones, mark and castrate the lambs, turn them out for another twelve months (unless to drive them up in June and July to kill a mutton or two), and yet, with this treatment, a flock of 20 to 40 head will actually increase in numbers, unless dogs get among them, or they range so far from any habitation that it makes good picking for thieves. I am satisfied that nothing would be more profitable in this county than sheep-husbandry with proper attention.

A correspondent in Union County, South Carolina, reported an income of $58.40 (80 pounds of wool at 28 cents, 300 pounds of mutton at 8 cents, and an increase of 6 sheep at $2) from a flock of 26 common sheep, costing $52, and $7 for salt and cotton-seed.

R. D. Winn, Gwinnett, Georgia:

This climate and our natural pasturage is well adapted to sheep-raising. In some parts of the county, where it is broken and sparsely settled, sheep require but little feeding, even during the winter months. These are only special localities and but few of them. I dissent from the commissioner of agriculture of Georgia in his estimate of the cost of raising wool in this State. His figures are too low for my county and too low for the State. A somewhat extensive acquaintance with the larger portion of the State authorizes the opinion I have given.

Dr. J. T. Chappell, Laurens, Georgia, says:

On paper it looks as though sheep-raising would be profitable, and doubtless it would be as a business *per se*. But it cannot be carried on in connection with cotton-planting. As all who own land and stock are in the cotton business, I do not think any one will risk a change. The risk is great, and the greatest risk is in dogs. Some parties that lost heavily in sheep put out strychnine and killed the dogs. The dog men retaliated by driving 60 head of sheep into a stream and drowning them. People here are poor, ignorant, and selfish. All own dogs and but few feed them. A hungry dog will eat sheep, kids, pigs, chickens, eggs, &c. They are of no use, but are kept on places where children suffer for bread. For seven years after the war I tried to raise sheep, kept them inclosed all the time. I used powder, lead, and strychnine, and after receiving much abuse for loss of dogs by neighbors, I left off in disgust and *lost all*. While you can give a bright picture in figures on sheep-raising, do not fail to give the dark one on dogs. I see no prospect of a change.

Mr. Robert Hester, of Elbert:

Pastures are very insecure, and sheep roam at large in the woods and old-field pastures without shepherds, and without the personal care of their owners even in winter. A small proportion of old farmers still keep up flocks and give some attention to them, but for the most part the losses from neglect are heavy, and they are laid on thieves and dogs. The great trouble is that sheep-owners expect their sheep to take care of themselves and bring their fleeces home at shearing time entire and free from burs and filth.

Mr. A. J. Cheves, Macon County:

Our county is not well adapted to sheep-husbandry. The wire-grass section is south and east of us. Nearly all of our open lands are cultivated every year. Our woods are pine, with a very thick undergrowth of oak bushes excluding the grasses almost entirely.

Mr. Timothy Fussell, Coffee:

Stock-raisers are inclosing large wood pastures, producing wild grasses. These woods are also of great service in saving lambs and keeping them from hogs, &c.

Mr. C. H. Sutton, Habersham:

Any of our uncultivated upland soils are capable of producing grass. Fine pasturage may be had by removing the undergrowth, leaving the larger trees for shade, and sowing in blue-grass, thus producing a fine range for sheep.

Mr. A. Davenport, of Fannin:

We have, as you will see, a vast territory of forest, all of which affords good summer range for sheep. The common sedge, springing up spontaneously all over the county, is of early growth, tender and nutritious until other and later grasses come in. Sheep are exceedingly fond of the seed of "beggar lice," which also grows abundantly in this hill country. Upon this wild range, from a state of poverty in the spring they are fat enough for market in July. They need shelter and tame pasture in winter, but I have known them to winter in the woods without any attention. They can be well wintered at small cost upon a pasture of early-sown rye, cost not exceeding 15 cents per head, thus placing them in advance of any other stock raised in this county; but, strange to say, no man in all this county is engaged in this highly lucrative enterprise.

Mr. C. J. Wellborn, Union County;

Sheep-raising up to this time in this county has been regarded as a mere incident of farm life, and not looked to as a business. Most farmers have a small flock, which are sheared and turned out about the first of April, and receive no further attention until they are hunted up in the fall to be sheared again. About one-half of them are then sold to drovers to be slaughtered for mutton, which is of the natural increase of the flock. This is a healthy climate for sheep.

Mr. J. S. Lavender, Pike:

The main point in sheep is raising lambs in the spring, shearing them in the fall, and killing them before winter and using their flesh for mutton. There is no profit in keeping sheep in this county when you have to keep over in winter.

Mr. James R. Brown, Cherokee:

I do not think wool can be produced in this part of Georgia at 6 cents per pound, as stated by our commissioner of agriculture. In the wire-grass part of Lower Georgia it might. This section of the State has grown up in such thickets that the bushes kill or shade out a large portion of the grass and other pasturage.

Dr. Wm. N. Bruce, Decatur:

In 1866 I had a flock of 40 sheep, somewhat improved by having a Merino buck with them. With great vigilance in their care they decreased, and in 1877 we sheared eleven ewes, every wether missing. I propose to try again. Several individuals have bought up hundreds, and after a trial lasting for a year or two abandoned them.

Mr. M. D. Sanford, Catoosa:

One hundred sheep cost $100; product in lambs, 75 = $75. Cost of keeping equal to manure and increase. Therefore the profit is equal to the wool = 3½ pounds to each sheep, or 350 pounds of wool, worth 25 cents per pound = $87.50 profit.

Mr. Freeman Walker, of Stewart County, Georgia, has 106 head that make him five pounds of wool per year each, for which he gets $132.50. It costs him only $10 to feed them on cotton-seed during the months that it is necessary to feed, and they average 75 lambs per year. The actual expense of keeping is about $10 per year. What his sheep make is just like picking it up.

The following paragraph is from Dr. James' Manual of Sheep Husbandry in Georgia:

Mr. David Ayers, of Camilla, Mitchell County, in Southwestern Georgia, where snow never falls and the ground seldom freezes, and where the original pine forest is carpeted with the native grass, says his sheep, 3,500 in number, cost him annually 14 cents per head, clip three pounds of unwashed wool which sells at 30 cents per pound, giving a clear profit of 90 per cent. on the money and labor invested in sheep. Lands suited to sheep-raising can be purchased in this section of the State for from $1.50 to $10 per acre, according to location. Mr. Ayers does not feed his sheep at any time dur-

ing the year, neither has he introduced the improved breeds, using only what is known as the native sheep. Of course, the cross of the Spanish Merino on this stock would give better results in both quantity and quality of wool. These sheep receive little care except to be gathered up once a year to be sheared and marked. Mr. Ayers complains of the ravages of dogs on the sheep and of hogs and eagles on the lambs.

Mr. Robert C. Humber, of Putnam County, in Middle Georgia, furnishes some interesting facts from his experience in sheep-raising as a factor of mixed husbandry, in which the famous and much dreaded Bermuda grass is utilized. He keeps 138 sheep of the cross between the Merino and the common stock. He says the cost is "nothing except the salt they eat," while they pay 100 per cent. on the investment in mutton, lambs, and wool. They yield an average of 3 pounds of wool per head, which he sells at the very low price of 25 cents; less than the market price. It costs him nothing except the shearing. His sheep range on Bermuda grass old fields in summer, and the plantation at large, embracing the fields from which crops have been gathered and the cane-bottoms, in winter. They are never fed at any season.

The records of this department furnish the following illustration of profit for Pulaski County, Georgia. Mr. A. bought 800 head of sheep in 1868, of which the following statement is made:

DR.		
Cost	$750 00	
Cost of hand to care for them, $12 and $15 per month	180 00	
Cost of salting and incidental expense	20 00	
		$950 00
CR.		
2,000 pounds wool, at 30 cents	600 00	
Increase, 225 lambs, at $1	225 00	
15 acres of land well manured, $10 per acre	150 00	
700 sheep on hand, at $1.50 per head	1,050 00	
		2,025 00
Profit		1,075 00

This was the scrub stock of the piny-wood counties of Georgia, but serves to illustrate the profits of sheep-raising, even in Georgia. Pasturage costs nothing. Good stock would pay better.

Mr. John Bradford, Leon County, Florida, says:

Ten years ago the writer began with 25 ewes and 2 bucks, common stock. Four years ago I procured a Merino buck. Have butchered about 130 mutton, lost heavily in not looking after lambs in January and February, and very heavily (some years as much as 30 per cent.) by roguish negroes, and have now 130 in my flock. The manure has more than paid for the actual cost of keeping. Have only had good attention one winter, then with the very best results, as the wool-clip and increase of flock amounted to about 90 per cent. of the value of the flock.

Mr. William E. Woodruff, Duval:

Sheep-husbandry has been about the best paying thing here, but since the negroes have given up work and become the proprietors of about four dogs each on an average it has become worthless. The fleece, although light, is fine and clean, and the mutton is, I think, finer in flavor than at the North.

Mr. A. M. Beardsley, Bradford:

I hear of but three persons in this county who have attempted sheep-raising. Of these, two have abandoned the enterprise, mainly in consequence of ravages by dogs, and the other is compelled to provide quarters for the flock in order to save them from these enemies.

Mr. C. S. Coe, Liberty:

There is little or no attention paid to sheep in this county; they range the woods from one shearing time to the next, often without the owner knowing anything about

them, only as he may happen upon them in hunting game or gathering up his cattle. At shearing time they are gathered, and turned into the woods again to ramble at their pleasure until next shearing time.

Mr. Henry J. Stewart, Hamilton:

About three or four years ago one farmer increased his flock (by purchase) to 400 head. He allowed them to roam at will, taking no pains with them, and the result is a loss of at least 50 per cent. per year, not by disease, but by dogs mostly, some few by drowning. Ours is a fine sheep country, and were the farmers to try they could make it exceedingly profitable; much more so than raising cotton. I scarcely hear of sheep dying of disease of any kind. They get very fat running in the woods.

Mr. William Thompson, Putnam County, Florida, refers to the extent of wire-grass range, valuable only for spring pasturage and the spreading of the more valuable Bermuda grass, and says:

One flock of sheep, numbering about 1,000, is doing very well, having thousands of acres to roam over and pick grasses suited to them for food. Sheep husbandry would be profitable if the sheep were attended to by a shepherd, and moved from place to place on the unoccupied lands, as exhaustion of range would require.

Mr. John H. Martin, Lauderdale, Alabama:

There are many instances of small flocks paying over 100 per cent. on investment, the manure not taken into consideration. We are getting some grade sheep now that will average from 7 to 9 pounds, and a few that will go 10 to 15 pounds. The northern portion of our country is especially adapted to sheep-husbandry.

Mr. William S. Earnest, Jefferson:

I am satisfied that we have in this county as good lands for sheep-raising as can be found on the continent. We have in this county a plat of land 18 miles long by about 6 wide, nearly all wild mountain land, that would feed and raise 10,000 sheep.

Mr. R. H. Powell, of Bullock County, reports a small flock of Maj. J. F. Culver, which has received care and shelter, which it well repays. He bought 25 common sheep in 1873, costing $55; supplied himself with mutton, sold some to his neighbors, and now has 206, worth $575. He gets 28 cents per pound for wool, and derives an annual profit of $180 from his flock. His loss from disease was but 1½ per cent. last year. During two months in winter extra feed is provided.

Mr. John Robinson, Wayne County:

Sheep-farming might be profitably engaged in in this region, three-fourths of our land being unredeemed or uncultivated, and yielding a fair pasturage during eight months of the year. I could fill folios with animadversions on our idiosyncrasies on farming, stock-raising, &c.; but enough. Unless some philanthropic exemplar comes to us and lets us see, it will be some generations ere we get out of our old ruts.

Mr. J. W. Councell, Watauga County:

There are 8,625 sheep in my county, valued for taxation at $8,629. Sheep never need feeding in this county unless the ground is covered with snow. A flock of sheep will winter and raise about as many lambs without feeding as with it.

Mr. J. B. Oliver, Duplin County:

Can only give you results for 1876 of my flock of 20 head—15 ewes. They were fed two months, January and February. Daily fed one bushel pea-hulls, worth perhaps 5 cents, and two ears of corn. The whole cost of feeding did not exceed 25 cents each. They had seven acres in winter oats as pasturage. The oats were none the worse for it, as they made a good crop. They also had the run of a forty-acre field in small grain the previous year. From these sheep I raised 12 lambs, for which I was offered $2 each by a butcher the middle of June. I sheared 60 pounds of wool, a part of which was sold at 25 cents per pound. I lost one ewe during the winter. Net profit, $31.

Mr. W. D. Sprott, Claiborne, Mississippi:

One flock in this county numbers 100 ewes. They were bred from the native ewe crossed with the Southdown. Average, about one-sixth Southdown. Such sheep are worth to-day in the market $3 per head. This flock looks well; has received during the past twelve months attention—salt, that is all. They have a large corral with a big shed made dog-proof into which they are driven every night. I saw this flock turned out this morning; they had following them 102 lambs from one day to three weeks old, looking well.

Mr. W. W. Dedrick, Hinds, Mississippi:

Mr. M. C. Cannada purchased in December, 1875, 225 sheep, mostly ewes. He has sold $110 in mutton and $260 in wool. He has on hand 250 grown sheep and 150 lambs. Cost of keeping, shearing, attendance, &c., $75 per annum.

Mr. T. S. Ford, Marion:

Eleven years ago Mr. R. invested $575, gold, in sheep, at $1.75 per head. He has since kept an accurate account of his income from these sheep, and states that he has realized in cash from wool and mutton during the eleven years over $10,000. He has now a flock of 1,500. The annual expense, including taxes, is not ten cents per head. He sees them but once a year. They run in the woods like deer and are not even salted. This, however, is an exceptional locality, there being few dogs. Sheep do not subsist on the woods' grass, but entirely on herbs, mainly upon one small perennial herb, growing flat on the ground, with broad and rounded leaves, resembling very much the deer-tongue (vanilla).

Mr. F. A. Wolfe, Hinds County:

I have only been experimenting three years, and during that time have tested the Cotswold on the native ewe, and have found the cross of good size, but not so easily fattened. After fattening they are much more easily reduced in flesh than the cross of the Southdown on the common ewe. I have only my original imported Cotswolds, two years, having lost all their increase, *i. e.*, the full-bloods. I feel very much encouraged in sheep-husbandry and will continue to increase my flock, but cannot have over 200 in one flock, as penning more than this number in one inclosure at night will not do in this climate.

Mr. W. H. Jacobs, Queen Anne, Maryland, thus writes of the sheep-range of Southern Mississippi:

A long residence in Southwestern Mississippi has convinced me that in that portion of the South sheep-raising, if properly prosecuted, might be made more profitable than cotton-planting. At that time (thirty years ago) much of the Gulf hill lands had become by incessant cotton-planting exhausted of their original fertility, but when thrown out as unprofitable for cultivation would in a few years become covered with a dense mass of Bermuda grass, affording the finest perennial pasture for sheep that I have ever seen. As editor at that time of the Port Gibson Herald, I endeavored through the columns of my own paper, and through those of the Plough, Loom and Anvil, a magazine then published by the venerable John S. Skinner, to urge this branch of industry upon the planters of that region. I had the hearty co-operation of Mr. Skinner, but we labored in vain. The owners of these lands admitted the justice of our arguments, that while these "worn-out" lands were incapable of producing crops of cotton, they were almost unequaled as sheep pastures; that a few years of such pasturage would restore their original fertility, when a crop of corn and cow-peas would kill out the grass and prepare the ground for greatly increased crops of the greater stapple (cotton).

Mr. B. F. Dane, Kendall, Texas:

Although most of our county is adapted to sheep-husbandry, I find these to thrive the best under fence on account of its mountainous surface. Unless very carefully herded, losses will occur when the flock is spread sufficiently for them to graze. Under fence they run at will and graze and eat at their leisure. The pasture should be subdivided so as to occasionally give them a fresh run. For the winter they should have a dry shelter at night. I find by this system that the flock will yield about a third more wool, sustain fewer losses, require less acres to graze on, save the wages of a shepherd, and in every respect do better.

Mr. J. T. Hester, of Navarro County, says:

I have been engaged in sheep-raising for fourteen years. In this and all the old prairie counties from 300 to 400 sheep do well; 100 per cent. gross profit is a fair statement. The profit diminishes 10 per cent. per 100 head as you go over 400. My flock has ranged from 300 to 1,000. I put annually 100 pounds of prairie hay and one bushel of cotton-seed to each sheep; have good shelters; permit no ewes to have lambs until fully grown; do not herd close; give my sheep close attention, and realize about 50 per cent. clear profit on 400 head, at a valuation of $1,000.

Mr. James Walker, Lavaca:

Mr. S. B. Moore has a flock of 1,500 head let out to a herder on shares, and therefore furnishes a pretty safe sample of annual profits. He gives the herder one-fourth of the wool and one-fourth of the annual increase; that is, the actual increase. Mr. Moore furnishes the salt, sheep-dip, &c., and the herder pays all other expenses and one-

fourth of the shearing expenses. This makes the net yield to Mr. Moore for wool $800. The increase of flock will average 800 head, which, at $1.50 per lamb in spring, makes $1,200; one-fourth of which to herder leaves $900 to Mr. Moore; thus giving a net annual profit of $1,700, or about $1.33⅓ per head on entire flock.

Mr. Pryor Lea, Goliad:

Cost and profit of growing wool may be estimated in two ways. Crediting increase of sheep as equal to all cost, the wool would be net profit, and this is claimed by many producers. Without crediting increase with more than enough to maintain the flock equal to its primitive condition, a practical estimate for cost, considering every kind of an item, might be from 10 to 12 cents per pound of unwashed wool, averaging 17 cents in market. This latter mode gives broad margin for contingencies.

Mr. M. J. Denman, Kimball County, Texas, thus writes of the flock of Messrs. Burton and Lemons:

They purchased 1,000 head of grade sheep, three-fourths Spanish Merino and one-fourth Mexican sheep; this purchase was made in 1876, in January. The total weight of spring fleeces was 3,100 pounds, and sold at San Antonio at 19 cents per pound, bringing $589. The fall clip of 1876 weighed 2,732 pounds, and sold in Austin at 20 cents per pound, bringing $546.40. He lost 58 head of the number purchased up to January, 1877, and the increase was 369 to the same date, showing an increase in the flock of 311 head; the cost of attention, including all expense, was $240, leaving the handsome profit on the wool of $895.40, saying nothing of the 311 increase, which is worth at least $900 in our home market. The flock above mentioned has been well cared for, and shows the result of proper attention to sheep in this immediate neighborhood; other flocks well attended show the same result. Mexican sheep yield only 2 pounds of wool annually, which is worth only from 9 to 13 cents per pound, bringing only enough to pay the expenses of attendance.

Mr. E. L. Walker, Stephens:

Mr. G. W. Gore owns about 600 sheep, and during last year lost but one sheep from his flock; cause, natural death. Others have lost from "scab," contracted elsewhere. The yield of fleece depends upon the stock. We are breeding up from common "Mexican sheep." Sheep-husbandry is a new industry in this county. Until the last eighteen months attention was paid to nothing but cattle. Stephens County is admirably adapted to sheep-raising, being diversified in surface, plains (flats), rolling, hilly, and many high creek bottoms.

Mr. P. S. Clarke, Waller:

Every year I looked after the flock they paid me full measure, and when I neglected them they neglected me.

Mr. H. Chamberlain, Nueces, a county which sustains more sheep than some States, thus writes of the condition of wool-growing:

The last ten years have wrought favorable changes in the sheep interests and sheep management in this county. Since the range began to be eaten close, and waste grasses ceased to lie on the surface, those diseases which had threatened many flocks have gradually, if not entirely, disappeared. Foot-rot is now unknown in this county. Lumbres, a complaint which up to 1868 had carried off many thousands of spring lambs annually, commencing in July or August and operating upon them through the fall and winter, until the flock frequently became exhausted. This disease follows overflows and a superabundance of rank grasses. It consists of something like a knob of long, small worms, resembling hair, in the stomach, the lungs invariably becoming affected; the outward symptoms resembling consumption in the human race. Semi-annual lambing is also very generally adopted in the county, the February or spring crop being always preferable; one set of ewes lamb in spring, and another set in the fall. Flocks are sheltered from November 15 to February 1 by selecting their range and night camp on the south side of some creek or prairie timber.

Mr. G. A. Kirkland, Shackelford:

Myself and partner bought 900 head of Mexican ewes last July, $1.50 per head, 18 Merino bucks, at $15 per head. For all of our half-breed ewes, the first cross on the Mexican ewes with the Merino bucks, we could get $3 per head. The first cross will also add one pound more of wool. Four crosses would make fifteen-sixteenths Merino, and would be equal in value to any Merino wool. It costs per month, for herding, $15; salt, $2; provision herders, $7; total, $24.

The following is from a successful sheep-raiser in Texas:

There is quite a difference in quality of sheep as well as manner of keeping. This climate is best adapted to the fine-wool sheep. I have 625 high-grade and full-blood

Merino (American). I shelter well, keep dry under foot, and in common winters feed hay only in storms, which generally do not exceed twenty days' duration any winter. I have lambs dropped from February 1 to April 1. The breeding-ewes need feed—hay, grain, or cotton-seed—until March 1, when grass is usually abundant. This attention is necessary to the growth of the lambs. My lambs can be taken from the ewes in time for them to get well recuperated by winter. The lambs getting the benefit of the tender grass in spring get in fine condition for winter. I commenced with 220 ewes three years ago, and have sold sufficient of the flock to make an increase of 100 per cent. per year, average; and the wool has averaged for that time from 75 cents to $1 per head annually.

Sheep-husbandry in Tennessee has long been a successful pursuit. In the hands of those who have been personally interested and persistent in it, it has always been profitable. Mr. Mark R. Cockrell, of Nashville, imported Saxon sheep more than fifty years ago. About twenty years ago he wrote the following, in a letter published in the American Shepherd:

I have about 1,000 head of fine sheep, and from 400 to 500 long-wooled or mutton sheep. My Saxon sheep were imported in 1824 or 1826, I cannot say which, and I find as yet no falling off in quantity or quality of their fleeces; on the contrary, I believe a little improvement on both points and a little more yolk, when well provided for, which, you know, does not abound much in the Saxon breed. In addition, the fleeces are a little more compact than formerly, hence more weight; and, from our mild climate, *the staple has become longer*. I assert it to be a fact that the cotton region I am now in (Mr. Cockrell dates from Madison County, Mississippi, where a part of his sheep are kept), in about latitude 32° north, is better than any country north of it to grow wool, as the sheep can be kept all the time grazing, by sowing small grain; for if grazed off it quickly grows again in a few days; and the wool of the fine Saxon sheep in this climate is softer and more cotton-like than any I have ever seen, although I have samples from all parts of the world. I have traveled from this very place to Boston, sampling all the sheep of note on the way, and I found nothing on my journey or at Boston as good as the wool I had grown, and so said all the wool-staplers whom I met with, and they were not a few. I presumed, in reality, that the blood of my sheep was no better than many I saw, but the superiority of my wool I ascribed to our climate, and the provision for the sheep of succulent food the year round.

Mr. Mark S. Cockrell, of Davidson County, Tennessee, writes to this department as follows:

I have lived on a sheep-farm all my life (forty years), and assert, from close practical observation and experience, that 100 per centum per annum can be made on money actually invested in sheep in Middle and East Tennessee. But it requires a knowledge of the natural enemies of the sheep in this latitude and how to prevent or avoid them. The greatest enemy is the sheep gad-fly. The habits of this fly are pretty generally known by all sheep-breeders, but there is one peculiarity about it that I have never seen in print, and that is that it lays living worms instead of eggs, as Dr. Randall declares. Any one wishing to test this can catch a fly, and by pressure upon the abdomen force out living worms, when they will immediately begin to crawl. Pine tar and pulverized sulphur put upon the noses of the sheep is the preventive, and ambeer injected into the nostrils of the sheep the remedy. By proper troughs the sheep can be made to tar their own noses, and the ambeer should be used very carefully. The sheep should be placed upon his back and held in a position to prevent the ambeer from being swallowed, as it will sicken, and if taken in sufficient quantities will kill the sheep.

Mr. George W. Morley, of McNairy, Tennessee, had in 1877 a flock of 59 native sheep, of which 39 ewes produced 55 half-breed (Southdown and Merino) lambs. He received $159.50 for sheep and mutton sold or used, and $92.75 for wool. Deducting $25 paid for Southdown ram and $4 for two sheep less on hand, his net receipts were $223.25. They receive as winter feed five bushels of cotton-seed each, and have the run of winter grain fields.

Mr. Henry C. Evans, Jefferson County, West Virginia, says:

Mr. J. M. Vanmetre, of Berkeley County, kept 270 ewes last year, which raised 257 lambs that were sold at $2.50 per head, and the fleeces were estimated at $1 each, making $912.50 income, and the cost of feed, pasturage, and care did not exceed $420, valuing the pasture for what it was worth for pasturing cattle. This leaves a profit of $1.71 per head on the flock kept.

Mr. Henry Neff, Gilmer, West Virginia:

The improved breeds (and their cost is no more than the common) the cost of keeping one year is estimated at $2 and the profits $1.85 per head. A cross between the Lincoln and Leicester is preferred.

Mr. J. D. Guthrie, Shelby, Kentucky, says that sheep-husbandry is largely on the increase, and farmers are finding it very remunerative; that improved long-wools pay the best, while those who keep common or short-wool ewes and propagate from rams of the long-wooled or mutton breeds for butcher's use, or to grade up for quality and price of both wool and mutton, are satisfied with the result. Below is an approximate result of the profits from both breeds, as presented by Mr. Guthrie:

To 100 common ewes, cost		$300 00
To 2 Cotswold bucks		50 00
To feeding, &c		50 00
Total cost		400 00
By 100 lambs to butcher	$400 00	
By 400 pounds wool, at 25 cents per pound	100 00	
By value of ewes and bucks after lambing	300 00	
	800 00	
Net profit		400 00
		800 00
To 100 Cotswold ewes, cost		$1,200 00
To 2 bucks		50 00
To feed, &c		50 00
		1,300 00
By 100 lambs, $10 each	$1,000 00	
By 1,000 pounds of wool, at 36 cents	360 00	
Value of ewes and bucks after lambing	1,200 00	
	2,560 00	
Net profit		1,260 00
		2,560 00

Mr. Silas Gatewood, of Trimble, Kentucky, reports the expenses and income of a flock of 50 Cotswold ewes costing $8 each. The items are: pasturage, at $1 per head, $50; 3 tons of hay in winter, $24; salt, $1; shearing, $6; care of flock, $20. Returns, 600 pounds of wool, $180; 68 lambs sold, $232; manure, $30. Profit, $341.

The following cases of liberal feeding and careful breeding for improvement of other flocks found in existing records of this department, show that this branch of sheep-husbandry has been made profitable in the South.

Mr. A. T. Drane, who was engaged in breeding Cotswold from 1850 to 1866, without intermixture, has been crossing them with Lincolns, and as yet has had no occasion to regret his action. It is a fine grass region, such as the heavy breeds delight in, and the climate appears to be congenial, sheep being proverbially healthy. They thrive upon grass exclusively, appearing to desire no other food when it can be had, and getting no grain except at yeaning time. Mr. D. thus writes concerning them:

They usually have one lamb at a birth, but have twins about often enough to make up for losses, and save about one lamb to the ewe bred. They are remarkably good nurses. Their fleeces are heavy, long, and lustrous, and command the best prices for combing. I sell rams chiefly, seldom sell ewes, and without attempting to state what it will cost to keep a sheep a year, or tell how many may be kept on an acre of grass,

I will merely give a glimpse of the record of my flock in 1869, and let the reader make his own deductions:

From 80 sheep sold 848 pounds of wool in grease for	$364 62
Sold sheep during the year	638 00
Rent of one ram	100 00
	1,102 62

I now have on hand 83 head of sheep, and my flock has yielded a gross return of $13.78 each, with a gain of three sheep.

Mr. Isaac Shelby, of Boyle County, Kentucky, reports a flock of 50 ewes, of Southdown and Cotswold blood, valued at $500 in the beginning of 1877. The account of last year is thus presented:

Dr.

50 ewes, at $10 each	$500 00
Cost of pasturage, salt, and shearing	62 00
Interest on value	41 00
	603 00

Cr.

50 ewes, present value	$350 00
48 lambs, sold at $4	192 00
220 pounds wool, sold at 28 cents	61 60
	603 60

He thus figures a profit of $3 per head, which is offset by an equal loss in reduced valuation, resulting from a want of stability in market prices. Though the sheep have lost no intrinsic value, they could not realize so much money by $150.

Mr. A. K. Denny says that great numbers of mountain ewes are brought into Boyle County, Kentucky, from Tennessee and Virginia, for the purpose of raising market lambs, and that the business has proved profitable, the lambs selling for $3 to $4 during May and June. He bred 25 ewes in 1876; the lambs came in February, 1877; lost 15 per cent., but raised 35. He thus reports the result:

25 ewes clipped 162½ pounds; 6½ pounds each, at 24 cents		$55 25
35 lambs clipped, 15th July, 117½ pounds; 3½ pounds each, at 25 cents		29 37
Value of 35 lambs, September 10, 1877, at $5 each		175 00
		259 62
Cost of keeping 25 ewes for 12 months, at $3 per head	$75 00	
Cost of keeping 35 lambs from July 10 to September 10, 20 cents	7 00	
		82 00
Profit		177 62

The ewes were old, and I sold them in December for $7 per head for the market. I gave mine no feed during the winter, except during a deep snow in January, 1877; then only some hay for two weeks.

Mr. George S. Baber, of Scott County, has a flock of pure-bred Cotswolds—keeping about 40 for breeding. They have grass the whole year, and in cold or stormy weather are fed some corn and oats, and are housed in very bad stormy weather, and cost in keeping the year about $10 per head, having extra care and attention; this flock clips on an average 10 pounds combing wool, and raises on an average one lamb to the ewe. He sells his entire surplus to breeders, in this and other States, at prices ranging from $25 to $100 per head, according to age and selection. He procures every two years an imported or Canada buck at a cost of about

$100, for his own breeding. He breeds his lambs at eighteen months old.

Common Cotswold flocks, kept simply for the mutton and wool, also pay well in Kentucky, as the following record from Carroll County shows:

The sheep most profitable in our county are the Cotswold and their grades. They will consume probably one-fourth more food than the fine-wool sheep, but are hardy, needing no shelter, and generally live the entire winter on our blue-grass pastures without other food, produce from 6 to 10 pounds of wool per head, and from 60 to 100 pounds good mutton at one and two years old. I have about 50 in my flock of the Cotswolds and grades which I have taken as a sample for the above statement. They have not eaten a single pound of hay or anything but what they have gathered for themselves in the pasture, winter or summer, for the last two years. This wool is worth, just as it comes from the sheep, unwashed, 35 cents per pound; mutton is worth 10 cents.

Mr. M. O. Taylor, Crawford County, Missouri:

I came from Ohio to this place eight years ago; have been more or less through eight States, and have always counted that this portion of Missouri is the best and most profitable place to raise sheep that I have ever seen. The surface of the land is rolling, making it sufficiently dry to be very healthy for sheep, with springs and running brooks to afford sufficient water. There has been but little done, however, to improve the breed or for their care in winter, which last accounts for so many lambs being lost.

It is impracticable and unnecessary to produce the returns in detail. All are important as constituents of the tabular consolidations; still it has been deemed proper to present in considerable fullness the variety of views held by correspondents, as nearly as possible in their own language. In addition to the quotations heretofore given, the following additional notes bearing upon the profits of sheep-husbandry are given:

MARYLAND.—*Cecil:* The hay raised in this county commands a higher price in Baltimore than any other. The old sedge lands have nearly all been brought under cultivation and improved so as to yield profitable grass and other crops. *Washington:* Few raised; farmers buy from Pennsylvania, in order to fatten for the market in the spring.

VIRGINIA.—*Prince Edward:* Formerly every planter had his flock of sheep to raise wool for his own family and for sale. The obstacles are want of suitable inclosures, and thieves, biped and quadruped. Our lands are well adapted to sheep-raising, but at present not one farmer in ten has sheep. *Sussex:* Sheep live and thrive here without any care winter or summer, and would doubtless do much better if cared for in winter. *Buckingham:* From the present prices of wheat, tobacco, &c., I think sheep-raising will become more extensive and profitable than tillage. *Goochland:* Land and grasses well adapted to the raising of sheep. Sheep-culture could be made profitable if well managed; they seem to do well without any attention. *Nansemond:* Sheep-husbandry is not and cannot be made profitable in the tide-water, southeast section of Virginia. When many are herded together they become diseased and die. *Orange:* The cost of keeping is about 50 cents a head in two flocks of long-wooled Cotswold and Leicester, and 30 cents per head for a flock of 80 Merinoes. The profit of one of the long-wooled flocks was $6.75 per head; of the other, $5.90 per head; the Merinoes $6.20. These results may be largely augmented by increased attention. The variety of grasses and herbage render this county a paradise for sheep and sheep-husbandry. *Middlesex:* One hundred acres will graze 40 sheep, and by adding one dollar to each sheep for winter feeding, we have as follows: For 100 acres, $600; interest on money, $30; 40 ewes and 2 bucks, $100; interest on same, $6; $736. Forty ewes will produce 50 lambs, which sell readily at $4 each, $200; 294 pounds of wool, unwashed, at 25 cents, $73.50; total, $273.50. The profit on the investment can be easily seen. *King William:* It needs no argument or statistical average to convince people that sheep-raising is the most profitable pursuit that can be followed. Drawback, half-starved dogs. Our climate is mild and pasture land abundant.

WEST VIRGINIA.—*Greenbrier:* Great portion of the county yet in timber. Sheep could not be wintered without inclosing land and making preparation. Forty-seven ewes had 67 lambs (5 died), and gave a net profit of $113.92. *Pendleton:* It is difficult to imagine why we have not turned our attention to sheep-husbandry. Sheep would be much more remunerative than cattle, and enable us to get a profit from a great deal of unproductive land. *Fayette:* Very little provision made for sheltering sheep. They are fed on hay and corn fodder; sometimes a little corn.

NORTH CAROLINA.—*Alleghany:* Cost of keeping sheep, 25 cents; profit, 75 cents. *Anson:* Until some means are devised by which thieving and the ravages of dogs are

checked, sheep-husbandry will not prosper. *Ashe:* This county is well adapted to sheep-raising, and there is a general tendency to improve the breeds and to devote more special attention to sheep. *Bertie:* Reporter's flock of 50 head last year yielded 200 pounds of wool, which sold for $72; 32 lambs, for $96. The cost of shearing and one bushel of salt was $5.75; leaving a net profit of $162.25. *Buncombe:* Pasturage good; dogs destructive; hence no more sheep are raised than absolutely necessary for domestic use. *Cabarrus:* The manure alone dropped by the sheep pays for their keep. *Duplin:* Reporter's flock numbers 20 head (15 ewes). Cost of keep, 25 cents per head; 60 pounds of wool, at 25 cents, $15; 12 lambs, worth $24; making the returns $39. Deducting from this the cost of feeding and loss of one ewe, there remains a profit of $31. *Edgecombe:* Intelligently managed, sheep-raising is a most profitable business, as wool can be raised for less than two cents per pound. The manure is of greatest value to the cotton-lands, so that the wool may be regarded as net profit. *Henderson:* The Southdown thrives best. *Hertford:* Sheep are not profitable, which is due to neglect, thieves, and dogs. *Iredell:* Owing to the utter neglect of the sheep, sheep-husbandry has thus far proved unprofitable, though this county offers a mild climate and most extensive ranges. *Mitchell:* One flock of 80 is reported, which costs 30 cents per head for keep; the fleece—4 pounds per head—at 35 cents, amounts to $1.40, from which, if the cost is deducted, a net profit of $1.10 per head is obtained. *Orange:* Sheep are raised for the table; wool is a secondary consideration. The most serious losses are sustained from high water. A flock of 18 Cotswold costs annually about $5; profit about $10. *Nash:* There is an encouraging interest taken in sheep-raising. Some farmers have light, movable fences, which inclose the land to be manured. The grazing plots are changed after every second night. The most popular breed is a cross of the Cotswold and the native stock. The Merino is fast coming into favorable notice. The sheep are healthy, receive no attention, and have but one enemy—the dog. *Rockingham:* Sheep-raising would do well here, with only the slightest attention. *Transylvania:* A growing interest is taken in sheep-raising. *Tyrrell:* Efforts are made now greatly to improve sheep-husbandry in this county. *Union:* This is a sheep county by nature, and sheep-raising would be a most profitable business rightly undertaken and pursued. *Watauga:* There are between 8,000 and 9,000 sheep in this county, which shift entirely for themselves, not the least attention being paid to them.

South Carolina.—*Abbeville:* An individual experience of twenty-five years has proved that the increase will pay all expenses of keep, leaving fleece and manure as profit. *Georgetown:* There are but two successful wool-growers in this county; their flocks are under control of experienced herdsmen; too many hungry dogs. *Laurens:* Reporter's flock cost for keep 50 cents per head; profit, 50 per cent.; neglect and dogs are the drawbacks to sheep-husbandry. *Oconee:* With proper care improved sheep would be the best paying of all stock; sheep live and do well without anything but their pasture the year round. *Orangeburg:* Sheep-raisers are discouraged; everybody is trying to sell out; half the sheep are annually lost. *Spartanburg:* There is a fortune in sheep-raising to any person who will devote his time to it; profit is according to attention.

Georgia.—*Calhoun:* The only expense attached to the raising of sheep is that incurred in gathering, marking, and shearing; a flock of 16 head increased to 200 in four years, with only average attendance; the money realized from the sale of wool each year was invested in sheep; this flock in the mean time supplied a large family with mutton. *Camden:* Few sheep raised, but of all stock are the most profitable; the wool and mutton are net profit. *Johnson:* Beyond shearing the cost of sheep-raising is small; profit, 80 cents per head per annum. *Jones:* There is a general tendency to give more attention to sheep-raising. *Lincoln:* The few special efforts made with sheep have not been attended by profitable results. *McDuffie:* There are several planters giving attention to sheep-raising; their flocks yield from 25 to — per cent. upon the investment; to this climate the Southdown and Cotswold, crossed with the Merino, are best adapted, and if properly housed could be sheared semi-annual.yl *Murray:* But few flocks in this county, yet the most ordinary attention to the sheep will pay 100 per cent. on the capital invested. *Oglethorpe:* Though not suited to sheep-raising in all parts, with a little care and an enforced dog-law, might be made to pay well. *Whitfield:* Doubtless sheep-raising might easily be made a paying business. *Worth:* The only expense in raising sheep is shearing—2¼ cents per head. *Terrell:* Sheep-raising is fast gaining favor among the farmers, and would soon flourish if the dogs could be kept under control.

Florida.—*Clay:* The profits realized on sheep amount to 50 per cent. *Jackson:* The number of sheep is about 5,000. The product of wool might, with proper management, be very greatly increased, and the only drawback to raising mutton for the market is the want of facilities of transportation. *Orange:* Several years ago an attempt was made to raise sheep, but the experiment was a failure. Now there is not a single sheep in the county. *Suwannee:* Cost of raising sheep nominal; profit, 100 per cent. *Santa Rosa:* Cost of keep, 5 per cent; profit from 25 to 40 per cent.

Alabama.—*Barbour:* Sheep-raising is steadily gaining ground. Lately some

fine bucks from Kentucky have been introduced. The only drawback is want of good grazing-lands. *Blount:* The cost, labor, and care expended on sheep is so little that the cost of wool is not more than that of cotton, pound for pound. If sheep received the proper care and attention the cost of wool would not be materially increased, as the natural increase of the flocks would fully compensate for extra care and labor. *Colbert:* Sheep are raised only for domestic use, though they pay, with a nominal cost, a profit of 30 per cent. *Calhoun:* With all the natural advantages of the best sheep country in the world, sheep-raising in this county will be a failure until the dog can be brought under control. *Coffee:* In 1868 a farmer began with a flock of 14 head; it now numbers 53. In the mean time no other attention was given than feeding on salt once or twice a year. A very large number was lost, stolen, and killed, from time to time. They now yield wool worth $50, besides supplying an occasional mutton. *Dale:* Sheep-raising is making great progress and is favored by land-pine woods fit for nothing else. *Lowndes:* More dogs than sheep in this county. The many worn-out old fields might be most profitably utilized by being set with Bermuda grass, thus making fine sheep-pastures; but cotton is the all-engaging subject. *Morgan:* In the mountain belt of this county the farmers are becoming alive to the wool-growing business. Thus far but the most passing attention has been given to this subject. *Winston:* But few sheep raised, the flocks averaging about 15 in number. With an outlay of 30 cents per head there is a return of 85 cents.

MISSISSIPPI.—*Amite:* There is a good prospect that sheep-raising will soon become popular. Sheep can be kept for 10 to 15 cents per head on such lands as this county affords. *Bolivar:* This county is not dry enough for successful sheep-raising, *Choctaw:* Most excellent grazing-lands and many old fields that might be used for sheep-pasture, but thus far sheep-husbandry has received no attention. *Greene:* A net profit of 20 per cent. is realized on sheep. *Grenada:* An encouraging change in favor of sheep is gradually taking place. The principal drawback to an otherwise profitable business is neglect of the lambs. *Lowndes:* Not much natural pasturage, but with a little expense the many worn-out fields might be converted into most excellent sheep-pastures. Even now the profits on sheep are from 50 to 75 per cent. *Rankin:* Thus far, on account of pasturage, cattle have been more profitable than sheep, but of late the latter are introduced on worn-out farms. *Hinds:* Reported experiments show that a cross of the Cotswold and the native ewe is not so good as that of the Southdown and the native ewe. Profits at least 50 per cent. *Benton:* Two flocks in this county have doubled their numbers annually. Cost, about 25 cents per head per annum, which was more than returned in fleece.

LOUISIANA.—*La Fourche:* Little adapted to sheep-husbandry. What few we have are healthy, and live on native grasses. *East Baton Rouge:* Could no doubt be made profitable. Very little of it done except for home use. Sheep healthy, and require but little extra care. *Claiborne:* A profitable investment when intelligently managed. It is a growing industry. Flocks with care should increase 75 per cent. annually. *Bossier:* There is no doubt that sheep-husbandry is the most profitable as well as most pleasant labor of the husbandman. The number of fine sheep brought to this county lately is considerable, and may be regarded as an earnest of what the future of sheep-husbandry may be. In the near future it will be our chief source of revenue.

TEXAS.—*Palo Pinto*: 1,000 sheep will cost about $300 per annum; extra help in lambing time, $30; salt, $15; shearing, $50; feed during winter, $200. Small herds here will pay better than large ones when they are so large as to require a herder. *Navarro:* In this and all the old settled prairie counties from 300 to 400 sheep do well. One hundred per cent. gross profit is a fair statement. The profit diminishes 10 per cent. per 100 head as you go over 400. Put up 100 pounds prairie hay, and 1 bushel cotton-seed to the sheep. Have good shelter, and give my sheep close attention. Realize a clear profit of 50 per cent. on 400 head at a valuation of $1,000. *Kimball:* A flock of 1,000 head increased 369 in one year (counting losses); sheared 5,832 pounds of wool (worth $1,135), the increase of sheep worth $900; expenses, giving good attention, $240. *Goliad:* Without crediting increase with more than enough to maintain the flock equal to its primitive condition, a practical estimate for cost, considering every kind of item, might be from 10 to 12 cents per pound of unwashed wool, averaging 17 cents in market. This gives a broad margin for contingencies. *Bandera:* Lands suitable for sheep-raising can be located on note certificates for 20 to 30 cents per acre, in surveys of 640 acres each, one for the owner of the certificate, the other for the school-fund. Expense of surveys about $12. *Ellis:* There are over 500,000 acres of pasture land in the county well adapted to sheep-raising. It is claimed that there are 75 different kinds of grasses grown here that are valuable for sheep, Farmers still continue to raise cotton at from 6 to 7 cents per pound and sell it at from 4 to 10 cents, when wool can be raised at the same price and sold at 15 to 25 cents per pound. *Bosque:* Very few sheep, but one of the best sheep counties in the State. *Waller:* A few years ago I sent the facts of my flock. Every year that I looked after them they paid me full measure; when I neglected them they neglected me. *Titus:* We are wearing down our lands and muscles at ruinous rates, raising cotton at 6 to 8

cents per pound. Some few farmers have picked up some sheep and are making it pay handsomely. *Stephens:* Admirably adapted to sheep-raising. Any amount of forage can be saved, and the only shelter is a long shed for the protection from "northers," which are greatly exaggerated as to severity. Sheep are exempt from "rot" and foot diseases incident to the level portions of the State. Flocks gain about 85 per cent. for every 100 ewes. *Rockwall:* Cannot be made profitable in this county. Soil, black and waxy; grasses coarse and rank. Fewer sheep in county now than 15 years ago. *Menard:* Indian raids operate against wool-growing. They kill the shepherd for his scalp and the sheep for sport. *Kennard:* Thrive best under fence on account of mountainous surface. Pasture should be subdivided so as to occasionally give them a fresh one. Should have a dry shelter at night in winter. *Hunt:* Heretofore regarded as of little importance, now attracting much attention and considered profitable. *Fort Bend:* Experiments at sheep-raising have been very successful, but cattle and cotton only receive attention. *Bowie:* No loss except from wolves. Fine sheep country. Whole county is a complete pasture.

There are a few sheep-breeders in the South who have demonstrated the profit of high-bred sheep, liberal feeding, and constant attention. Mr. Crutchfield, near Chattanooga, Tenn., has a flock of modified Cotswolds, yielding a fleece of soft, long fiber, which was produced by crosses upon native ewes, first by a Merino ram, next by an improved Kentucky, and finally Cotswolds. He does not pamper his flocks, but furnishes an abundant supply of winter pasture, and ample but not expensive shelter. He makes the following statement of profits:

Since 1864, I have invested—		
For ewes		$130 00
For bucks		220 00
Total		350 00
Since 1866, I have sold—		
For breeding and mutton, over	$1,800 00	
For wool	1,500 00	
		$3,300 00
I have on hand 78 sheep—		
76 ewes and wethers, mutton price, $10		760 00
2 bucks, cost		75 00
60 lambs, at $7		420 00
		4,555 00
Deduct original cost		350 00
		4,205 00
Deduct cost of keeping an average of 75 head for ten years, at $2 each		1,500 00
		2,705 00

Or a net profit on the amount originally invested in 1864 of over 60 per cent. per annum.

The ewes and wethers are valued at about what they would bring for their wool and mutton; the lambs at $7 each, about one-half of which are buck lambs, and will be sold at from $15 to $25 each (fifteen of them are now engaged). But suppose they are not sold for breeding purposes, and are kept simply for wool and mutton, next April or May they will clip an average of ten pounds of wool each, which—

If sold at 35 cents		$3 50
And weigh from 125 to 150 pounds—say 135, at 5 cents		6 75
		10 50
Deduct for keeping, &c	$1 50	
Deduct 10 per cent. loss	1 00	
		2 50
And they will pay		7 75
I have 78 sheep—		
Ewes, 68; wethers, 8—76, at $10 each		$760 00
Bucks, 2, at cost		75 00
		835 00

Cost of keeping twelve months, $1.50 each		$117 00
Ten per cent. losses		83 50
One per cent. taxes		8 35
		1,043 85
I have from them in wool—		
Shipped to Boston, pounds	662	
Gave to the servants three fleeces, pounds	26	
	688, at 35 cents	$240 80
Sixty lambs, at $7 each		420 00
		660 80

Or over 60 per cent. upon the investment.

In my former estimates I have allowed $2 per head per annum for keep, &c., when I had not the grazing oats; now I have allowed $1.50 per annum for keep, &c., while I am satisfied that the droppings of the sheep and cleansing of the meadows would pay their way. They graze the meadows in the summer after mowing, keep down noxious weeds, trumpet vine, sedge, &c., until frost, when these pests cease to grow; then they are taken to the grazing oats, and the tame grasses in the meadows and pasture lots put forth with every mild season during the fall and winter, to be grazed only when the oat-field is too soft to allow the sheep to be on it.

A committee appointed to consider the adaptability of Smith County, Tennessee, to profitable sheep-husbandry, arrives at the following conclusions:

1. That one acre of average pasture will keep three sheep in good condition the year round, with only an addition of a little feed in winter for the few days that the ground is covered with snow.
2. That the net profits on sheep in Smith County, as elsewhere, are large, amounting to more than 50 per cent.
3. That the best breeds are the Leicester, Cotswold, a cross of the Leicester and Cotswold, and the Southdown. One of our correspondents, we have seen, prefers a cross of the Leicester upon the Merino, and certainly if the lambs, as he claims they do from that cross, weigh from 75 to 100 pounds at four or five months, his preference is justified by the result.
4. That here in Smith County sheep need scarce any feed the year round.
5. That what are known as the common scrubs are not worth keeping. They yield too little wool, and make too little mutton, and of too poor a quality to pay for raising them.

The committee thus report a statement of the experience of General B. F. Cheatham, who in the spring of 1866 bought 12 sheep for $24, the account of which is as follows:

In 1869 I sold my wool for	$37 80
In 1870 I sold my wool for	46 48
In 1871 I sold my wool for	77 73
In 1872 I sold my wool for	153 17
In 1873 I sold my wool (in Philadelphia) for	201 00
In 1874 I sold my wool for	223 00
Total amount of wool sold in six years	739 18
In 1874 I sold 58 sheep for	277 85
Total	1,017 03
Have on hand 95 ewes and 100 lambs worth	500 00
Making total wool and sheep sold, and sheep on hand	1,517 03

besides the unknown number consumed at the table.

The general adds:

My sheep have been raised entirely on grass, winter and summer. When the ground is covered with snow, which is only a few days each winter, I have given them a few feeds of sheaf oats. This spring, after the ewes commenced lambing, during the excessive wet weather, I fed 70 ewes one-half bushel shelled corn daily, for thirty days, which is all the corn ever fed them.

ARKANSAS.—*Baxter:* This is a mountainous country and well adapted to sheep-raising, and farmers are beginning to see the profit in it. *Drew:* Pay no attention to

sheep, only to mark and sheer them. Do not need feeding or sheltering. *Franklin:* It is an industry to which people pay little attention, although it would pay larger dividends than cotton. *Howard:* Do not require any labor but marking and shearing. Will live in the woods from March 1st to November 1st, and afterwards will require but little attention, except in case of snow-storms, which only last a few days at a time. *Independence:* Think sheep should be folded every night. *Izard:* Need feeding from January to April. Diseases rare; very few destroyed by dogs or wolves.

TENNESSEE.—*Lewis:* During the war I had a flock of sheep that was left for two years without any attention, except that I had them sheared once a year. They did as well as ever, although they lived two winters without being fed. *Warren:* Wool can be grown in this county at a cost not exceeding 10 cents per pound, and, were it not for worthless dogs, this branch of husbandry would yield more profit than any other. *Wayne:* Invested $133 in sheep in August, 1876; cost of wintering, $40. Sold 12 sheep at $2 per head; wool, for $32.75; value of sheep on hand, $149; net profit, $32.75. Summer pasturing balanced by improvement of land from droppings. Winter cost of keeping averaged a little too high, perhaps.

KENTUCKY.—*Cumberland:* But few sheep, though it is generally conceded that they pay better than tobacco. *Graves:* The general impression is that sheep-raising would be more profitable than tobacco-growing. *Hart:* Pasturage most excellent, but sheep-raising has not been sufficiently followed to develop its profits. *Harrison:* The fleece will nearly pay cost of keep, leaving a profit of 25 per cent. *Johnson:* Sheep-raising is not popular with the farmers, though they have all possible advantage of making it a most profitable business. *Lewis:* Those persons making sheep-raising a specialty report a profit of $2 per head. *Owen:* Cost of keep, $1.80 per year; returns, $2.25 to $3. *Shelby:* Sheep-raising is recognized as a remunerative business, and is fast growing in favor. *Simpson:* About one-fourth the farmers have flocks, numbering from 10 to 20 head, for home use. *Trimble:* A flock of 60 Cotswolds was kept for $111, and the returns were $442, leaving a clear gain of $331. This county is very well adapted to sheep-raising. The land is cheap, and the sheep require but little winter feed.

MISSOURI.—*Bates:* I have been in consultation with some of our largest sheep-growers, and all acknowledge that there is no more profitable business connected with farming. The cost of keeping will not exceed 65 cents per head. *Benton:* Splendid county for sheep, but not extensively carried on, as it is not generally well enough understood. *Cass:* Eight years ago I bought eight ewes, and from them have raised about 200. Have had less attention than any other stock on the farm, and I think sheep-growing could be made profitable in this part of the county. *Crawford:* Have been more or less over eight States, and believe this is the best and most profitable place to raise sheep that I have ever seen. The surface is rolling, making it dry and healthy for sheep, with streams and running brooks. Little done to improve breeds, or for their care in winter. Many lambs are lost, but dogs are our worst enemies. Tame grasses are easily raised. *Holt:* Increased about 30 per cent. since 1876. *Jefferson:* More are lost by keeping a ram of the same kind too long; they degenerate. *Laclede:* From my experience I must say that this is the best sheep country I ever saw. Sheep do well with scarcely any attention. Every farmer has enough for his own use. *Lawrence:* Very much neglected on account of heavy losses. *Mississippi:* Have found sheep more profitable than anything else in proportion to capital invested. *Stoddard:* Sheep do extremely well here, as they always have access to the grounds. We have only the coarse breeds. *De Kalb:* Good sheep of every breed can be found in this county—Merinos for wool, coarse-wooled for fattening. Many coarse-wooled are purchased in the fall from New Mexico and Colorado for fattening.

SHEEP-HUSBANDRY IN THE SOUTH.

PREPARED AT THE REQUEST OF HON. ALEXANDER H. STEPHENS, OF GEORGIA, AND OTHERS.

BY

JOHN L. HAYES,

SECRETARY OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS.

REPRINTED FROM THE BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS.

CONTENTS.

APPENDIX.

SHEEP-HUSBANDRY IN THE SOUTH.

The appreciative request by which the writer of this paper has been honored* has only hastened the execution of a work which he has for a long time contemplated, and is but a continuation of an inquiry as to our national wool resources already pursued in regard to the Pacific and trans-Missouri sections of the country. In preparing an article on wool-growing in the last-named region, we had to meet, at the outset, the objection that the encouragement of wool-production on the cheap grazing lands in the far West involves the abandonment of sheep hus-

* WASHINGTON, D. C., *December* 10, 1877.

SIR: In the numbers of the Bulletin, published as the organ of your association, for December, 1876, and September, 1877, appear two articles from your pen, entitled "The Part of the Wool Industry in our National Economy," and "Wool Production and Sheep Husbandry."

The interest called forth in us by the perusal of these papers has been deepened by the reading of the Report upon Wool and Wool Fabrics, made by you as one of the group of judges in the late International Exposition, which you were officially requested to prepare.

While very much has been written upon this question relative to the advantages of the North, the West, and the Pacific slope, we feel that the special inducements of "the South" have not been recently presented by any influential authority, like that you represent.

As the objects of your association are national in their character, we believe the proposition will meet your approval, if we suggest that you prepare a paper upon "Sheep Husbandry and Wool Production in the South," for publication in your journal, and also for general distribution.

Being residents of, and therefore specially interested in, that section of the country, we believe that an authoritative setting forth of the great advantages it presents for this industry, by your association, will give a great impulse to all interests there; while it will also be of much aid and value to the reader and capitalist from any quarter.

In the hope you may be induced to render the service we desire, and assuring you of any aid we may be able to give you in furtherance of that result, we are very truly yours, &c.,

ALEXANDER H. STEPHENS, M. C., of Georgia.
J. B. GORDON, U. S. S.
BENJ. H. HILL, U. S. S.
JOHN T. MORGAN, U. S. S.
M. W. RANSOM, U. S. S.
JOHN W. JOHNSTON, U. S. S.
RICHARD COKE, U. S. S.
L. Q. C. LAMAR, U. S. S.
WADE HAMPTON, Governor of South Carolina.

I have not had the pleasure of reading the articles referred to; but, as Texas is most largely interested in wool-growing, I trust the articles suggested will be prepared.

S. B. MAXEY, U. S. S.

With great interest in the subject, and beg to add my signature.

T. F. BAYARD, U. S. S.
R. L. GIBSON, M. C., of Louisiana.

I join in the above. Wool-growing is one of the leading interests of my district—Western Texas.

G. SCHLEICHER, M. C.

JOHN L. HAYES, Esq.,
Secretary of the National Association of Wool Manufacturers, Boston, Mass.

bandry in the older States of the North and East; and that what the far West gains, Vermont and Ohio would lose. This objection, we said, if it were true, is a local, not a national, one.

The aim of a national industrial system is the wealth, grandeur, and independence of the nation as a whole; and of the comfort, elevation, and well-compensated labor of the American people as a whole. Above all things it abhors monopolies of individuals, States, or sections. It does not favor the exclusive occupation of the cotton manufacture by Massachusetts or Rhode Island, but would plant it also by the side of the cotton-fields in Georgia and Mississippi. It would light furnace fires in Michigan, Ohio, and Alabama, as well as in Pennsylvania. Statesmanship would have our national industrial system advance in its march like one of our grand national railroads; which must not stop for fear that the town which has sprung up on its route may be eclipsed by another, and yet another, which springs up as it advances. It must march on until it spans the continent; although, when it reaches its western verge, San Francisco may be compelled to divide her trade with Chicago. To say that the production of the new State will compete with that of the old, and that new industries will vie with those long established, is to state the principal object of the national system. Domestic competition, with its accruing cheapness, excellence, and abundance of protection, neutralizes the apparent taxation imposed under the protective system. Domestic competition, gradual, equable, and healthful—and not, like foreign competition, spasmodic, irregular, and incapable of being guarded against, and hence disastrous—lifts the industries from their old ruts, introduces economies, labor-saving machines and processes, compels a constant watchfulness for the popular tastes and necessities, and an incessant activity for superior cheapness or excellence, and thus converts protection from a tax to a boon. It is only when the nation blushes to own each new star which she adds to her banner, that she will regret the competition in industry which each new State makes with the old.

As then at the East writing of the far West, so now at the East writing of the South, we pursue the subject in the interest of the national wool industry, and not of a section. Still, while free from sectional predilections, we cannot divest ourselves of sympathy for a people emerging from the overthrow of a cherished social system, and struggling for the higher and broader industrial life to which recent events have forced them; and cannot but take pleasure in pointing out some of the means which offer for settling their waste and restoring their impoverished lands, for employing their labor and diversifying their industries.

Although sheep were early introduced into Georgia, and flourished to such a degree during the colonial period that their wool was commended by British travelers to the English clothiers as "equal to the Spanish, and superior to that grown in England"; although General Washington introduced the New Leicesters at Mount Vernon, the influence of whose progeny is still seen in the excellent mutton of that section of Virginia, and, further, so inspired Colonel Humphreys, who resided for a time at Mount Vernon, with a love of sheep, that he subsequently, while minister to Spain, became the introducer of the Merino to this country; and although Mr. Jefferson sent the progeny of the Merinoes presented to him by Mr. Jarvis to the counties adjoining Monticello, as the choicest boon he could offer to the agriculture of Virginia, the breeding of sheep fell at length into general disrepute at the South, as is evinced by the contemptuous remark attributed to the statesman of Roanoke. This prejudice, according to Colonel Skinner, was nourished by the popular essays of "Arator," the celebrated Col. John Taylor. It was more probably due to a jealousy of any product which might vie with the exclusive monopoly of cotton, to which sectional pride gave a regal title. At all events, sheep-husbandry became generally unpopular throughout the South—except, near the great cities, for a supply of mutton and lambs—and was supposed to be attended with difficulties peculiar to the Southern climate and soil. This remark does not apply to Western Virginia, where Merino-sheep husbandry has been pursued since the first importation of

the race, with a success unsurpassed in any Northern State; nor to Texas, where the pursuit was attaining a great importance until checked by the war; neither to a limited number of individuals, like Mr. Cockrell, of Tennessee, Mr. Peters, of Georgia, and Colonel Watts, of South Carolina, who have exhibited unusual energy and intelligence in the pursuit. Neither is it to be supposed that the number of sheep was by any means inconsiderable, for there were upwards of six hundred thousand sheep in the five most southerly States in 1839, but the sheep were poor in quality and but little cared for.

The first systematic attempt to remove this prejudice was made about 1847, by Hon. Henry S. Randall, LL. D., since so celebrated as the author of the "Practical Shepherd," who published in the Farmer's Library, at the request of Col. J. S. Skinner, a series of letters addressed to Col. R. F. Allston, of South Carolina, on sheep-husbandry in the South. These letters were collected and published in a separate book, in 1860, by Orange Judd & Co., of New York. This work, by so high an authority and a writer so accomplished, makes us hesitate to undertake our task. It seems presumptuous to attempt to glean from a field which has been so thoroughly reaped and garnered. But as the precedence of Dr. Randall, and the short space to which our pages limit us, reduce our work to scarcely more than one of annotation and condensation, we have less diffidence in attempting it, especially since we shall be at least the means of introducing some fresh and original matter from high authorities on sheep-breeding at the South.

That a new field for sheep-husbandry is about to be opened at the South is shown less by what has been as yet accomplished than by a complete change in popular opinion in that section as to the desirability of extending this industry within its borders. No stronger evidence of that change could be presented than the request of so many distinguished statesmen of the South that the claims of Southern sheep-husbandry should receive the special consideration of the National Association of Wool Manufacturers. Personal interviews with many of these gentlemen have assured us that it is their earnest conviction that no industry at present offers for their section such advantages in return for capital invested, and general improvement of the country in question, as sheep-husbandry. As other indications of the change in popular opinion, we may state that the commissioner of agriculture of the State of Georgia, holding an office recently created, presented, as his first official document, a report on the sheep-husbandry of the State; and that the State Agricultural Association of Georgia has recently addressed a memorial to Congress protesting against any reduction of the existing duties protective of the wool production of the country—the first instance, it is said, of similar action in the history of the State. The question whether the prevailing popular opinion at the South in relation to the advantages of wool production of and sheep-husbandry in that section is well founded, is the direct object of our inquiry.

This question is one of comparison. If sheep-husbandry may be pursued more cheaply, and as advantageously in other respects, at the South as in the present principal seats of the industry, it is merely a question of time, or of the diffusion of knowledge, when the fields of the South will compete with the flock pastures of the North and West; or, rather, when capital and animals will be transferred from their present seats to others at the South, where wool production is cheaper and more advantageous. The comparison must be first made in respect to only one branch of sheep-husbandry, that of the pastoral or *Merino* sheep-husbandry—that designed for wool production chiefly; mutton sheep

husbandry being subject to different conditions, which must be considered separately.

Climate.—The most important relation of the climate of the North to sheep-growing is exhibited by the following table, drawn from the reports of the Department of Agriculture, exhibiting the number of months of full and partial feeding in the States named, made necessary by the severity of the climate:

States.	Number of months of full feeding.	Number of months of partial feeding.
Maine	6	1½
New Hampshire	6	1½
Vermont	6	1½
New York	5½	2
Pennsylvania	5	2
Ohio	4½	2

A much greater range in the requirements for winter feeding is found at the South. The months for full feeding in Virginia are set down at four, and for partial feeding at two. The time diminishes in both respects as we go South, until in Southern Georgia full feeding is required only during occasional storms, and partial feeding from two to three months.

The next point of inquiry is the relation of climate to the health and wool-producing capacity of the sheep. The effect of the climate of the North in these respects is admitted to be favorable.

Health of sheep at the South.—Dr. Randall has given this branch of the subject minute attention. After enumerating the many thousand sheep existing in 1839 in districts of the extreme South, on the borders of the Okefenokee Swamp and the borders of the Gulf, and even the delta of the Mississippi, he says:

> No portion of the United States is lower, hotter, or more unhealthy than much of the preceding; and none, according to commonly-received notions, would be more unsuited to the healthy production of sheep. Yet that they are healthy in these situations is a matter of perfect notoriety to all conversant with the facts. So far as *health* is concerned, then, we are assuredly authorized to assume the position that no portion of the United States is too warm for sheep.

Effect of climate on the wool-producing qualities of the animal.—Upon this point Dr. Randall thus sums up his conclusions:

> My convictions are decided, and the facts reported appear to fully sustain them, that warmth of temperature, at least to a point equaling the highest mean temperature in the United States, is not injurious, but absolutely conducive, to the production of wool. The causes of this are involved in no mystery. Warm climates afford green and succulent herbage during a greater portion of the year than cold ones. Sheep plentifully supplied with green herbage keep in a higher condition than when confined to that which is dry. High condition promotes those secretions which form wool. Every one at all conversant with sheep well knows that, if kept fleshy all the year round, they produce far more wool than if kept poor. A half a pound difference per head is readily made in this way. Within the maximum and minimum of the product of a sheep or a flock, the ratio of production always coincides with that condition.

Some other facts, not referred to by the author, illustrative of the beneficial influence of warm climates upon the Merino-sheep husbandry, which we have now specially in view, may be here stated. M. Moll, the distinguished scientific reporter on wool at the Paris Exposition of 1867, says: "We observe that it is the vine and mulberry which best suits the ovine species in general, and the fine-wooled races in particular." It need not be remarked that the more southerly States emphat-

ically belong to the vine-bearing zone. The great Merino wool-clip of the world is produced in even warmer latitudes. The Argentine Republic, standing second in the world in the supply of the wools of commerce—having 57,501,260 sheep, producing 216,000,000 pounds—has a climate where the cold of winter is so moderate as to produce no more severe effects than slight hoar-frosts, which disappear with the morning's sun. Its wools, chiefly Merino, are fine and soft; having, as their principal defect, the burr clinging to the fleece, derived from the white medoc or clover, on which the sheep feed, unfortunately in that country inseparably connected with the productive lands and best pasturage. The most productive Merino-wool regions in Europe are the southern provinces of the Russian Empire, where the climate is so mild that the sheep require shelter and fodder only about six weeks in winter. Single flocks in that country reach to fifty, seventy-five, a hundred thousand, and even four hundred thousand head. Specimens of Merino wools from this region, shown at the Centennial Exhibition, in fineness and extreme length of staple surpassed any exhibited. Mr. Graham, author of the most accepted hand-book of the sheep-husbandry of Australia, asserts that—

> The "Salt-bush" country in New South Wales, a region of excessive heat, can and does in some instances produce as heavy and valuable wool as do any other portions of the Australian colonies. It was the received *dictum*, in 1845, that the climate of the Darling Downs, within the tropics, was too hot for the growth of wool. The superintendent of the Clyde Company thought otherwise, and adopted a careful and judicious system of selection. In eight or nine years the Darling Downs produced as good wool as any grown in Australia, although it still bore the name of *hot-country wool*.

To the Northern farmer, accustomed to see his sheep and cattle suffering and refusing nourishment during periods of excessive heat in the Northern summers, it may seem inconceivable that sheep should not be unfavorably affected by the hot summers of the South. But it should be remembered that the summer heat of the South is tempered by the breezes blowing from the Gulf; and that at New York, in midsummer, the days are very nearly one hour longer than at Savannah, and the nights correspondingly shorter; consequently, at New York there is one hour longer for the heat to accumulate from the direct rays of the sun, and one hour less time in the night for the accumulated heat to be carried off by radiation. From these two causes, the summer heat is never so excessive in southern as in northern latitudes.

But it is asserted that warmth of climate, while promoting the quantity of wool produced, enlarges the fiber, making the wool coarser. This was the opinion of Dr. Randall, and is still generally adopted. He says: "There can be but little doubt that the pelage of the sheep becomes finer in cold climates, and coarser in warm ones." He sees the causes of this phenomenon in the greater amount and quality of the nutriment received by the animal in warm climates, which maintain in greater activity those secretions which form wool, and that increase the quantity and weight of the fleece. The weight, he thinks, is increased by increasing the length and thickness of the separate fibers; just as plants put forth longer and thicker stems on rich soils than poor ones.

The popular belief that wool becomes coarser in warm climates is strengthened by the admitted fact that sheep originally covered with hair and an undergrowth of wool, when introduced into very hot climates within the tropics in time become covered with hair alone; the wool, as is supposed, being converted into hair. This supposition is not correct. The wool part of the fleece is not changed; it is lost. Mr. George W. Bond, an eminent expert in wool, has recently exhibited to a scientific

society skins of Arabian sheep, some of them covered with hair alone, and others having similar hair, but with a thick undergrowth of wool. The fiber of the wool proved by test to be equal to that of the very finest Saxony wool. The fiber of the wool proper, then, is not changed or enlarged by climate.

But this question, it would seem, has been finally put at rest by the carefully-conducted experiments of Professor Sanson, the most eminent zootechnist in France, published in the *Comptes rendus* of the French Academy—such a publication by that body being in itself a sufficient indorsement of Professor Sanson's scientific authority. The importance of the observations justifies us in giving at length a large part of Professor Sanson's note to his table of experiments, given by him in detail. His researches were made upon twenty specimens of wool. The animals from which the wool-fibers examined were derived he calls "precocious" Merinos; that is, animals so bred and highly fed as to produce the utmost weight of fleece and flesh; the race having, besides, the quality of maturing early. He says:

It is generally admitted, from reasoning *à priori*, that the rapidity of growth in precocious Merinoes, due to the abundance and special qualities of nourishment, cannot fail to increase the size of the hairs of the same wool. I have proposed to determine scientifically the truth of this induction.

After stating his experiments and manner of conducting them, he considers certain propositions demonstrated, among which are the following:

1. The precocious development of Merino sheep, having the effect to carry their aptitude to produce flesh to the highest degree that sheep can attain, exercises no influence on the fineness of their wool. This preserves the diameter which it would have, had it developed in normal conditions, for the reason that this diameter depends upon the individual and hereditary aptitudes.

2. The influence exercised by the precocious development upon the hair of the wool exhibits itself by an augmentation of the length of the same hair; its growth, resulting from the formation of epidermic cellules in the hair-bulb, being more active. There is, therefore, more woolly substance produced in the same time.

3. The precocious development does not vary the number of hair or wool bulbs existing for a determinate extent of the surface of the skin. It produces, therefore, no change in what is vulgarly called the *tasse* (density of staple). The modifications which the staple of wool presents in this respect are only apparent. By increasing the length of the hairs the precocity necessarily increases that of the locks of wool which they form, which makes the fleece appear less dense.

The views here presented, we admit, would not be accepted by the majority of our breeders. But all will admit that any tendency of warm climates (if such exists) to make wool coarser can be easily counteracted by judicious breeding.

In connection with the question of the effect of climate on the *fineness* of wool-fiber, we may appropriately quote a breeder of great reputation in Tennessee, but whose flocks were in Mississippi. His statement is old, but the more valuable since the culture of fine Saxon sheep has now almost wholly ceased in this country. Mr. Mark R. Cockerill, in a letter published in the American Farmer, says:

I have about 1,000 head of fine sheep. * * * My Saxon sheep were imported in 1824 or 1826—I cannot say which—and I find as yet no falling off in the quantity or quality of their fleeces; on the contrary, I believe a little improvement in both points, and a little more yolk when well provided for; which you know does not much abound in the Saxon breed. In addition, the fleeces are a little more compact than formerly, hence more weight; and from our mild climate the staple has become longer. I assert that the cotton region I am now in (Madison County, Mississippi), in about 32° north, is better than any country north of it to grow wool, as the sheep can be kept all the time grazing, by sowing small grain; for, if grazed off, it quickly grows again in a few days. And the wool of the fine Saxon sheep in this climate is softer and more cotton-like than any I have ever seen, although I have samples from all parts of the world. I have traveled from this very place to Boston, sampling all the sheep of note

on the way, and I have found nothing on my journey or at Boston as good as the wool I have grown; and so said all the wool-staplers whom I met with, and they were not a few. I presume, in reality, that the blood of my sheep was no better than many I saw; *but the superiority of my wool I ascribe to our climate*, and the provision for the sheep of succulent food the year round.

Having examined the volume of awards of the Exhibition at London of 1851, commonly called the World's Fair, we find that the reports of the juries recognize the German wools as the finest and longest. Two prize medals of the same grade given to the German exhibitors were awarded to exhibitors from the United States. The awards are arranged in the order of merit. The first is given to Mr. Cockerill. It says: "The wool transmitted by the exhibitor from Nashville is well got up and exhibits, like the preceding specimens (the German), a quality of fiber indicative of care and skill in the development and improvement of the fleece, which calls for the award of the prize medal." The report further says: "One of the able experts, whose valuable aid the jury have already acknowledged, reports, 'Those shown by America (United States) as most approximating to the character of German wools.'"

Mr. Howard, of Kingston, Georgia, writing to the Department of Agriculture, in 1874, says:

It is objected that wool degenerates in warm climates, and becomes coarse and valueless. This is an error. The writer, whose flock is of the Cockerill Merinoes, which took the premium at the World's Fair in London, many years ago, the sheep being reared in Mississippi, after this lapse of time is now ready to compete with any wool in the United States in fineness of staple.

The quality of extreme fineness in wool is much less regarded now than formerly, on account of the changes in fashion of fabrics. The great bulk of wools at present consumed is of medium grades. Length of staple, however, has become a very desirable attribute, on account of the increased demand throughout the world for wools for combing purposes, which enter into worsted coatings and a great variety of dress goods. This quality of length of fiber, it is seen, is greatly favored by the propitious climate of the South. As our manufacturers advance to the production of the higher qualities of dress goods, such as the French Merinoes and the very finest grades of worsted coatings, which are now coming into demand, fineness no less than length of staple would be demanded for merino combing wools; and, for both of these qualities, it is shown that the climate of the South is favorable.

Culture of electoral wools recommended.—There is likely to be no more appropriate place than in this connection to speak of a class of wools whose culture has almost ceased in this country, and has greatly declined throughout the world. We refer to the exceedingly fine electoral wools, such as were formerly produced by the old Saxon sheep, and at present by the Silesian sheep of the same or a very similar race. They are still cultivated, to a limited extent, in Silesia, Hungary, and Poland, which countries produce all the superfine wools in use in Europe. The few wools of this class used here are imported from these countries, at enormous prices. Fashion, invariably revolving in great cycles, always repeats herself in time. Superfine broadcloths, and other tissues demanding the finest fiber, will again be in vogue. The electoral wools will secure prices, as they have never yet done, proportionate to their high cost of production. On account of the delicacy of the animals producing them, these wools cannot be successfully grown at the North; as we know personally from observation on the paternal farm in Maine, where their culture was formerly attempted with the utmost energy, but with such poor results as to cause its abandonment. In the mild climate of the South their successful culture is assured beyond all ques-

tion. This is proved by the letter last quoted. Mr. Watts, of South Carolina, in his communication elsewhere given at length, says:

I have now on my table a Silesian wool measuring, say, 1,800 hairs to the inch, which cost the consumer here $1.50 in gold per pound. With none of the ridiculously extreme care which the European growers of the electoral wool exercise in their flocks, Mark Cockerill, of Tennessee (near Nashville), has raised Saxony wools of a fineness of 2,000 hairs to the inch, and could sell it at a handsome profit at $1 per pound. In fact, Mr. Cockerill claims that there is more margin of profit in it than in the growth of more ordinary wool.

These wools are designated in Germany as *noble* wools. Their successful culture was deemed a fit employment for noblemen of high birth; and the princes of Hungary, we are informed, now the principal growers there, continue the production from motives of pride. Two Hungarian princes competed with each other on exhibits of *noble* wools at our Centennial Exhibition. The patrician element of the South would be not uncongenial to a similar industrial competition.

Asking pardon of our readers for this digression, we proceed to consider other important conditions of successful sheep-husbandry.

Resources for the nutrition of sheep.—The next point of inquiry is as to the resources, natural or artificial, for the nutrition of sheep in the South. This involves not only further consideration as to climate, but also the influences of physical geography, soil, and hygroscopic conditions. As it would be impossible, in our limited space, to consider these conditions in each of the Southern States, we will select a typical district, such as that composed by the States of Georgia and North and South Carolina. The physical geography in this district is very distinctly marked, and is illustrated by the natural divisions in Georgia known as Lower, Middle, and Upper Georgia, or low country, hill country, and mountain country, the characteristic features of these divisions extending through North Carolina to Virginia. The lower division, sometimes called the tide-water zone, consists, in Georgia, of a belt of country with an area of about 35,000 square miles, much rising as high as 300 feet above the ocean. Geologically, it consists of the three divisions, Eocene, Miocene, and Pliocene of the Tertiary period. The soils on the dry lands are generally light, and sometimes too sterile to admit of profitable cultivation; that of the swamps and river bottoms is often exceedingly fertile. This is the land of the long-leaved or famous Georgia pine and wire grass. The middle region commences at the head of navigation of the rivers, the line of junction of the two regions forming the line upon which the great interior cities are situated. The middle, or hill country, having an area of about 15,000 square miles, rises first into gentle hills, and finally, as it approaches the mountains, into high and often broken elevations. The geological formation underlying this country consists of the primary and metamorphic rocks, and the soil in its natural state is generally fertile. In this division is comprised what was formerly regarded as the *el dorado* cotton country of the State. The mountain country above this, with an area of about 10,000 square miles, is formed by the different chains of the great Appalachian Range. For further details as to a portion of this district, North Carolina, the reader is referred to the valuable paper of our correspondent General John A. Young, published in the appendix.

With the indications as to natural soils given in the above sketch, in order to determine the resources of the country in question for supplying pasturage and forage for sheep, we must consider certain atmospheric conditions, which apply not only to the immediate sections under consideration, but to the whole of the vast country lying south of the thirty-fifth parallel, and between the Atlantic and the meridian of San Antonio,

Texas, which is *par excellence* the cotton belt of America. The remarks of Mr. Walter Wells, in his admirable paper on cotton culture in the United States, and on the influence which the rainfall has on this culture, are very instructive in this connection:

> The cotton plant, in its period of growth, requires abundant rain; its succulent foliage, if duly supplied with moisture, appearing fresh under a sun that shrinks the leaves of a majority of other crops. In the cotton-growing district surrounding the Gulf of Mexico, the fall of rain is so profuse through the midsummer as to suggest very distinctly the temporary establishment of true tropical conditions—the lapping over of torrid-zone rains upon this portion of the temperate zone while the sun is at its northernmost declination. As the sun retires, the tropical conditions give way; the comparatively dry, serene, and temperate autumn of the mid-latitudes succeeds, securing most favorable conditions for the maturing and gathering of the cotton harvest.
>
> The cotton plant seems to be, in a peculiar manner, dependent upon the *latent* or *hygroscopic* moisture of the atmosphere for the perfect development of its peculiar product. It loves the influences of the sea. The great volumes of vapor raised from that immense evaporating caldron, the Gulf of Mexico, drawn inland by the draught of summer heat, not only supply to all the surrounding country profuse rain, with numerous, and at certain seasons almost daily, showers, but immerse all vegetation in an atmosphere charged to repletion with liquid and bland solution; hence the long, trailing, moisture-loving mosses of the Southern forests, and hence a vigor of the cotton plant and softness of its staple elsewhere hardly paralleled.

It need not be said that the influences which affect the cotton plant so favorably must have an equally beneficial effect upon the plants required for the pasturage and forage of sheep, provided they are adapted to the climate; especially upon the grasses, grass of all vegetation being soonest affected by drought on the one hand, and an overabundance of rain on the other. "It is," says a recent writer on British sheep-farming, "the regularly distributed rain—the fine weekly or biweekly showers—that the grazier can alone build upon for success in raising wool and mutton." The very existence of the American cotton belt proves at least that within it no such droughts can prevail as compel the *transhumance* of the Merinoes of Spain and Upper California, and in Lower California destroyed during the last year millions of sheep.

The grasses.—In a country where cotton was, until very recently, looked to as the only market crop, and grass as the deadliest enemy of cotton, and where but few animals were required for labor, it could not be supposed that there should exist the rich, thick-swarded pastures or meadows of many portions of the North. But grass culture is now attracting large attention at the South, and, happily, from persons of science and practical knowledge. Conspicuous among them was Mr. C. W. Howard, recently deceased, whose extremely well-written manual on the cultivation of grasses and forage plants at the South is the principal source of the notes which follow. Mr. Howard, speaking generally but carefully, says that, after an observation of more than twenty years, he does "not hesitate to say, if ground be made sufficiently rich and is well prepared; that if judgment be exercised in sowing and in adaptation of species to particular localities, and proper subsequent management be observed, that, so far as soil and climate are concerned, the South has unusual fitness for the successful cultivation of the valuable grasses."

While admitting that there are portions of the South (as is the case in all countries) where the grasses will not grow, he declares unhesitatingly, "There is nothing in the *climate* of the South to prevent the successful growth of the valuable grasses." Omitting all that he says upon the culture of grasses for hay—as the winter grazing at the South is a substitute, except in exceptional periods, for this indispensable fodder for sheep at the North—we will condense his observations upon the grasses for pasturage.

One of the most marked advantages of the South is the ability to grow grasses which may be pastured in winter. Thus the cost of cutting the grass, and saving the hire of barn for storing it, and the cost of feeding it out, are dispensed with; while succulent food, which, at the North, must be provided for by storing roots and vegetables, is afforded throughout the year. By the aid of winter grasses, it is perfectly practicable, throughout a large portion of the South, to raise sheep without other cost than the interest on land and the value of the salt. Oats, barley, and rye, sown in the fall, may be grazed during the winter without injury to the crop of grain, as is frequently done; but they must be sown annually, and are inferior to permanent grass pastures. The meadow oat, orchard and blue grass, with wild rye or Tyrrell grass, are chiefly relied upon for permanent winter-grass pasture.

Spring pasturage is afforded by the broom sedge; and the summer pasture, by the native crab-grass—an annual peculiar to the South, which springs up everywhere at the South in the stubble where small grains had been harvested, making a summer pasture which cannot be surpassed. Very sensible farmers at the South have estimated the crab-grass pastures of a fair season, on stubble land, as being nearly equal in value to the preceding small-grain crop. "The Northern farmer," as Mr. Howard observes, "has nothing to correspond with our crab-grass. His stock are eating, without appetite or relish, in August and September, the old grass of the spring; while our stock are luxuriating on the fresh bite of the newly sprung crab-grass." Mr. Howard does not mention the Japan clover (*Lespedizea striata*). This exotic, as we learn from reports to the Department of Agriculture, is rapidly taking possession of uncultivated places in South Carolina, and even in Tennessee. It is highly relished by sheep, and, although short, furnishes a good pasture from May till frost.

The grass, however, *par excellence* for summer pastures at the South, is the Bermuda grass,* and would seem to surpass any known at the North. This species, chiefly found at present in Middle Georgia, though abundant in Louisiana, was introduced from the West Indies, and is believed to be identical with the celebrated *daub*, or sacred grass, of East India. Being stoloniferous in its habit, it clings so closely to the soil that it is eradicated with great difficulty; and, rapidly propagating itself by means of its runners, it was regarded as the worst pest of the cotton-plantation. "Fighting General Green" became a proverb which illus-

*This grass is known in India by the various names of *daub*, *doob*, *darbba*, or *darva*. Sir William Jones, in his Botanical Observations of Select Indian Plants, published in Asiatic Researches, vol. iv, p. 520, speaks thus of the *darbba* or *daub* grass: "Every law-book and almost every poem in Sanscrit contains frequent allusions to the holiness of this plant; and, in the fourth Veda, we have the following address to it, at the close of a terrible incantation: 'Thee, O Darbba! the learned pronounce a divinity, not subject to age or death; Thee they call the armor of *Indra*, the preserver of regions, the destroyer of enemies, a giver that gives increase to the field. At the time when the ocean resounded, when the clouds murmured and lightnings flashed, then was Darbba produced, pure as a drop of gold.'"

Capt. David Richardson, in the seventh volume of the Asiatic Researches, says of this grass, which he calls "doob grass": "This is probably one of the most useful and beautiful grasses in this or any other country; and, like the cow which feeds on it, is held in high religious veneration by many tribes of Hindoos. A natural velvet carpet, if the expression be admissible here, may at any time be formed of this elegant grass, in the space of two or three weeks, merely by cutting it in pieces and sprinkling them on prepared ground mixed with earth. In this way, the beauty of rivers, public roads, fortifications, garden walks, and marginal borders is frequently secured in India, upon principles which unite expedition, elegance, and strength in one verdant sward, which, to those unacquainted with the rapidity of vegetation in these climes, has almost the appearance of enchantment." It is curious to observe that the same mode of propagating this grass is followed in India as in our States at the South.

trated the perpetual warfare which the planter had to wage with the Bermuda grass. Not unfrequently the grass was the victor, and many considerable districts were completely abandoned to its sway. It is now thoroughly appreciated by the best cultivators of the South "I think it," says Col. A. J. Lane, a successful cotton-planter, "very doubtful whether there is an acre of land thoroughly set in Bermuda grass (if the proper use is made of it) that is not worth more than any crop that can be grown upon it." It will flourish on dry and almost barren lands. It will hold its place indefinitely. Its nutritive power is said to surpass that of blue grass, it containing, according to the analysis of Dr. Ravenel, 14 per cent. of the albuminoids. Its yield in weight far surpasses that of clover. Although it produces no seed, it is easily propagated by sowing broadcast pieces of the roots obtained from the turf, washed free from the dirt, and chopped fine by a cutting machine. The grass, when grazed, forms a very compact sod, which, turned in by the plow, has extraordinary manurial value. The results of cultivating thirty acres of land well set with this grass are thus stated by Colonel Lane:

First crop: Cotton, half stand, owing to the mass of undecomposed sod; 1,800 pounds of seed-cotton per acre.
Second crop: Cotton, 2,800 pounds seed-cotton per acre.
Third crop: Corn, 65 bushels per acre; corn manured with cotton seed.
Fourth crop: Wheat, 42 bushels per acre.
The average product of this land, without the sod, would have been not more than 100 pounds of seed-cotton, 15 to 20 bushels of corn, and 8 to 10 of wheat.

According to Mr. Howard, by turning up Bermuda grass land by the plow, and sowing blue grass and white clover, a pasture can be produced capable of sustaining stock summer and winter. As the Bermuda grass dies down in autumn, the blue grass and white clover appear; the reverse occurring in the heat of summer.

We will conclude our extracts from this writer with one more directly pertinent to our subject;

More than thirty years ago the writer, walking with a gentleman of far-reaching mind, and observing the gullied and excoriated condition of the soil near Milledgeville, inquired: "What is to restore its fertility to the worn-out portion of Georgia?" The answer was promptly given: "Sheep and Bermuda grass." There was profound wisdom in the reply. A large portion of old Georgia must become a sheep-walk before it can be restored to fertility and the land-owners can become independent of the negro.

A correspondent from Memphis, Tenn., writing to the Department of Agriculture in January of the present year, says:

The best of all our grasses, though not a winter grass, is the Bermuda. Too much cannot be said about it as a pasture grass; and if the South were half covered with it we could then have fat sheep and plenty. For successful sheep-raising at the South we want this grass alone. Turnips—plenty of them, not patches—large fields of them, and fields of rye or wheat or oats to pasture on in winter, will make up for the rest of the year.

To this testimony as to the relations of Bermuda grass to Southern sheep-husbandry may be added—although his enthusiastic deductions need some qualification—that of Dr. George Little, the State geologist of Georgia, who says:

When the value of Bermuda grass is appreciated by farmers and the thin and waste portions of their farms are clothed with it, which seems to have been intended especially for sheep, Georgia will sustain a sheep to every acre of territory, and 37,000,000 of sheep would be worth to their owners in the aggregate $37,000,000, net, per annum, nearly double the present gross value of the cotton crop of the State.

Forage plants.—There are exceptional periods when winter pastures will prove insufficient. These periods, short at the extreme South,

become longer with the ascending latitudes. Some supply of cured forage is indispensable for these periods. The field pea, which grows luxuriantly on all the sandy soils of the Tertiary formations of the South, is for that country what the clover is to the North. It is highly recommended by Mr. Howard and Dr. Randall as a winter forage for the South, as its haulm, or straw, when cut partially green, makes a rich fodder relished by all stock. Dr. Randall says that "for sheep and breeding ewes there is probably no feed in the world equal to nicely cured pea haulm, with a portion of the seed left unthrashed. It gives them condition and vigor, and prepares them to supply a bountiful supply of milk for their young."

To this may be added the sweet potato, another peculiar product of the South. It is estimated that from two to three bushels of sweet potatoes are equal in value to one bushel of corn. More than three times as many bushels of sweet potatoes can be raised on an acre as can be raised of corn on the most fertile lands of the West. Well-cured pea-vines and sweet potatoes afford as cheap and valuable food for *fattening* sheep as can be found in any country whatever. A still more important product, peculiar to the South, must not be overlooked—the abundant cotton-seed, more nutritious than any grain, and so cheap that it is afforded in Georgia for fifteen cents a bushel.

Alfalfa.—California has recently brought into prominence a plant of foreign origin, which is destined to replace all others at the South for soiling or hay. This is the alfalfa, Chili clover or lucerne, *Medicago sativa.* Although introduced into California from Chili—whence its Spanish name—it has long been the chief reliance of the French farmers. While it will not succeed in England for want of sun, nor at the North on account of the winter's cold, it has been thoroughly tested at the South, and found to thrive from Texas to Virginia. Its requirements are very rich light and dry land, such as will be permeable to its long tap-root, which penetrates the ground, sometimes as deep as seventeen feet, for the moisture which enables it to resist any degree of superficial dryness. These requirements being met, it will, after the first year, yield from six even to eight tons of hay, which is preferred by cattle and sheep to any hay whatever. A writer in the Transactions of the State Agricultural Society of California for 1871 says that the alfalfa is the only plant which will grow through the dry summers of that State, and keep green all summer. He is assured, by those that have pastured sheep upon it, that one acre of good land will keep forty sheep in good condition all the year round. The "Pacific Rural Press," of March, 1878, describing a ranch having 7,000 sheep, and other stock in proportion, says that 1,300 acres, sown to alfalfa, were cut last year five times, yielding about one and a half tons of hay to the acre to each cutting. From 35,000 to 40,000 acres in California were seeded with this clover in 1876. Its culture is regarded as the only hope for preserving the sheep-husbandry in the drier portions of the State. It flourishes admirably in Texas; keeping green all winter, and affording feed to all kinds of stock. In upper portions of Georgia, the alfalfa does not keep green through the months of December and January, and is used only for seeding and hay. It would probably keep green through the winter in the lower parts of the State, and might be pastured.

Turnips.—An important feature of the climate of the South is that the wool-grower of that region can adopt the English practice of folding sheep on turnips. It is well known that the first great step in the improvement of the sheep-husbandry of England was the introduction from Holland by William of Orange of the turnip culture, at the end of

the seventeenth century. They were fed to sheep; and it was found that by this system the same land would support treble the number of sheep. Turnips and sheep form the foundation of the English four-field system, and are the basis of English agriculture. This system cannot be adopted at the North, on account of the turnips freezing in the ground. The folding system is especially fitted for the sandy lands on the coast, both as the cheapest means of ameliorating them, and because such soils are favorable to the growth of the turnip.

The mode of procedure is this: After turnips are grown on land which has been suitably fertilized and cultivated—say in December or January—a fold is made of hurdles or a portable fence, inclosing as many turnips as the flock of sheep will eat in twenty-four hours. One thousand sheep will consume the turnips on an acre in that time; one hundred, a tenth of an acre in the same time. The manure deposited by the sheep in that time will suffice for four years' rotation. Mr. Harwood, in his admirable paper on the condition of agriculture in the cotton States, says of this system, which he has practically tested on Georgia lands:

> The advantage of folding turnips is twofold. It is by far the cheapest method of manuring land. No hauling manure is required, as the sheep haul their own manure, both solid and liquid, to precisely the spot on which it is desired to apply it. It is evenly spread without labor, no part being excessively manured at the expense of another part. The effect of this manuring will be felt for years. Land so manured is good for two bags of cotton to the acre the following year. The other advantage is the fine condition into which the sheep are put at a season of the year when mutton brings the highest price. When land is put into sufficiently good order to bring 500 bushels of turnips to the acre, the gain in mutton is equivalent to the cost of the crop. The heavy manuring of the land is, then, clear gain.

Present condition of Southern sheep-husbandry. When we turn from this picture of the possibility of sheep-husbandry at the South to its actual condition at the present time, the contrast is very painful. The reports of the very able statistician of the Department of Agriculture, which, from a careful examination of the system adopted by him in arriving at results, we regard as very reliable, show the numbers of sheep in the States of the cotton belt, excluding Texas, to have been as follows, in January, 1878:

States.	Number of sheep.	Area in acres.
North Carolina	490,000	32,450,560
South Carolina	175,000	21,76 ,000
Georgia	382,300	37,120,000
Florida	56,500	37,931,520
Alabama	270,000	32,462,080
Louisiana	125,000	26,461,440
Arkansas	285,000	29,184,000
Tennessee	850,000	14,720,000
Mississippi	250,000	30,179,840
Total	2,883,800	262,269,440

The area of the States named is derived from the reports of the Land Office.

Thus there are in these States not far from one sheep to every 100 acres. Ohio, with an area of 25,766,960 acres has 3,783,000 sheep, or a sheep to about every seven acres.

One county in Pennsylvania, Washington, has over 400,000 sheep, producing as good merino wool as there is in the world, while the whole of Georgia has not that number.

The United States Commissioner of Agriculture, with a due appreciation of the importance of sheep-husbandry to the South, has recently sent circulars, with minute inquiries as to the present condition and possibilities of this industry, with blank returns, to his assistants in each county of the Southern States. The original returns to these circulars, received in January, we have been kindly permitted to examine, and have carefully read every one received. The general impression made upon our mind by these returns, as to the actual condition of sheep-husbandry in most of the States, was far from agreeable. The returns did not show a single case of a well-bred and carefully-kept flock, such as we found in the North; although it is known that there are exceptional cases of such flocks. As a rule, the variety kept is the native breed, producing about two pounds of wool, selling from 25 to 30 cents. Very few flocks, as would be seen, reach a hundred in number. Frequently the animals obtain their entire subsistence from the swamps and range. Those which have somewhat better care during the winter months, receive a little cotton-seed and a few turnips and straw from the thrashing-floor. But no provision seems to be made of hay or other forage. All the returns agree in declaring that the great obstacle to sheep-raising is the destruction by dogs, popular opinion having hitherto prevented the enactment of suitable dog-laws. One return says: "There are but two successful wool-growers in this county, and their ranges are in constant supervision, a stock-minder in each constantly patrolling."

There is now and then a hopeful gleam in the returns. A farmer in Georgia says "his 'herd' of 104 sheep produced $132.50." It cost only $10 to feed them on cotton-seed. "What my sheep make," he says, "is just like picking it up."

Maj. R. A. Griffin, of Horry County, South Carolina, stated by the reporter to be a person of acknowledged skill and success in sheep-husbandry, says: "An individual experience of twenty-five years has proven that the *increase* will pay all expenses of keep, leaving fleeces and manure as profit."

Thomas M. Bealy, of South Carolina, says:

> Oats and rye are the only small grains, except rice, that will grow here. For every plow animal on the farm, the farmer should sow down, sod well prepared in September, six acres of oats. Upon these oats he should turn in three to five head of sheep the middle of December. It will give them the best of pasture until 1st of March, when they should be turned out, and the oats left to head up. Each six acres of these oats should yield feed for one horse or mule twelve months, and kept in order at constant work without a grain of corn. Such farming would make a man rich in a short time.

E. C. Ethridge, of Colerain, S. C., says: "When sheep-culture receives the attention that cotton now does in this section, it will be the most prosperous country in the world."

Andrew A. Spaulding, of Rockingham County, North Carolina, born a Scotchman, says:

> I am from the North, and have been here four years. I believe this is the making of a good agricultural country, if it was properly cultivated by an improved system of farming, particularly sowing grasses and clover, having a rotation of crops, keeping more stock, and letting the fields lie three years in grass, and sowing down yearly as much as is taken up. By this means the farmers would be better off and the land vastly improved.

A more exact picture of the sheep-husbandry of the South, as hitherto pursued, is given by our intelligent correspondent, General Young, of North Carolina, who, as a wool-manufacturer, has been led to give particular attention to the wool resources of his State. He says:

Twenty years' experience in manufacturing the wools grown in this State has familiarized the writer with the manner in which this valuable animal (the sheep) has been cared for; and has convinced him that, without great natural advantages, their utter neglect would long since have exterminated them from the soil. There are but few plantations in the State upon which there was not to be found a flock of sheep, intended to be *only* sufficient to furnish the wool necessary to clothe the family and furnish an occasional mutton. These sheep were generally the "native breed," rarely improved by crosses upon foreign blood. As a general rule, these small flocks never entered into their owners' estimate of his valuable property, and they were never so treated. In the spring they were shorn of their fleeces, and turned outside their owners' inclosure to seek their summer's support in the forests and waste lands, over which they chose to roam and to run the gauntlet for life among hungry hounds and gaunt curs almost as numerous as themselves. All that might escape and were able to find their homes in the fall season, and would seek its inhospitalities in the winter, would be admitted within the gates and permitted to eke out a scanty living in the denuded fields and corners of worm-fences, which is supplemented by a morning and evening allowance of corn fodder, which the compassionate and appreciative owner allows to be fed to them by a boy who has not yet attained sufficient size to be otherwise useful; the only protection against the rains and occasional storms of winter afforded to a majority of the flocks being such as their instinct leads them to seek, by hovering on the sheltering sides of barns and outbuildings that may be accessible. Yet, under this treatment, the flocks of the farmers kept their numbers full, and occasionally multiply beyond their wants.

The facility with which these flocks may be improved is well illustrated by General Young. He says:

Of necessity, the fleeces of these sheep are light and inferior; but wherever an effort has been made to improve the stock by crossing on Merino or other approved blood, the effect is satisfactory and lasting. From the universal custom of turning the entire stocks into the common "range," the impression of a Merino, Southdown, or other importation, would manifest itself upon the flocks of entire neighborhoods. So apparent is the improvement thus made that, in purchasing the surplus brought to market, there would be no difficulty in recognizing the wool from a neighborhood that had been favored by some enterprising farmer having imported from Virginia or Pennsylvania a pair of blooded animals. Without any change in the mode of treatment, these improvements are known to be distinctly manifest in neighborhoods thirty years after their introduction. Being able to withstand all the hardship and neglect, and promptly to respond to every effort to improve their quality or condition, it is evident that there is in North Carolina an adaptation of natural gifts to their peculiar wants.

The returns to the Department of Agriculture before referred to make no mention of the large flocks—reaching as high, in some cases, as 3,500—which are spoken of by the commissioner of agriculture of the State of Georgia as occurring on the pine-lands of that State. We learn from General Abbott, of North Carolina, that flocks reaching up to 1,000 head are found on the pine-lands of the State. These flocks, if they can be called flocks, are never fed; the care of the owners being limited to marking and gathering them up for shearing. This can scarcely be called sheep-husbandry; for husbandry implies care, and provision for sustenance. Indeed, of the large portion of the South—especially the lower South, excluding Texas—with exceptions which almost could be counted on the fingers, taking into view the general want of care and provision for sustenance, it may be said that sheep-husbandry, in the proper acceptation of the term, does not exist in that country. This cannot be considered a reproach. The exclusive devotion to cotton accounts for it. And the interest now taking in sheep-culture by the most intelligent men of the South, and the general interest recently manifested by the numerous letters received by the Department of Agriculture, asking for information on the subject, are guarantees of a brighter future in this industry at the South.

Our view of the actual condition of this industry at the South, we admit, does not correspond with the impression readers would be apt to form from the report of the commissioner of agriculture of the State of

Georgia upon the sheep-husbandry of that State. He says that "the average annual profit on the capital invested in sheep in Georgia is 63 per cent. The average annual cost of keeping sheep is only 54 cents. The average cost of raising a pound of wool is only 6 cents; while the average price for which the unwashed wool sells is 33⅓ cents, or 27⅓ cents net." These results are alleged to have been, and undoubtedly were, derived from returns addressed to those engaged in the business. Particulars are given of only two cases, which we will quote:

Mr. David Ayers, of Camilla, Mitchell County, in Southwestern Georgia, where snow never falls and the ground seldom freezes, and where the original pine forest is carpeted with native grass, says his sheep—3,500 in number—cost him annually 14 cents per head, clip 3 pounds of unwashed wool, which sells at 30 cents per pound, giving a clear profit of 90 per cent. on the money and labor invested in sheep. Mr. Ayers does not feed his sheep at any time during the year; neither has he introduced the improved breeds, using only what is called the native sheep.

Mr. Robert C. Humber, of Putnam County, in Middle Georgia, keeps 138 sheep, of the cross between the Merino and the common sheep. He says they cost nothing, except the salt they eat; while they pay 100 per cent. on the investment, in mutton, lambs, and wool. They yield an average of 3 pounds of wool per head, which he sells at the very low price of 25 cents—less than the market-price. It costs him nothing, except the shearing. His sheep range on Bermuda grass—old fields in summer, and the plantation at large, embracing the fields from which crops have been gathered, and the cane bottoms, in winter.

We are not disposed to deny that the estimate of profits made by the commissioner, or given in the particular cases cited, are literally correct. But we are compelled to state that some of the returns from the above-named State, at the United States Department of Agriculture, express dissent from the commissioner. One return says: "His figures are too low for my county, and too low for almost the entire State." Indeed, it may be generally said that no particular estimates of the cost of raising sheep and the profits resulting therefrom can be relied on as inducements for others to embark in the business. The broad proposition that the annual profits from raising sheep throughout an entire State are 63 per cent. must be fallacious. While it may be true that a particular owner, having a vast range very favorably situated, in which two or three thousand can pick up their sustenance, may find them very profitable, a competing owner in his neighborhood would limit the range, and the profits would diminish. It may be true that small flocks will cost so little to their owner that the profit from them will be "just like picking it up"; but this may not be the case with flocks of two or three hundred animals. It is erroneous to consider sheep-farming, as it must be ordinarily conducted, as a matter of direct profit from the investment of capital. The amount of money which can ordinarily be put into sheep-husbandry with advantage by one person is so small that it cannot be properly called an investment of capital. The consideration in growing sheep, except under the purely pastoral system, is not one of direct profit, to be calculated like the dividends from bank stock; but it is the general advantage of combining it with other industries on the farm, of adding to its resources, and of making the *whole* more productive.

The course recommended for the South.—There are two very distinct branches of the wool-growing industry. One is purely pastoral, having regard only to wool, taking but little account of the value of mutton, and none of the improvement of the land. It is conducted as an exclusive business in large flocks. The sheep-husbandry of Texas, California, and Australia belongs to the purely pastoral system. It is believed by many that the vast region of pine-lands in Southeastern and Southern Georgia, extending from Savannah to the Chattahoochee, comprising about ten million acres, now practically unoccupied, constitutes a

natural pasture upon which a million sheep could be raised at a trifling expense. This is the opinion of the commissioner of agriculture of the State.

Col. Richard Peters, of Atlanta, Ga., admitted to be the highest authority on sheep-husbandry in the State, in his original communication, elsewhere given at length, speaks of this district as follows:

> Across the entire width of the State there is a belt of country of an extent, northward from the coast and the Florida line, say from 100 to 150 miles. It is the land of the long-leaf pine and the wire-grass. Flocks of native sheep, as high as 3,500 in number, are found here and there scattered over the surface, receiving but little care or attention, except at the annual gathering for shearing and marking. Very little can be said either for the quantity or quality of the wool raised there. I am aware that it has been claimed for this section that its present advantages are as great for large flocks as the ranges in Texas and California. I do not subscribe to this opinion. The pasturage of this section, called wire-grass, offers fine grazing for sheep in the spring; but, for permanent and continuous food, it cannot be relied on. A fair experiment in sheep-raising, uniting good attention, selection, and crossing, with a determination to secure the best development in frame and fleece, has not been made in this section for many years. If it were properly attempted, by combining Bermuda with the wire-grass for spring and summer pasture, and red winter oats for one or two months in winter, for the ewes and lambs, I think the results would prove of the most satisfactory and profitable character.

General Young, of North Carolina, who, as a practical wool manufacturer, speaks with much weight, is more sanguine than Mr. Peters as to the capacity of the lower region for sheep-husbandry. He says that, in the tide-water regions—

> The sheep find a sustaining pasturage the entire year upon the wire-grass which grows spontaneously through the otherwise barren forests. Being thus independent of their owners, they keep in uniform good flesh, grow to better maturity, and furnish better fleeces than in the upper portions of the State.

By the statements of General Gordon and others, it appears that immense tracts of these lands can be obtained at from 50 cents to $1 an acre. Having been burned over in former times by the Indians, they are free from underbrush. There is no necessity of clearing the land, as the pines may be destroyed by girdling. The land can be prepared for the required pasturage of winter oats, simply by harrowing. A great advantage of these more southerly localities is the facility for supplying early lambs for the Northern markets. Even Texan flock-masters with whom we have conversed admit the advantages of these lands for sheep-growing on a large scale.

When intelligent sheep-farming is practiced on these now waste pine lands, it is believed that it will develop a value in them never yet conceived of. Sheep-farming has made the chalky downs of England, once arid wastes, gardens of verdure. There are no soils so responsive to manure as those of a light, sandy character. The most productive lands in all the United States are in Cambridge, Mass., where the writer resides. Originally sandy plains, bearing a few pitch-pines, they have been converted into market-gardens. Covered with glass, or hot-beds, in the winter, and heaped up with manure when the glass is removed, they bear successive crops through the whole year, and yield as high as $4,000 per acre in a year. The Tertiary lands of the South contain many elements wanting in our Northern pine plains (especially in the subsoil), as they contain organic remains. A scientific farmer in Louisiana regards the pine lands, when made rich as they can be with pine straw, folding sheep, and plowing in green crops to supply organic matter, as the most pleasant lands to cultivate, and the best lands in the State.

It is of such land as this that Longfellow speaks in "Evangeline"—

> Here no stony ground provokes the wrath of farmer,
> Smoothly the ploughshare runs through the soil, like a keel through the water.

Sheep for mixed husbandry.—The other and more important branch of sheep-husbandry, in its relations to the improvement of a country, is that where the culture of sheep is made auxilary to a mixed husbadnry. The highest advantage of this system is the improvement of the land. As this paper may come under the eye of persons less familiar with the subject than our habitual readers, we may be allowed to repeat facts before stated in our pages.

Sheep are the only animals which do not exhaust the land upon which they feed, but permanently improve it. Horned cattle, especially cows in milk, by continued grazing, ultimately exhaust the pastures of their phosphates. In England, the pastures of the county of Chester, famous as a cheese district, are kept up only by the constant use of bone dust. Sheep, on the other hand, through the peculiar nutritiousness of their manure, and the facility with which it is distributed, are found to be the most economical and certain means of constantly renewing the productiveness of the land. By the combination of sheep-husbandry with wheat-culture, lands in England, which, in the time of Elizabeth, produced, on an average, 6½ bushels of wheat per acre, produce now over 30 bushels. For these reasons, the recent practical writers in the Journal of the Royal Agricultural Society of England pronounce that, while there is no profit in growing sheep in England simply for their mutton and wool, sheep-husbandry is still an indispensable necessity, as the sole means of keeping up the land

Experience in the United States leads to similar conclusions. Mr. Stilson, of Wisconsin, by keeping sheep, is able to raise his 24 bushels of wheat to the acre, while the average yield of wheat in Wisconsin is but 10 bushels. There are cases in Vermont where sheep-farmers have been compelled to abandon one farm after another, as they became too fertile for profitable sheep-growing. Mr. George Geddes, whom Horace Greeley used to regard as the highest authority on agricultural matters in the State of New York, and who has raised sheep for many years in connection with wheat, says that with one sheep to the acre of cultivated land, pasture, and meadows he raises more bushels of grain on the average than he did when he had no sheep to manufacture his coarse forage into manure, and to enrich his pastures to prepare them for the grain crop; that the land is constantly improving, and the crop increasing in quantity; and that, while producing crops on less acres and at less cost than he did before he kept sheep, he has, *in addition, the wool and the mutton produced by the sheep.*

Mr. William Chamberlain, of Red Hook, Dutchess County, New York, celebrated as a grower of Silesian sheep, purchased in 1840 a farm in that palce of 380 acres, which had been used so long for selling hay that it was worn out. The hay crop in 1841 was 17 loads; 40 acres of rye gave 10 bushels to the acre; 25 acres of corn averaged 20 bushels to the acre; the rest of the farm pastured 2 horses, 4 oxen, and 1 cow. The land was so poor that it would not raise red clover. By using sheep as the producers and manufactures of manure, he made this worn-out farm so productive that its crops would be satisfactory even in Ohio. The product in 1866 was 600 tons of hay; 40 acres of Indian corn, yielding 50 bushels to the acre; 30 acres of wheat, averaging 15 bushels; 30 acres of oats, 8 acres of roots, and the pasturage of 300 sheep, and of the teams, cows, &c., necessary to carry on the farm and to supply the families on it with milk and butter.

Mr. Chamberlain's plan, when he first commenced making manure by using sheep, was to spread it thinly, so as go to over all the surface he could and make clover grass; and he said that, when he had brought

his land to where it would produce clover, improvement henceforth was easy and rapid. The sheep not only gave the first impulse, but were all the time depended upon as the great manure-producing power.

Now, all this can be done by sheep at the South. By their use even red clover, the grand ameliorator of land (which it was once declared could not be grown at the South), can be made to have the same regenerating influence which it has at the North. Even in Mississippi, as Dr. Phares has asserted and proved, red clover may be grown as promptly and as luxuriantly, and yield as heavy crops of forage, as in any portion of America.

Many of the most intelligent men of the South believe that the *exclusive* cultivation of cotton has been a scourge, instead of a blessing, to their country; that, with a crop of over 500,000 bales of cotton—worth, at 15 cents a pound, $75 per bale—in one State, Georgia, its agricultural population, as a whole, were poorer at the end than at the beginning of the year; that labor on a cotton plantation where a fall crop is planted is without intermission; and that it is excessive in the quantity required, often exceeding in cost the whole salable value of the plantation; that such is the demand for labor in those sections in which exclusive cotton culture is practiced that the planter is compelled to take any labor that offers, whether good, bad, or indifferent; and thus the exclusive cotton-planter belongs to the negro as the negro once belonged to him; that if but half the usual quantity of cotton were planted the value of the crop would be about the same, and but half the labor would be required; that by high farming, or cultivating with the plow, fewer acres, and those only which can be heavily manured, greater results may be obtained with diminished labor, the cost being rather in the manure than in the cultivation; and that high farming would be remunerative in the cotton States, with the triple effect of improving the soil, increasing profits, and diminishing, and therefore controlling and improving the labor. None of the language in the above paragraphs is our own; it is literally taken from Southern writers.

If they speak correctly, and the Southern land-holder must cultivate only the small proportion of land which he can manure heavily, what is to become of the rest of it? The only answer is, the rest may be devoted to small grains, to meadow and pasture. To utilize the meadow and pasture, sheep can be more profitably used at the South than any other stock. Cattle can be better raised at the West. Dairy and cheese farming are more difficult and more laborious than sheep-farming. Sheep culture has other advantages over cattle-raising. It gives annual dividends in the fleeces. Indeed, the ewe gives two dividends—her fleeces and her lambs. The beef-producing animals give no dividends; and the grower must go on adding his expenses till the end of their lives, when he must find his compensation (if he can) in one gross sum. The capital required for the purchase of sheep—enough stock for a fair trial—is small. Large flocks are not required.

Sheep-growing is commended by other considerations, apparently slight, but too important to be overlooked. Wool never has to seek a purchaser. Poor or good, it is evidently the cash article on the farm. The little addition from this source to the resources of the farm affords a satisfaction to which every wool-growing farmer will testify. The absolute enjoyment the farmer has in the care of his flocks is no little consideration; neither is the gentle and humanizing influence, which a love for animals is well known to exert, to be overlooked. If the prejudice still lingers that sheep culture is a less dignified occupation than that of cotton-planting, it should be dispelled. The nobility of

sheep-growing, and especially of sheep-breeding, is recognized by all the advanced nations. The Empress Eugenie took the flock of Rambouillet under her special protection. France has recently erected a monument to Daubenton, who first showed how the culture of the merino could be made successful. The Queen of England takes pride in the choice flocks which adorn her parks. The first exhibitor of wools at our Centennial was an archduchess. The princes of Hungary are as proud of the fineness of their wools as of their own descent. The English nobleman values the prizes for his perfected Southdowns or Lincolns above all the honors of the turf; and, at a dinner of the landed gentry, the topic of sheep and turnips takes precedence of all other table-talk. With such recognitions, sheep-husbandry has no need of urging its claims to a place of honor on the plantations of the South.

Precisely how sheep-farming, in connection with the cotton culture, is to be carried on we would not presume to indicate. Fortunately, we have a Southern man—Mr. Howard, before quoted, and whose high authority as a scientific and practical farmer is well recognized in Georgia—to illustrate the application of diversified husbandry to the cotton culture. He submits the following rotation of crops, in connection with sheep-growing, as suited to the agricultural condition of the South:

We will suppose a farm of 500 acres of open land under fence. Let 250 acres be devoted to arable purposes and the rest to grazing. The rotation might be as follows: 1. Cotton and corn, in the same field, in suitable proportions; 2. Oats, sown in August, on the cotton and corn land; 3. Rye, or rye and wheat, sown in September, the land having been twice plowed, in order to kill the permanent oats; 4 and 5. Clover, if the land is in sufficient heart to produce it; if not, the fourth year rest ungrazed, and the fifth year sheep and cattle penned upon it every night during the year, using a portable fence. An ordinary farm of 500 acres will support 500 sheep, besides the crops in the above rotation. The oats and rye will feed them during the winter nearly or entirely, without injury to the grain. Five hands would be sufficient to work such a farm and take care of the live stock.

During the first year the following results might be expected from an ordinary farm without manure:

25 acres in cotton, 12 bags, at 15 cents	$900 00
25 acres in corn, 250 bushels, at $1	250 00
50 acres in oats, 500 bushels, at 80 cents	400 00
25 acres in rye, 200 bushels, at $1	200 00
25 acres in wheat, 150 bushels, at $1.50	225 00
Increase and mutton sales of 500 sheep	500 00
Wool, 3 pounds per head, at 33 cents per pound	500 00
Manure, at $1 per head	500 00
	3,475 00

Separately, each of these products is small; still the aggregate result is more than $600 per hand. Yet this is nearly three times the average product per hand in the cotton States.

The farm products given in the case above supposed are the result of the first year's rotation. The next year the cotton and the corn would be more than double by penning 500 sheep at night on 50 acres. It is the writer's experience that 10 sheep, regularly penned, will manure 50 acres. Two hundred would therefore manure well 50 acres. The appearance of the ground would not indicate this high manuring, but it should be remembered that liquid manure (which is equal in value to the solid) is not visible. * * * At the end of the fifth year of this rotation the change in the farm would be equal almost to a transformation, the crops having doubled or trebled without (which is a most important point) any material increase of labor or other expense.

The accuracy of the estimates above given we do not vouch for. As we have said before, all definite estimates of profits in any industry are liable to be fallacious. They are submitted only for illustration. The best hand-books of art can do hardly anything more than suggest and excite the reader to apply his own intelligence to the particular problem which he

desires to solve. The more general statement of another (Mr. Peters) may be more safe. He is experienced in sheep, and commends their employment in connection with the culture of cotton. He says:

In the middle part of the State of Georgia the Bermuda grass prevails; and, under the cotton system of culture, it was the dread and bane of the planter; but now, for its nutritious qualities and compactness of sod, it is considered by our people as valuable and reliable as any grass, not excepting the Kentucky blue-grass. It will offer sheep the very best of pasturage for six months of the year in this section of the State; and, if managed as on the pastures of Kentucky, for the entire year. In Putnam, Hancock, Wilkes, and adjoining counties (formerly the *el dorado* cotton country of Georgia), where the Bermuda has taken possession, there is a future for successful sheep-husbandry, providing, of course, the supervision be intelligent, and the business properly conducted, and combined with cotton culture, the result must prove highly remunerative—far surpassing anything in the past history of this industry in New England or the Middle States.

In regard to the general culture of sheep at the South, independently of its relation to any particular locality, he observes:

In reference to the whole matter of sheep-husbandry at the South, in which neither labor, care, nor expense has been spared by me, I may say with safety I know of no investment so likely to yield constant and profitable return to the farmer; and certainly none so valuable to the acres he occupies. I think the State of Georgia, from its varied climate, soil, and surface, offers unequaled facilities for this industry.

My own experience has been to a great extent in North or Upper Georgia, in Gordon County. The country is hill and valley, the land changing very rapidly; the pasturage, sedge, crab, and other native grasses. Of the cultivated, the orchard-grass, red and white clover on the upland, and red-top on low land, succeed admirably. Lucerne and German millet are never-failing sources of an ample supply of hay. The former afford from four to five cuttings in a season. Red rust-proof oats—a variety reliable in winter, if sown in September—can be pastured during the winter and early spring, and then yield a full crop of grain. The same may be said of barley, rye, and wheat.

The breeds I have tested are the Spanish and French Merinoes, Southdowns, Oxfordshiredown, Leicester, Asiatic broad-tail or Tunisian, improved Kentucky Cotswold, and native sheep. I have also crossed nearly all of these varieties. Those between the Spanish Merinoes and native, and the Cotswold and native, have proved most profitable. My present varieties are the thorough-bred Merinoes and Cotswolds and crosses between these two.

For general purposes of wool and mutton, I recommend most decidedly the cross from the native ewes and Spanish Merino bucks, the progeny showing marked improvement, having constitution, fattening properties, thriftiness, and a close, compact fleece.

If the winters are mild, my flocks require feeding about thirty days; if cold and wet, twice that time. My Merino sheep are very healthy. They have had trouble with the sheep bot-fly; but I have found a liberal use of tar a perfect preventive.

In all well-selected and well-managed flocks, the increase and manure will amply pay all expenses, and leave the fleece clear profit. The fleeces of my flocks, not housed at night, will give an average of seven pounds of wool to the head.

The future history of the sheep-husbandry of this State, if intelligently pursued in accordance with its natural divisions, will show three distinct systems; that of Northern Georgia will somewhat resemble the industry in Ohio, Pennsylvania, New York, and New England; that of the middle of the State, Kentucky; and that of the southern portion (with shepherds and dogs), Texas, Colorado, and California.

In order that Southern gentlemen who may see this paper should have the views of a thoroughly practical farmer and expert in sheep-husbandry at the North, we have requested Mr. William G. Markham, of Avon, N. Y., president of the New York State Wool-Growers' Association, and secretary of the National Wool-Growers' Association of the United States (whom we have had the privilege of consulting daily during the preparation of this paper), to give some suggestions in furtherance of the object of improving and extending sheep-culture at the South, and particularly as to the breed of sheep most desirable in that section. He has replied to this request as follows:

AVON, N. Y., *April* 21, 1878.

DEAR SIR: You ask my views of improved sheep-husbandry and its adaptability to the South. My personal experience as a breeder of sheep has been mainly with Ameri-

can Merinoes in Western New York, though I have bred Cotswolds and other long-wool varieties to some extent.

In my immediate vicinity are some of the most skillful and successful breeders of American Merinoes in this country. I have at all times been quite familiar with their flocks, and watched with greatest care and interest the results of the different experiments in management and breeding.

The little, light-fleeced foreigners imported from Spain between A. D. 1800 and 1813, by Colonel Humphreys, Consul Jarvis, and others, were transformed by Messrs. Atwood of Connecticut, Hammond of Vermont, and others, into a type of sheep so far superior, in constitution, form, and weight of fleece, and altogether so widely different from the original importation, as to be regarded a distinct variety; and, in justice to our breeders, the word *Spanish* was dropped, and the term *American* Merinoes applied to them.

To continue this improvement in our stud flocks a system for identifying and individualizing the sheep has been inaugurated, by placing a permanent metallic medal in the ear of each sheep, containing its flock number, and an accurate record is made of the general characteristics of each sheep, giving weight of fleece, length and quality of staple, form, and breeding qualities, &c., and preserving the pedigree of each individual for a public register. This additional care has enabled our breeders to attain greater and more valuable fleeces than ever before produced from this variety of sheep. Our flocks are small, usually containing from 50 to 100 breeding ewes, the clip of which will, in some instances, average upwards of 15 pounds each, while selections of ewes not in breeding often shear as high as 18 to 22 pounds, unwashed, which scour from 6 to 7½ pounds. The live weight of these ewes reaches 90 to 130 pounds. The stock rams produce from 26 pounds to 36 pounds, yielding about the same proportion of scoured wool, weight 150 pounds to 190 pounds.

And these sheep are the direct descendants, without admixture of other blood, of the importations from Spain prior to 1813, which give 3 to 5 pounds unwashed wool from ewes and 7 to 9 pounds from rams.

Our market for these sheep of late has been in the South and West, principally California, Colorado, New Mexico, and Texas. It has been the especial study of our breeders to produce such rams as, when crossed upon the common or native sheep of these sections, will produce the most valuable results in wool and mutton.

The great bulk of all wool used is Merino clothing-wool, requiring strong fiber, of medium length and fineness.

It is unquestionably true, that cultivating the *finest* quality of wool has a tendency to produce effeminacy, resulting in a fine-bound, delicate sheep.

It is also the experience of our breeders that great length of staple is incompatible with density of fleece. In breeding for great length of staple, we do so at a sacrifice of density, which, of all characteristics, is most difficult to secure and retain. In no other way can so much be accomplished in this direction as by the use of wrinkly rams.

The most desirable type of sheep for the wool-growing sections of the South and West must possess, *first*, constitution. This implies a broad, deep chest, strong heavy-boned legs, large feet, broad short head and nose after the bull-dog pattern, and carcass modeled as nearly after a short-horn bull as possible.

In fleece, one of the most important considerations is density, which better protects the sheep from storms and the wool from dirt, gives greater weight of fleece, and in hot climates better protects the yolk necessary for a healthy growth of wool.

It is the impression of our sheep-men that Northern sheep, when taken South, shear much lighter fleeces than at home, and that to keep up the weight of their flocks' fleeces, rams must be bred North.

The fleece should be even over the entire body, covering well the head, legs, and belly, and of medium quality, suitable for clothing wools.

It is the aim of our breeders to furnish rams which will soonest produce this type of sheep when crossed upon the light, dry, thin-fleeced native Mexican and Texas sheep.

Much has been said by wool merchants, and even wool-growers who are ignorant of the true theory of our breeding, against the wrinkly, greasy, dirty-looking modern American Merinoes.

Even Dr. Randall, who in his day was the highest known authority on sheep matters, in his "Practical Shepherd" denounced these exaggerated types of this class of sheep as "an unmitigated nuisance"; and yet the experience of the doctor subsequently convinced him that he was in error, and that in no other way could radical defects in a flock be remedied so advantageously as by the use of a ram possessing the desired characteristics in an exaggerated form. This he freely admitted, and he used upon his own flock of choice-breeding ewes one of the most wrinkly and greasy rams it has ever been my good fortune to see; and this to retrieve what he had lost in density and weight of fleece by the use of long-stapled, plain, fine-fleeced rams.

Breeding improved sheep in Western New York is quite unlike wool-growing in the Southern States. To succeed in either, a uniform supply of nutritious food and drink must be supplied, and sheep kept thriving every day in the year.

In introducing sheep-husbandry in the South where wool is the main object and mutton an auxiliary, the most profitable sheep to breed is unquestionably the type I have described, resulting from a cross of American Merino upon the native sheep of the land.

In the vicinity of large towns, where early lambs or mutton may be more profitably grown, the Cotswold should be used upon the second or third cross of Merinoes upon natives; the Cotswold being more hardy than any other of our mutton-sheep, and yet not as hardy as the resultant cross with Merinoes. In whatever line one is breeding, the SHEEP is of first consideration; second, take care of the *sheep*, and you make a success.

Very truly yours,

WILLIAM G. MARKHAM.

The culture of long-wooled sheep and of other lanigerous animals.—The formation of flocks of Merino sheep, by grading them up from a foundation of the native stock, is recommended for the greater part of the South, as the chief product will be wool; which, being so easily transportable, can be grown profitably without reference to accessibility to markets. The vicinity to large cities, usually railroad facilities, or the command of permanent pastures of unusual richness, admit of another branch of sheep-husbandry in which the principal object is large and early lambs. For this class of sheep-husbandry, the English races of sheep—the Leicesters, Lincolns, Cotswolds, and Downs, and varieties of the Cheviot—are specially fitted. An important incident to the culture of these varieties is the production of the long combing-wools now in so great demand for the worsted manufacture. The worsted manufacture of this country, ten years ago of a value not exceeding $10,000,000, now anually exceeds $20,000,000. Our principal supply of these wools formerly came from Canada. Now the production is declining in Canada, and rapidly increasing in the United States. The successful production of the long combing-wools is limited to the populous districts, where there is a demand for mutton, and where there is an improved agriculture. Therefore, while the production of fine merino wools in this country is liable to be affected by the competition of the vast pastoral regions of the Southern Hemisphere, and, without defensive duties, would be certainly overwhelmed, there is no probability of overproduction in the growth of combing wool. As a general rule, the English long-wooled races are adapted only for situations where the lands are rich, not subject to drought, fitted for root-culture, and where good city markets are easily accessible. It would seem, then, that there are but few situations at the South, or that portion of the Southern country which we have hitherto in view, where the English races could be cultivated to advantage. Mr. Peters is of opinion that the more elevated country of the Southern States is well adapted to these sheep; as he says, that the influx of the English combing-wools "would keep, for many generations, the fair Blue Ridge of the South without sheepwalks, though it is by nature one of the most favored spots in America for this class of wools." A milder climate than that of the North is required for the successful culture of the most important of the long-wooled English races—the Leicester. The universal testimony at the North is that the climate, generally, is too severe for the Leicesters, and therefore the hardier Cotswolds are preferred. Leicester wools, pronounced to be equal to the best English, have been produced in Ohio, on the southern border of Lake Erie. But the climate is modified by the lake, and this is peculiarly a region of the vine. The wool of the Cotswold is too coarse for many worsted fabrics, and has neither the fineness nor the luster of the Leicester. Greater fineness in the Cotswold fleece may be produced, as has been done in Kentucky and Tennessee, by a slight infusion of Merino

blood; but the highly important quality of luster, such as is wanted for the so-called black mohair and brilliantine fabrics, can be imparted only by Leicester or Lincoln blood. Besides, the Leicester is the most valuable of all mutton-sheep for crossing, and imparts its precocity—that is, its capacity of fattening in one year, and of reaching full growth in two years—and therefore its mutton-producing capacity, to all other races. Where there are rich, sweet pastures, with quantity in a small space, and a moderate climate, the Leicester will thrive. Such localities must exist at least in Kentucky or Tennessee, and there the Leicester should be introduced.

Kentucky sheep.—Whatever may be the possibilities of the Blue Ridge region for growing the long-wooled races, the ultra-montane regions of Tennessee, and especially Kentucky, are the only fields at the South where actual success has been achieved on any considerable scale. This may be due to geological formations existing in those States. It has been observed that the geological map of England exhibits an exact chart of the distribution of British sheep; and Professor Shaler, the able professor of Geology at Harvard College, has observed to the writer that the capacity of Kentucky for mutton-sheep husbandry is strictly limited by the geological features of that State. Kentucky mutton, produced by her long-wooled sheep, invariably appears in the choice *menus* of city hotels at the North. Its consumption is enormous. There are stalls at the Faneuil Hall Market, in Boston, where nothing is sold but Kentucky mutton.

We have obtained the following statement from an intelligent gentleman in Boston *:

BOSTON, *April* 19, 1878.

I have not forgotten your request in regard to Kentucky sheep. Through an introduction from Mr. Terry, the inspector of provisions, I have been placed in communication with the two largest dealers in mutton in this city.

Yesterday afternoon I went to the abattoir in Brighton, and saw both of these gentlemen, from whom I obtained the following facts:

During the year ending May 1, 1877, 272,000 sheep and lambs were slaughtered at the Brighton abattoir. This supplies the Boston market, the neighboring towns, and many of them are sent to the surrounding cities—Portsmouth, Concord, Fall River, and Manchester. There are, of course, a large number of dressed sheep sent to the Boston market from other places, not included in this number.

In regard to Kentucky sheep, my informant—one of the gentlemen referred to, who does not desire his name to be published—tells me that about 20,000 are annually sent to this market. This includes, as I understand, all the sheep from Kentucky. Before the war, the sheep sent from this State, though less in number, were superior to those now sent, being almost all full-blooded Leicester, Cotswolds, or Southdowns. Lately, many of these long-wooled sheep have been crossed with the native mountain or "Tennessee ewes," which are of an inferior grade. The principal supply of sheep for this market, from Kentucky, comes from four counties [of course, the blue-grass counties.—*Ed*].

The first-class Kentucky sheep will weigh about 150 pounds. Lots will average from 125 to 150 pounds. Kentucky sheep, dressed, bring $2 per hundred more than ordinary sheep.

The price of Kentucky lambs is as follows: from June 1 to July 1, about eight cents; from July 1 to August 1, about 7 cents. The sheep average about 6 cents, live weight. Ordinary New England sheep average about 4½ cents, live weight.

My informant says that many of his best sheep come from Ohio and Canada.

I saw in the pens at Brighton some very fine Kentucky sheep, just received, and some excellent sheep from Michigan. In the latter State, the Merino is crossed with a long-wooled sheep, which increases the size of the animal and improves the mutton.

My informant has agents in various parts of the country—in Covington, Saint Louis, Ohio, and other places—and does an immense business, amounting in one year as high as 245,000 sheep. He thinks that the national encouragement of sheep and wool production will lead to an immense export of mutton, and that we shall supply England and the rest of Europe with all that they can take. Since December 1 he has killed

* William A. Hayes, jr., counselor at law, No. 41 Sears Building, Boston.

and exported from New York 2,500 sheep per week. He predicts that, in the course of a few years, the character of the business will change in Boston, and will become like that of Chicago, the "tail end" only of the supply remaining here, the best animals being exported to Europe. He also, without any suggestion from me, stated that the South is to become a great sheep-producing country, and that there sheep could be produced more cheaply than in Ohio and the West.

Connected with the slaughter-houses at Brighton are immense refrigerators, where the animals slaughtered can be kept for a long time. The same system is now introduced on board ship, rendering the transportation of fresh meat a very easy matter.

I was astonished at the extent of the abattoir, and the system which pervades the establishment. There is nothing lost, and the greatest cleanliness prevails. The hoofs and shin-bones, after having the oil extracted from them, are sent to Europe, and used in the manufacture of buttons, &c. The fat is fried out in large boilers, and converted into tallow. The blood and scraps of meat are dried, and the heads ground into bone-dust; the whole being converted into the Stockbridge fertilizers, which are manufactured in a large building near the abattoir. All disagreeable fumes arising from the rendering process are conducted into a large chimney, and there consumed. Nothing goes into the river but pure water.

I may mention that I saw two or three sheep wandering about the yards apparently quite at home and very tame. These, I was informed, were "flock leaders," and used to lead the flocks of sheep which come by the cars to any desired place. They are thoroughly trained, and are considered very valuable.

The peculiar capacity for growing mutton-sheep in certain parts of Kentucky is given by the limestone soils, which produce permanent pastures of the nutritious blue-grass. Indeed, large size in all animals is a characteristic of this country. This has been attributed to the calcareous character of the soil, which, supplying material for bone, favors the enlargement of the skeletons of all animals. The reports to the Agricultural Department say that no property in Kentucky pays better than sheep. One correspondent says that "the best results are from grades of the native with the full-blooded Cotswold breed. Three crosses will make a good flock. Full-bloods do not herd well. Only a small number can be kept together—say thirty. If large, the flocks of full-bloods deteriorate." This corresponds with the experience in Canada. The enormous production of Canada long combing-wools is furnished by flocks of from 20 to 50 head, very rarely equaling that number. The most profitable mutton-sheep is said by another correspondent to be the Cotswold crossed with the Southdown.

A correspondent from Trimble County, Kentucky, makes the following statement:

We feed only when the snow is deep; the balance of the winter, sheep do well on blue-grass. There are no wild grasses in the county.

The following are the results with a flock of 60 good sheep:

Fifty-nine Cotswold ewes, which cost $8 per head	$472 00
One buck cost $25	25 00
Feed in winter, 3 tons of hay	24 00
Pasturage in summer, $1 per head	60 00
Salt	1 00
Shearing per head, 10 cents	6 00
For attending to flock	20 00
Total cost	608 00
Clip per head, 6 pounds, at 30 cents	180 00
Fifty-eight lambs, at $4 per head	232 00
Manure from 60 head of sheep	30 00
	442 00
By deducting the cost of keeping the sheep	136 00
Leaves	300 00

The net profit on an investment of $497.

The most eminent breeder in Kentucky of the long-wooled sheep is Mr. Robert W. Scott, of Kentucky, who claims to have created a new permanent race, which bears the name of "Improved Kentucky." From the published accounts which Mr. Scott has given of his procedure in creating this breed, it appears that the object he had in view was to obtain the form and delicacy of mutton of the Southdown, and the weight and length of fleece of the Cotswold, with the thickness and softness of the Merino. His method was the infusion, from time to time, of the blood of each of these races, according to the quality which he desired to have predominate. Although it is not in accordance with the generally recognized principles of zoötechny that a permanent race could be thus created, having the best attributes of all its ancestors, as there is constant tendency to reversion to the strongest race, Mr. Scott claims that his breed has become permanent, constantly reproducing itself; that, in 1866, the sheep had become essentially alike and uniform, maintaining their identity and imparting their qualities as surely as any other breed. So highly are they esteemed that he has found ready sale for all he could produce from a flock of a hundred ewes, at the uniform price of thirty dollars. He claims that they are peculiarly adapted to the South, as they need no housing. They are able to face the bleakest winter in Kentucky, without any protection.

The great Silurian limestone basin of Middle Tennessee would seem to possess equal advantages with the last-named State for growing the long-wooled sheep. Mr. Killebrew, commissioner of agriculture of the State of Tennessee, in the advance sheets from a work on sheep-husbandry, just published by him, thus describes this district:

> There the meadows are luxuriant, the pastures are green, the soil is fertile, the water abundant. * * * There all the grasses flourish; even the loftiest hills are set in blue-grass, and countless flocks fleck the landscape on every side. The highest evidence that can be adduced as to the value of this basin for sheep-raising lies in the fact that sheep are grown upon nearly every farm, and, up to a certain number, are universally held to be profitable. Sheep require no feeding in this division during winter, when upon good grass, barley, wheat, or rye fields, except when there is a fall of snow. Then some oats, fodder, or corn is fed. They are very healthy; and, indeed, when attended to, prove a most profitable investment, up to a certain number—say one sheep for every five acres of open land, or two sheep on every acre of permanent pasture, presuming that the farmer will have other stock in proportion to the size of his farm.
>
> The cost of keeping sheep per annum is about $1.25. The wool of one sheep of high grade will about pay for the keeping of two. Lambs are a clear profit, and the estimated cost of wool is below 10 cents per pound. The average yield of wool for improved lands in this basin is between 7 and 8 pounds. Nearly all the natives have disappeared from this locality, and high grades have taken their place. Mutton sheep, near Nashville, good grades, bring in the market 5 cents per pound, gross; lambs, grade, $3.50 to $4.50. A large trade in lambs has been built up within a few years past. Hundreds of car-loads are shipped every spring from this basin to points North, and good prices realized. Good sheep-farms can be bought in the basin for $20 to $40 per acre, varying according to the situation and soil.

Mr. Killebrew publishes a letter addressed to him by Mr. Tom Crutchfield, of East Tennessee, a successful sheep farmer, from which we quote the following:

> In 1864, I purchased a lot of native ewes, and was fortunate in getting the use of a superior Spanish Merino ram, bred by R. Peters, of Atlanta, Ga., to cross upon them; which cross gave great improvement in carcass, form, and fleece, covering the naked places of the natives, and making the fleece much more dense, and the fiber finer and stronger.
>
> I saved the ewe lambs of the cross, and bred them to an improved Kentucky buck, bred by Robert W. Scott, of Frankfort, Ky., which increased the size of carcass, and gave greater length and yield of wool.
>
> The ewe lambs of her get were bred to the best Cotswold buck I could procure, American breed and imported; never using one buck longer than two years, and never

breeding in and in. In the mean time I have added to my flock American-bred and imported Cotswold ewes at heavy cost, breeding them to the same bucks.

The imported and American-bred Cotswolds and their offspring are not superior, either in carcass or fleece, to those of my own breeding. I clipped samples of wool from Prince of Wales, an imported English-bred buck, and also from a ewe of my own breeding, which, through several generations, could be traced back through the Merino cross to the native. I sent these samples to my wool-merchants in Boston, Mass., with history, and requested their opinion of the wool on its merits. They pronounced the ewe's wool superior to the buck's. It was equally as good combing wool, 18 inches long, was of finer and stronger fiber, soft to the touch, attributable to the shade of Merino in it.

The effects of cross to the Spanish Merino, in fineness and softness of fiber and density of fleece and strength of staple, remain for many generations. I cull my ewes annually, at shearing time, marking all that are deficient in form or fleece, or that are becoming aged, and set them apart with the wethers for mutton, which are sold the following spring, often taking a better price than ordinary sheep, because they gross less and are better mutton.

I sold a lot last spring (fattened principally on grass) to the butchers of Chattanooga that averaged 166⅔ pounds gross, having clipped an average of 10¾ pounds of nice combing wool, which sold at 37½ cents per pound. The price for them was 6 cents per pound gross, netting me $14 per head; while the market for ordinary mutton was 4 cents. They grossed less than one-third, and were sold for 15 cents per pound net.

Mr. John W. Bowen, of Smith County, Tennessee, a blue-grass district, in a report to the Patrons of Husbandry, published in the Rural Sun, gives the experience of farmers of the county in raising long-wooled sheep. One farmer says: "My experience is that one acre of average pasture will feed three sheep. My sheep net me always 50 per cent. I like the Leicester and Cotswold crossed; I should prefer the Leicester." Another says: "Two dollars on the sheep, after deducting all expenses of every kind, is the least any one ought to expect as the annual profit. As to breeds, I like the Leicester best, the Cotswold next, and the South-down next."

Even in countries so favorably situated as Tennessee and Kentucky, the culture of the long-wooled sheep can be profitably carried on only as an adjunct to other husbandry. The agricultural commissioner of Tennessee gives this sensible advice:

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. The object of this paper is to show the profitableness of sheep-raising on a small scale. I do not advise the keeping of large flocks by the generality of farmers. If every farmer should carry a small flock, breeding up the natives to high grades, the profits would be very much increased.

We agree so heartily with this opinion, that we hesitate to recommend, at present, the introduction on a large scale, even in districts favorably situated, of another race producing combing wool and mutton, the Cheviot, which has received scarcely any attention in this country. The exceeding hardiness of this race, which, according to British writers, "is certainly the most convenient sheep, as he will thrive anywhere, on much or little, in mountain storm or by dreamy mansion;" the acknowledged fact that, of all English races, "the Cheviot has the best general mutton and wool"; the fact that the county of Northumberland, the home of the race, containing 1,250,000 acres, and having one sheep to every one and a quarter acres, has a physical aspect corresponding to regions in the Blue Ridge and Tennessee, being largely occupied with mountains rising to a height of 2,000 feet, has led to the opinion that the Cheviots are peculiarly adapted to the slopes and plateaus, or table-lands, of the Blue Ridge and the Cumberland Mountains. One intelligent correspondent, Colonel Watts, of South Carolina, speaking of sheep adapted to the Blue Ridge region, says: "I should also strongly recom-

mend the Cheviot, so successful in the districts of England and Scotland, of similar altitude and climate." We know nothing to oppose this opinion, which appears quite reasonable. But no experiments have yet been made with the Cheviots in these localities; nor have any judiciously conducted experiments with the native or Merino sheep, in large flocks, been made. There have been several attempts at sheep-growing on a large scale on the Cumberland table-land at an elevation of 2,000 feet, where, in the summer months, the land is covered with tussocks of nutritious mountain grass, furnishing a sufficient sustenance for eight months in the year. As no attention was given to providing forage in the winter for these flocks, the enterprise, of course, ignominiously failed.

For the benefit of those who may possibly contemplate a trial of the Cheviots, it may be said that, in the counties in England and Scotland producing these sheep, the sheep-farms are commonly about 2,000 acres in extent. In general, only a small part of the farm is cultivated (rarely more than 50 to 100 acres), and that only for winter food for the sheep. Although bred in purely pastoral regions, they are grown primarily for mutton, which, when fattened, is held in the highest estimation. The breeder, in the mountains, however, rarely fattens his sheep or lambs for market. They are turned over, at different ages in different districts, to be fattened by the farmer of the arable lands and lower and richer pastures. In the more southerly counties the increase of a flock of a thousand sheep is sold as lambs. Their sale, with the fleeces, makes the whole return of the flock. But the culture of flocks of this or any other race, on a large scale, upon the elevated regions of the South, cannot be recommended at present. It must be the outgrowth of a general and more modest system of sheep husbandry.

We must not pass from the mutton-sheep without reference to a race which seems to be peculiarly adapted to the South and is hardly known at the North: we refer to the broad-tailed sheep of Africa and Asia Minor. Colonel Watts, of South Carolina, the most experienced flock-master of that State, recommends the culture on the rich bottom-lands of the Southern coast of the African broad-tail or a cross with the Cotswold. After speaking of the actual tests which he had made of all the principal wool and mutton breeds, including the one last mentioned, he says: "If the principal object should be to raise mutton for the market, I would certainly recommend the African broad-tailed sheep, because they mature earlier. * * * Were the question one of long-combing wool, I would cross the Cotswold ewes with the African broad-tailed ram, for all the range of country this side of the Blue Ridge." These statements are exceedingly interesting. They show the possession of a resource for mutton and wool at the South not generally supposed to exist in this country. This race is the oldest known. It is the sheep of Syria and the Bible, the race to which belonged the Paschal lamb, and should be cherished for its associations, if for nothing else. But travelers speak of the flesh of the animal, when well bred and fed, as "superior to that of any breed on the face of the earth." Its wool furnishes that strong and bright fiber found in the rich Persian and Turkish carpets. It is a natural combing wool; and the cross referred to might impart brightness and strength of staple to the Cotswold fleece.

The Angora goat.—Our Southern correspondents, Mr. Peters and Mr. Watts, give us some original contributions in relation to the culture of the Angora goat, derived from their own experience, which show that the mountain range of the Blue Ridge is peculiarly adapted to this interesting lanigerous animal. Before quoting from these gentlemen, we may appropriately show the uses to which the fleeces of the Angora goat may

be applied, as stated in the report of the judges on wool at the International Exhibition of 1876:

Mohair, the fleece of the Angora goat, is not a mere substitute for wool, but occupies its own place in the textile fabrics. It has the aspect, feel, and luster of silk, without its suppleness It differs materially from wool in the want of the felting quality, so that the stuffs made of it have the fibers distinctly separated, and are always brilliant. On account of the stiffness of the fiber it is rarely woven alone; that is, when it is used for the filling, the warp is usually of cotton, silk, or wool, or the reverse. The distinguishing qualities of the fiber are luster, elasticity, and wonderful durability. The qualities of luster and durability particularly fit this material for its chief use—the manufacture of Utrecht velvets, commonly called "furniture plush," the finest qualities of which are composed principally of mohair, the pile being formed of mohair warps, which are cut in the same manner as silk warps in velvets. Upon passing the finger lightly over the best Utrecht velvets, the rigidity and elasticity of the fiber will be distinctly perceived. The fiber springs back to its original uprightness when the pressure is removed. The best mohair plushes are almost indestructible, and are now in general use by all principal railroads as the most enduring of all coverings for railroad seats. The English have attained the greatest success in spinning mohair, and the French and German manufacturers use English yarns. * * * Another analogous application of mohair is for forming the pile of imitation seal-skins. Some of these fabrics, exhibited by manufacturers of Huddersfield, England, were of striking beauty, the resemblance to seal-fur being quite striking. * * * Mohair forms an essential material for the best carriage and lap robes, with a long and lustrous pile. Some exhibited were made to resemble the skins of tigers, leopards and other animals. * * * Another application of mohair is for the fabrication of braids for binding, which have the luster of silk, but far greater durability. * * * Still another important application of this material is the fabrication of black dress goods, resembling alpacas, the mohair being woven with cotton warps. They are called mohair lusters or brilliantines. Beautiful exhibits of this admirable fabric were made by the Arlington Mills and the Farr Alpaca Company of Massachusetts. Mohair is also used in France in the manufacture of laces, which are substituted for the silk laces of Valenciennes and Chantilly.

So numerous are the applications of this material, that, so soon as a sufficient domestic supply is assured, the manufacture will have a great extension in this country, furnishing a home market for all that can be produced; although it must be admitted that its use at present is comparatively small. The total production of mohair in the world, as shown by the imports into Europe (a very little as yet being imported into this country) in 1876, was, according to the Messrs. Burnes, four and three-fourths millions. Formerly it was all produced in Asia Minor. Recently the Angora goat has been acclimatized in the colony of the Cape of Good Hope, which exported in 1876 one and a quarter million pounds; a fact which stimulates growers here. The average price last year was 37 pence, about twice that of the best Lincoln hogget wool. That of alpaca fell as low as 20½ pence. The Angora, therefore, is by far the most valuable of all lanigerous animals, not even excepting the famous Cashmere goat, which produces only two or three ounces, to the animal, of the *pushm*, or fine wool used for making India shawls.

As to the adaptability of the culture of this invaluable animal to the elevated regions of the South, Mr. Peters says:

I have owned these animals (Angora goats) from six distinct importations; those brought over by Dr. J. B. Davis, in 1848, proving to be superior in many respects to any of the more recent importations. One of the most valuable, interesting, and remarkable traits of the Angoras is the rapidity with which fleece-bearing goats can be obtained by using thorough-bred bucks to cross on the common short-horned ewe-goats of the country. The second cross produces a goat with a skin valued for rugs, mats, and gloves. The fifth cross (known by many breeders as full blood) will yield a fleece not inferior to much of the mohair imported from Asia Minor. The fifth cross can be readily obtained in five or six years. Thorough-bred bucks should always be used, because the progeny of the so-called "full-blood" bucks vary greatly, and the upward progress is by no means satisfactory. The Angora is a hardy, industrious, and self-sustaining animal, and can be classed as herbivorous. Being active and vigorous, they roam over wide ranges of country, giving value to worthless vegetation refused

by most other animals, and will feed and fatten at double the distance from water that sheep can, as they travel faster and endure more. I have for twenty years bred them largely, and have observed the following rules in my selection of stock bucks:

In pedigree, dating back to Asiatic importation.

In fleece, weight and length of the long, silky, ringleted, white fleece, and its freedom from kemp, and mane on the back and neck.

In form, size and vigor, long, pendant ears, and upright, spiral horns.

If that point has not been already reached, I believe it will be, when (as in the history of the Merino sheep) finer specimens of the Angora, American bred, may be seen here than can be found in their haunts in Asia Minor.

I have had great success with the Angoras, and regard them as one of the most valuable acquisitions to the resources of our husbandry. They have yielded me more substantial pecuniary benefit than any branch of my extended stock investments. In 1861, I sent out to William M. Landrum, of California, the first Angoras that went there; where they have laid the foundation of what, I am confident, will be a very extensive and profitable husbandry. There can be no doubt that, in the range of the Blue Ridge, extending from Alabama to Virginia, they would find all the requirements of their nature, utilize a vast country, and prove a source of great benefit and profit to all interested.

Colonel Watts, on the same subject, uses these words:

Let me say, in view of the industrial wants of the country, I think this last-named section of our State [South Carolina], the Blue Ridge Mountains, can, with moderate care and expense, most successfully find all the facilities needed for the best combing wools and the Alpaca and Angora goat. In fact, I have no doubt on this point. Even here, 75 miles from the mountains, I have, for six years, grown most successfully the Angora goat; whose flesh I regard as superior to any mutton, and whose fleece, properly handled, could there be made more profitable than any wool-growing. This I can say from actual, careful experience with Angoras of the Asia Minor stock, meeting here few obstacles to their profitable breeding; and which, in the Blue Ridge beyond me, would find an exact counterpart of their native soil and climate.

Aside from their flesh and wool, there is another advantage which they offer, which, in the mountains beyond, would be most valuable. In a cross I have made with a pure Angora buck and a Maltese ewe-goat, I have raised a ewe-goat that will give four quarts of as good milk as any cow on my plantation. The feed of one of my cows will keep twelve goats. My cows must have certain food, or they will not thrive. My goats will eat anything almost, and do well; and with this advantage, also, that their milk and butter are not in any way affected by their diet.

It is not, therefore, at all an open question with me, after years of practical experience, whether the Angora and kindred races of the goat tribe would thrive on our Blue Ridge. They would be more profitable in that locality than any other husbandry.

In confirmation of the value of one fact, among many others, mentioned by Colonel Watts, it may be remarked that the reports of the Society of Acclimation of France, upon this animal, dwell specially upon the importance of giving milk-producing qualities to the Angora; as, with this quality, and the value of its fleece, the Angora would wholly replace the common goat.

Mr. F. S. Fulmer, of Spring Mills, Appomatox County, Virginia, writes us:

My Angora goats, fifty in number, pure bred, got their living all last summer in a pasture where grass (other than broom-straw) and clover never grows. So far this winter I have fed them nothing but coarse corn-stalk. In fact, up to this time, they have kept in a thriving condition almost entirely on acorns, of which they seem very fond. I treat them as to shelter, &c., just as I would sheep, except I am rather more careful to keep them out of cold rains [an important observation]. From my experience, I am led to conclude that the Angora goat, aside from first cost, can be made to pay better than sheep, especially in the Southern States, where they can have large ranges over poor land.

The culture of this animal is now receiving much attention in the Australian colonies. Mr. Samuel Wilson, who is said to have had exceptional opportunities for observation, in a paper read before the Victorian Zoölogical Society, says:

Some think the preferable plan of starting a flock of Angoras is to commence with a few *pure* goats, and trust solely to their increase. By this process, considerable time must elapse before a large number could be raised; while, by commencing with

the common goats, you can obtain by crossing, in six years, a valuable flock, only limited by the number of common goats procured at the commencement of the operations. It is urged, as an objection to this system, that you can never reach absolute purity. Theoretically this is self-evident; but practically you can eliminate every trace of base blood. By constant use of pure sexes, and by judicious selection, a standard would be reached at least as pure and as certain to breed pure to type as that of the improved Leicester sheep, the modern fox-hound, or what we call the "thoroughbred" horse.

The writer of this paper has, for a long time, made a special study of the Angora goat. In 1869 he prepared an elaborate essay on the subject, which was published in the Proceedings of the Boston Society of Natural History, and subsequently was translated and published in the Transactions of the Royal Agricultural Society of France. In that essay he held the view that the characteristic qualities of the fleece could not be secured by breeding the Angora on the common goat. This opinion he has been compelled to modify. While believing, with Mr. Peters and Mr. Wilson, that a pure-blooded sire should be always used, he must admit that good fleece-producing animals may be founded on the common goat. The conclusive fact establishing this is the statement of the Messrs. Bowes, in their statistics of wool for 1878—a very high authority. They say:

We may refer to the acclimatization, in the Cape of Good Hope, of the Angora goat, on which mohair is grown. The progress made during the last dozen years has been very satisfactory, not only as regards the quantity produced, but the quality, which has been very much improved. The first shipment made was in 1865, and consisted of 6,804 pounds; in 1869, 245,000 pounds were shipped, and in 1876 the quantity reached 1,298,455 pounds.

This great quantity could not have been grown upon pure animals, as they could not have been procured. It must have been the product of graded animals. The best test of the value of this product is that it has become a regular commercial article. These facts, and the experience of the Southern gentlemen whom we have quoted, place it beyond doubt that the culture of the Angora goat can be made a most remunerative industry at the South.

TEXAS.

The sheep-husbandry of this State is so distinct in its character from that pursued or feasible in the older States of the South, and is of such high importance, that it demands a separate consideration. The estimated number of sheep in this State, in January, 1878, was 3,674,700. It ranks at present as the third wool-producing State in the Union, although having but about a hundred thousand head less than Ohio, which has 3,783,000, and about half the number of California, which has 6,561,000 head.

In its adaptation for sheep-husbandry on a large scale, Texas possesses decided advantages over our other Southern States, enormous ones over the Northern and Eastern States, and many over California and the trans-Missouri regions. The cheapness of land, its natural fertility, its genial climate and exemption from tempestuous weather, except in the northers, whose severity is generally much exaggerated; the absence of seasons of continuous drought, owing to the influence of the Gulf before referred to; the possession of permanent winter grasses, making the pasturage perennial, are advantages which will make Texas one of the great wool-producing countries of the world. Dr. Randall said, in 1859, of regions of Texas which he had thoroughly studied:

I do not entertain a particle of doubt that wool can be raised more cheaply in those regions than in any other portion of the globe where good government prevails, to

make life tolerable and secure, and such property as sheep safe from frequent and extensive depredations. In no such portion are lands furnishing perennial pasturage, or the use of such lands, so cheap. In none are general circumstances more favorable, the accidental and occasional disadvantages so few.

Upon its annexation to the United States, in 1845, Texas retained, as the most valuable, though then little appreciated, relic of the former Mexican proprietors, scattered here and there, flocks of the so-called "native" sheep of Mexico, of which large flocks still abound in that country, and which still furnishes an easy supply of all that are needed. This race, greatly deteriorated by neglect, small in size, and bearing about two pounds of coarse wool, is supposed by many to be degenerated Merinoes. It is now well established that they are descendants from the *Chourra* race of Spain, even at present distributed in all parts of that kingdom—a race distinguished for its robust temperament, the facility with which it is nourished, and its resistance to hunger and tempestuous seasons. When the animals are properly fed and bred, they may be made to produce a long and very white, though coarse, wool, well adapted for carpets. This is the stock which was the original foundation of the present Texas flocks.

The first recognized improver of these sheep, and therefore the founder of the present sheep-husbandry of Texas, was G. W. Kendall, who had been an editor of a leading paper in New Orleans. He was the first to conceive the idea of ingrafting the Merino stock upon the native Mexican sheep. His experiments were attended with extraordinary success. He was, in his time, the largest wool-grower in the State. "Braunfels" (his establishment), about twenty miles northeast from San Antonio, will take its place in the history of sheep-husbandry with "Camden," the initial point from which the sheep-husbandry of Australia spread. Mr. Kendall did for Texas what Captain McArthur did for Australia. They were the great benefactors of their respective countries. The journalism of America can cite no better example of the influence of that great profession than the results achieved by the journalist, Kendall.

We regret that, with all our efforts, we have been unable to obtain condensed original statements in regard to the sheep-husbandry of Texas, like those so kindly furnished us by Mr. Peters and Colonel Watts in relation to Georgia and South Carolina. In their absence we must content ourselves mainly with giving extracts from the Texas correspondents with the Department of Agriculture. Although fragmentary in their character, they will, perhaps, present a more exact picture of the general sheep-husbandry of the State than could be given bymore elaborate and better-arranged statements.

We give the extracts at hazard, and without reference to the geographical position of the counties, or their bearing upon any particular question in sheep-husbandry. In order to preserve the piquancy of the statements, the exact language of the correspondents is given in all cases. The correspondents, it will be remembered, are selected by the department from the most intelligent agriculturists residing in the several counties.

A correspondent from Palo Pinto County writes:

A sheep-raiser for several years says: Say for 1.000 head it will cost $300 for herding; extra help in lambing time, $30; salt, $15; cost of shearing, $50; feed during winter, $200. We imagine the Georgia bureau of agriculture knows but little about large herds of sheep, as they are grown on prairie grass. They are accustomed to herds of from 10 to 100 head. Such flocks are not necessary to he herded, and yield a fine profit. If we make it a specialty, and put 500 to 1,000 in a herd, which is common here, they will not pay so well. The figures made on paper will show them to pay better than anything else, but a very little experience shows the figures quite an error. Small

herds here will pay very well, and much better than large, when they are so large as to require a herder.

Navarro County.—"I have been engaged," says the correspondent, "in sheep-raising for fourteen years. In this and all the old settled prairie counties, 300 to 400 sheep do well. One hundred per cent. gross profit is a fair statement. The profit diminishes 10 per cent. per 100 head as you go over 100. My flock has ranged from 300 to 1,000. I put up annually 100 pounds of prairie hay and one bushel of cotton seed to the sheep, and have good shelter provided."

Goliad County.—This correspondent, Hon. Prior Lea, the writer has the pleasure of knowing personally to be entitled to great confidence. "Cost and profit of growing wool may he estimated in two ways. Crediting increase of sheep as equal to all cost, the wool would be net profit, and this, at least, is claimed by many persons. Without crediting increase for more than enough to maintain the flock equal to its primitive condition, a practical estimate for cost, considering every kind of item, might be from 10 to 12 cents per pound of unwashed wool, averaging 17 cents in market. This latter mode gives broad margin for contingencies."

Brandon County.—"Cost of keeping sheep, about 25 cents per head; profit, 30 cents to $1, exclusive of increase."

Another, same county: "One flock or 800 cost, for shepherd and salt, $275; net profit, including wool and increase, 31 per cent."

Aransas County.—"Cost of keep, 10 per cent.; profit, 50 to 60 per cent. on capital. Mr. P.'s flock average 50 per cent. of its total value as profit. About 100,000 sheep in the county, mostly improved Merinoes."

Bexar County.—"One-half in farms under cultivation; all the rest a complete pasture. Sheep-raisers say this is the best county they ever saw."

Callahan County.—"Flock of 2,000; 20 cents per head cost. Profit by wool, 40 cents per head."

Fort Bend County.—"250,000 sheep could be raised in this county. One-quarter in cultivation. All the rest adapted for sheep-pasture, yet no sheep worth mentioning; all cattle and cotton. At close of war sheep-raising began to decline, owing to depreciation of price of wool. A reaction has now taken place; extensive pastures are now being inclosed; improved breeds are introduced."

Kendall County.—"Mr. B. has 1,000 head of sheep. Shears 5,000 pounds of wool; at 28 cents, $1,400; cost of keep, $325; profit, $1,075."

Another, same county: "A successful sheep-raiser says: 'I commenced with 200 ewes, three years ago; and have sold sufficient of the flock to make an increase of 100 per cent. per year, average; and the wool has averaged for that time from 75 cents to $1 annually.'"

Lavaca County.—"Mr. S. B. M. has a flock of 1,500 head, let out to a herder on shares; and, therefore, furnishes a pretty fair sample as to profits. He gives the herder one-quarter of the wool and one-quarter of the annual increase, that is, the actual increase. He furnishes the salt, sheep dip, &c. The herder pays all other expenses, except shearing; and pays one-quarter of this amount. This makes the yield to the owner—

For wool		$800 00
The increase of the flock will average 800 head; which, at $1.50 per lamb, in spring, makes lambs	$1,200 00	
Deduct from this $1,200, one-quarter to herder	300 00	
Which leaves		900 00
Leaving a balance as net profit, on one flock, of		1,700 00

or about $1.13 per head on the entire flock."

Nueces County.—There are several reports from this, the leading wool-producing county in the State.

One correspondent says: "Sheep-husbandry is the leading industry; and a higher degree of intelligence is devoted to it than to any other enterprise in the county."

Another says: "I would estimate the cost of keep and profits on the sheep (Spanish Merino) as follows:

1 two-year-old ewe cost $5.

Dr.		Cr.	
To interest, one year, at 12 per cent.	$0 60	By 5½ pounds wool, at 20 cents	$1 10
To cost of feed, herding, salt, &c	1 00	By 75 per cent. of lamb, at $4	3 00
To buck service	40		
To insurance	10	Total	4 10
To shrinkage in value	70	Less cost of keep	2 80
Total	2 80		1 30

Per cent. of profit, 25.

"My own flock, now numbering 1,700, started 460 in 1873 (Merinoes and Cotswold grade), has paid above per cent. of profit, or more."

Another careful correspondent from the county of Nueces says: "Rams have been imported in large numbers. Improvement is already far advanced. Flocks are sheltered from November 15 to February 1, by selecting their range and night-camp on the south side of some creek or prairie timber. There is no foot-rot. Semi-annual lambing is generally adopted in this county; the February or spring crop being always the most preferable. One set of ewes lamb in the spring, and another set in the fall. Those who shear the best and most desirable clips of wool handle their sheep in moderately large flocks of 1,000 to 1,200 head. Provision is only made for select sheep, such as rams. Average weight of fleece, 5 pounds. Average cost of keeping, 25 to 28 cents. Profit, 72 to 75 cents. Where dipping has to be added, the general expenses will be 3 to 4 cents per head. Good tobacco, liberally used, invariably cures the scab; all other preparations have failed in this county. Profits on wool only given, as profits from increase are rarely turned into cash. Ewe lambs of high grade sell readily for $2.50 to $4 per head. The cost of keeping, where the shepherd cares for only 1,000 sheep, is the cost given; where he cares for 1,500 to 2,000, as many do the year round, the real cost is proportionably less."

The number of sheep in this county, according to the returns of assessors, is 656,000; and the remarkable fact is presented to us, that very nearly the most southerly county of the whole United States is the banner sheep county of the Union. The adjoining county, Starr, has 184,000 sheep. And these two counties have more sheep than the four States of the South—Georgia, South Carolina, Florida, and Louisiana—together; or the conjoined States of the North—New Hampshire, Vermont, Massachusetts, and Rhode Island.

One of our own correspondents, certified to as one of the oldest and best citizens of Texas, writes us as follows:

WACO, MCLELLAN COUNTY, TEX., *January* 12, 1878.

SIR: I have been directly or indirectly interested in wool-growing in this State and section for many years. The country is rolling prairie land; the soil, black, waxy, and, in sections, quite sandy, and an excellent grazing country. The natural grasses are the sedge and mesquite; of the latter, three varieties—the best, the bearded variety. My flocks have been French and Spanish Merinoes, mixed; the average product of fleece being six pounds, at an average valuation, for five years, of 25 cents per pound. This can be produced under favorable circumstances for 16 cents net cost to the shepherd; but he should have not less than the 10 cents profit added, to make a paying investment. If there is no change in our duties, I am confident that there is no more promising industry in the country than wool-growing; but, if we are to have reduced duties or free wools, the occupation will have to be abandoned.

There is no objection to sheep from any section of the North or West, if free from disease. For the ordinary wools, I would prefer the Merino; for mutton or combing-wools, a cross of the Cotswold with pure-blood Merinoes. The country is uniformly healthy for sheep here. In three months of the winter the sheep should have some feed—say one-third of their consumption. I would say that 65 cents a head would cover every possible contingency or cost in sheep-husbandry, per annum, in this section. As I have said, if the farmers are to keep the protection they now have against the producers of foreign wools there is no more profitable industry that any one who will put his attention to the business can be engaged in.

Yours truly,

W. R. KELLUM.

Another of our own correspondents writes as follows:

HOUSTON, TEX., *January* 9, 1878.

DEAR SIR: I have had long experience in sheep-husbandry in the San Joaquin and Santa Barbara country, and also in Los Angeles, Cal. I know well Colonel Hollister, Mr. Dibbles, of California, and other prominent wool-growers there. I was also for a time in Utah; also, in Western Texas, which I regard as the best country for the industry with which I am acquainted, if life and property were only secure against Mexican depredations. The climate, for man and beast, is unrivaled; the feed rich and unfailing all the year round. No country I know of could so well sustain the large flocks which, from various causes, are being broken up in California.

In a parallel drawn north from Laredo to the Indian Territory, there is the best location for the industry, in my judgment, in the country. But, until Uncle Sam will protect us there, the life of the shepherd and his flocks are in constant jeopardy from

the Mexicans. These thieves and marauders operate in a regularly systematic way, being fitted out and encouraged by the wealthy Mexicans living on or near the border, who for years have been at the bottom of all the border troubles, from their desire for annexation to this country. Their purpose constantly is to provoke a war, believing the result will be annexation, when they will then have a stable government, which they know they never will have under any Mexcan leader. * * *

There are other very fine fields for this industry near Corpus Christi, San Antonio, north and south of Dallas; but the finest section in this country, in my judgment, must remain idle, unless, as I have said, the government will give protection.

S. W. PIPKIN.

Statements of Mr. Shaeffer.—After the above notes had been put in press, the writer enjoyed the privilege of several personal interviews at Washington with Mr. F. W. Shaeffer, of San Diego, Tex., commended by members of the delegation in Congress from Texas as the highest authority on sheep-growing in that State. The following notes, which this gentleman permitted us to take at these interviews, will serve to give a much more exact idea of the present condition and resources for sheep-husbandry in Texas than the notes before given.

Our informant, born in Ohio, was early in life engaged in mercantile pursuits in the city of New York. Finding them uncongenial, he embarked in sheep-husbandry in Texas, about the year 1857, settling in the higher region of the State, north of San Antonio. The foundation of his flocks, which now number 15,000 head, was sheep purchased before the war from a brother of General Beauregard, supplemented since the war by 1,500 breeding ewes, obtained from the estates of G. W. Kendall, identified with the introduction of improved sheep-husbandry into Texas. Finding the climate in the high region where he was first established not as mild as he desired, he purchased lands in the more southerly region of the State, about fifty miles from Corpus Christi, in Nueces County, obtaining gradually about 80,000 acres; the whole of this great tract being inclosed in one vast pasture by a wire fence, which cost upward of $16,000. Here he found the climate so mild that the sheep thrive absolutely without shelter. He regards it as necessary only to keep the sheep fat and in good condition, to enable them to resist without inconvenience the cold wind and rain of that climate. Even the shepherds have no shelter, except such as they may make with their blankets, and no means of warming themselves but a fire on the open ground. They suffer no inconvenience, however, from this exposure, and are always on hand to take care of their sheep.

The sheep in this district are divided into single flocks of from 1,100 to 1,300 in number—usually about 1,100—this being about the number which can be advantageously kept together under the care of one shepherd. The ewes, with their lambs, are kept separate from the dry ewes and the wethers, or *muttons*, as they are generally called. A thousand or eleven hundred sheep will "herd" or keep nearly together* within a space which the shepherd can easily move around. When driven out on the range from the camping-ground, they are kept constantly moving for a mile or two, the shepherd continually moving around the flock, which is guided by his voice. They snatch their bites of grass as they go slowly along. They return in the same way, slowly feeding, to the

* Mr. Shaeffer gives a satisfactory reason for the fact, often stated without explanation, that the English race of sheep—the Cotswolds, Leicesters, &c.—cannot be kept in large flocks. The reason he gives is, that the Cotswolds will not "herd" or keep together like the Merinoes. While feeding, they invariably scatter over a wide domain. A Cotswold, if tired, will lie down and cannot be driven up by the shepherd, and when it recovers is liable to wander off and join another flock. Mr. Shaeffer thinks that the Cotswold blood should never be introduced into large flocks of Merino sheep. Without greater care in breeding than the ordinary flock-master can exercise, they will make the wool of the flocks uneven, and ultimately ruin them.

camping-ground, generally selected on the southerly side of some creek or under the shelter of the prairie timber. In rainy or cold weather, the sheep travel much more briskly than in warm. In very hot, dry weather, they often will not feed by day, making up for it by feeding late in the night. Thoroughbred shepherd-dogs have been tried, but have been found useless, except to relieve lazy shepherds, who can do the necessary guiding much better than the dog. The flocks, however, are usually attended by cur dogs, which are useful for frightening away wild animals. These curs having been suckled when young upon goats, continue to attach themselves to the flock. The shepherd-dogs were discarded, because it was found that when they drove the sheep they caused them to huddle together, thus making a great loss of feeding time. It is of the first importance to keep the animal fat. Its fat condition not only makes the fiber strong, but enables the sheep to resist the storms and cold. If sheep are fat, they are also better able to endure occasional droughts. All the sustenance in the country in question is supplied by the natural pasturage, which consists of different varieties of the mesquite grass. A great superiority of these grasses over the annual grasses of California consists in their being perennial, and having long and stout roots which cannot be pulled up by the sheep nor trodden down. Although the grass may be apparently dry during a drought, after a rain it becomes perfectly green in a week or ten days. The rams, it may be observed, except when they range with the ewes, are confined in inclosed pastures. They receive in winter extra forage, either cotton-seed (which is considered more nourishing than grain) or, more generally, oats. A new variety of oats has recently been grown in Texas, called the "anti-rust." This variety has been known to produce as high as 100 bushels to the acre, weighing 37 pounds to the bushel instead of 32. Through its introduction, the price of oats has been reduced from about 70 or 75 cents to 22 cents. It is sown in November and fed off during the winter, which increases the crop of grain. This variety would be admirably adapted to the Georgia pine-lands for a winter forage for sheep.

Although the orignal stock upon which Mr. Shaeffer's flocks were engrafted was principally the native Mexican sheep, improved by Merino bucks, the Mexican blood has been so completely eradicated as to show no trace of its existence. The native Mexicans would weigh scarcely more than from 50 to 55 pounds, gross weight, and produce fleeces of poor wool, weighing about 2 pounds. The improved sheep of Mr. Shaeffer average for the whole flock seven pounds of unwashed fine wool. His wethers—or "muttons," to adopt the Texan term—will weigh, at four years old, 100 pounds gross weight.

These sheep, which are of the best improved American Merino stock, make excellent mutton. The mutton fed upon the mesquite grass never has any of the rankness or *muttony* flavor peculiar to those sheep at the North. A great number are now sent from Nueces and other counties in Texas to Saint Louis and Chicago, where they bring good prices. They reach these markets before the Western sheep are sheared and ready for the butcher; and they form an important source of supply for these markets in the spring, coming in like the Southern vegetables to our Northern markets. A notice has recently been published of the loading of ten double-decked cars, carrying 160 animals each, with sheep, at San Antonio, destined for the Chicago market, at a distance of 1,500 miles. One flock of three-year-old wethers was sold by Mr. Shaeffer for $3 a head, to a party who pastured them for two years in Texas, receiving their wool for this period; and who sent them to market in New Or-

leans, at five years old, where their fatness and the excellence of their meat was the subject of general comment. Mr. Webster used often to say, at his dinner-table, that he never knew the secret of making good mutton until he visited England, where he found that it was *age*, the best mutton being five years old. While the sheep increase but little in weight after the third year, the meat constantly improves in quality. It may be readily seen how easy it is to obtain good mutton where the food costs absolutely nothing, and almost the only cost of keeping the sheep till full maturity is the interest of the capital, while the sheep are all the time producing their semi-annual returns of wool.

The flocks in this country are kept up by the constant purchase of regenerators. These are the rams raised in New York, Vermont, and Ohio by skilled breeders, who find this much more profitable than growing large numbers of sheep for wool or mutton. A very large number of Northern rams are sold in Texas. Mr. Shaeffer has himself purchased over 800 at the North, many of them from Dr. Randall. There are at present five hundred rams in Corpus Christi; all which will be sold at prices ranging from $30 to $50, and very choice animals for $100. The Texas sheep-husbandry is thus the means of keeping up the most profitable branch of sheep culture at the North—a branch which may be carried on upon the highest-priced lands. The high-priced rams are kept in Texas two or three years, and sold at a less price to persons commencing the sheep business with but little capital.

It had been the custom for the Texan flock-masters to sell the high-bred rams produced from their own flocks only at the high prices demanded by the Northern breeders. Mr. Shaeffer early saw that he could benefit his country better, and do as well for himself, by changing this system. He found that the young men of his country going into the sheep business could not pay these high prices and make a living. He therefore reduced the prices of the high-bred rams which he had raised in Texas to from five to ten dollars, and sold a great many more by so doing. This had the effect of greatly extending the improvement of the flocks in the country. Another step taken by him was important for the development of the country in the direction of sheep-growing. Mr. Shaeffer found that contests were constantly occurring between the cattle-herders and the shepherds. He therefore began gradually to purchase all the lands he required; his example was followed by others; and at present the greater part of the land in the sheep region is held in freehold by the respective flock-masters.

There has now been so long and extensive an experience in this country as to reduce the methods of the peculiar pastoral sheep-husbandry to a well-established system, which is so simple that it may be easily learned by any intelligent person. The plant required for the business, except the first stock of ewes and rams, is exceedingly small. No buildings are required, if we except the covered platform for shearing. A rude camp is all that is necessary for the flock-master, and a wagon with a pair of horses for his supplies; of course he will have a saddle-horse. The well-arranged *ranche* is an after luxury, to be earned by the profits of the enterprise. The aim is to have flocks of at least 1,000 or 1,100 head, for each of which one shepherd—invariably a native Mexican, called a *pastore*—is required. It is desirable that the proprietor should have at least three flocks of this number. The separate flocks, each with its shepherd, are so located that they can be brought at night to a central camp, where the *baccierro*, or sheep-overseer, also a native Mexican, is established. This overseer is necessary, in all cases, to relieve the

shepherds in case of accident, and to cook their rations. The *baccierros*, as a class, are remarkable for their fidelity. The *impedimenta* of the camp, if they may be called by this name, consist only of the rudest cooking utensils and the stores of provisions, no shelter being required, and the bed of the shepherd being a sheep-skin. The food or rations of the shepherd are corn for *tortillas*, or, sometimes, flour, coffee, and fresh meat, no pork or bacon being used. The fresh meat is almost invariably supplied by goats, which are pastured with the sheep for this purpose. They cost about a dollar a head. Their flesh is excellent, and preferred by the Mexicans to any other. The quantity of goats' meat which the *pastore* will consume is enormous; the consumption being about one goat a week to the shepherd.

The shearing seasons are the busiest times for the Texan flock-master, not only on account of the number of extra hands to be overlooked, but because upon the care exercised at these periods, in culling, depends the future character of the flocks; and the tying up of the wool nicely is important for its sale. The shearings take place twice a year. The spring shearing commences about April 15, and the fall shearing about September 15. The shearings continue from three to four weeks, according to the weather. The practice of two shearings a year has been adopted, from the experience that it is most advantageous for the warm climate of Texas. It has been a mooted question whether there is more profit in shearing twice a year than once. By shearing twice, the wool, of course is shorter; is fitted for only one purpose, that of clothing; and brings a less price per pound. The high prices of wools for combing purposes, for which many of the improved wools of Texas, if suffered to grow to their full length, are well adapted, is lost, and there is the additional expense of the extra shearing. But, on the other hand, the sheep sheared twice a year are healthier and keep fatter, and the shearing checks the scab, if there is any tendency to this disease. The flock-master gets the money for his wool twice a year instead of once—an important consideration where the least rate of interest is 1 per cent. a month. The double shearing is especially advantageous to the lambs. By giving them their first shearing in August, to be repeated in the next spring, their health and growth are greatly promoted, and consequently the general increase of the flock. Mr. Shaeffer believes it would be advantageous to shear the *lambs* twice, even at the North. Seeing the lambs in the flock of an eminent breeder in Missouri failing, Mr. Shaeffer recommended immediate shearing. The advice was followed, and all were saved. One of these lambs (a ram), when grown, was afterward sold for $150.

The shearing in Texas is all performed by Mexicans, from both sides of the river Rio Grande, many coming in, for this purpose, even from as far as Monterey. They shear by the head, the usual price being $3.50 per hundred for fine sheep. The shearers average about thirty head a day. The shearing is performed on a floor or platform, especially constructed for this purpose. The most careful flock-masters have this floor protected by a roof. The barn floors of the North, it must be remembered, are not known in Texas. In shearing, the Mexicans tie down the sheep upon the floor, usually about ten at a time. This time the flock-master improves for examining his sheep and the character of their fleeces. He selects those which are to be culled out on account of age or defects of fleece, or those which are to be preserved for special uses in breeding; makes the proper marks upon the animals, duly entering them into his sheep-book. The wool from the spring shearing is

tied up in fleeces; the fall shearing, being light, is put in sacks, without being tied. The packing the wool in sacks, although it cannot be dispensed with, is considered disadvantageous to the grower of the wools; as wool from inferior fleeces, or an inferior part of the body, is liable to be mixed with better wool, and to prejudice the whole lot to the buyer. It is believed that a profitable enterprise, and one very advantageous to the Texan growers, would be the establishment in that country of extensive wool-scouring establishments, like those in Belgium and France. The facility of obtaining scoured wool would be advantageous to manufacturers with small capital and establishments, and in saving of freight. The sheep in Texas, it must be observed, are never washed. The water is calcareous, and perhaps contains iron, because it makes the wool black.

Even with the rich pastures of Texas, it is deemed desirable to have at least two acres to every sheep. It is of the first importance that the range should not be overstocked. A much larger range is required than in regular, inclosed pastures, over which the sheep scatter as soon as they are driven to them; while in the open range, under the care of the herder, much of the grass is trodden down by the sheep passing from one point to another in compact flocks from their sleeping grounds. The proportion of bucks required for the ewes is larger than in the North, as the bucks run with the ewes on the range about five weeks. Three bucks are required for every hundred ewes. The main lambing takes place from February 20 to April 1. It is an interesting observation in regard to lambing, that it is attended with much less danger and difficulty where the sheep live in the natural state of wild animals, than under a more artificial system. This applies, also, to the general health of the animals. During the lambing season, in the evening or next morning, after the flock of ewes, with the lambs dropped during the day—say from fifty to one hundred—are driven into the camping-ground, the ewes with the newly-dropped lambs are separated from the flock, and suffered to rest until the middle of the day near the camping-ground. The next day they are moved to another camp-ground, to give place to those which come on that day, the last comers to join those which came on the previous day. This continues until a flock of about 500 ewes and 500 lambs is made up, which is kept separate. It is not safe to calculate, one year with another, that the number of lambs raised will be more than eighty per cent. of the ewes.

All the ewes which lose their lambs for any cause are turned in with bucks by the first of June, to lamb in November.

Our informant has but little faith in estimates of profits, as the circumstances vary so much in the situation of the establishment, and the personal and economical habits of the flock-master. He has consented, however, to make a statement of the necessary expenses and results, with one flock of 1,100 sheep, in one year.

EXPENSES.

Shepherds and wages, at $11 per month and rations	$250 00
Shearing and sundry expenses at shearing-time	77 00
Dipping for scab, four cents per head	44 00
Sheep dip for worms	5 00
Extra labor	20 00
	396 00

Salt is not required near the coast or with mesquite grass.

RECEIPTS.

1,100 sheep, at 5 pounds per head, equals 5,500 pounds wool; at 20 cents per pound ..... .20		
Cash receipts.....	$1,100.00	
		$1,100 00
80 per cent. increase, 880 head, at $3.....		2,640 00
		3,740 00
Less expenses.....	$396 00	
Interest on $5,000, at 12 per cent.....	600 00	
Rent of place.....	100 00	
	1,096 00	
		1,096 00
		2,644 00

In this statement the expenses of the overseer are not included. One is required, in all cases; but one will suffice for three or four flocks. It is best to start with 1,600 head of ewes, because after lambing they can be divided into three flocks of ewes with their lambs, with an expense of but one *baccierro* and one camp, and three shepherds. At the end of five months the lambs are weaned and taken from their mothers. Then, until the next lambing time, which will take place in the succeeding March, the sheep can be well cared for by only two shepherds and one overseer, the ewes being in one flock and the lambs in another.

The procedure and increase may be illustrated as follows:

We will suppose the new flock-master commences—	
October, 1876, with ewes	1,600
March, 1877, the ewes produce 80 per cent. of lambs	1,280
September, 1877, weans the lambs; places them in one flock, and the ewes in another, making only two flocks.	
March, 1878, there are ewes.....	1,600
March, 1878, there are yearlings; one-half ewes and the other half wethers	1,280
March, 1878, there are lambs, as 1877.....	1,280
Making four flocks; three of ewes and lambs, and one of yearlings.....	4,160
October, 1878, there are breeding ewes	1,600
October, 1878, there are young ewes.....	640
Total to go to ram in October.....	2,240
March, 1879, there are wethers, two years old.....	640
March, 1879, there are yearlings (ewes and wethers).....	1,280
March, 1879, there are breeding ewes	2,240
March, 1879, there are lambs	2,240
	6,400
October, 1879, there are breeding ewes.....	2,240
October, 1879, there are yearling ewes.....	640
Making number of ewes to go to ram.....	2,880
March, 1880, there are breeding ewes.....	2,880
March, 1880, there are lambs	2,880
March, 1880, there are wethers, three years old	640
March, 1880, there are wethers, two years old.....	640
March, 1880, there are yearlings, ewes, and wethers.....	2,240
Total number March, 1880.....	9,280

Advice to emigrants.—The adventurer from a distance, seeking to invest in sheep-husbandry in Texas, is advised to proceed directly either to Corpus Christi or San Antonio, from each of which points he can make observations with convenience, and obtain information as to desirable locations. He should spend three or four months looking around for a range. The ewes may be carried from the West or bought in Texas. Mexican ewes can be purchased at 75 cents per head, and improved sheep for from $1.50 to $4. Texas raised rams can be bought for $10, and imported rams for from $30 to $50. It would be more safe to rent a tract of land, which he can probably obtain at a very cheap rate—say $100 per year for enough land to feed two flocks of sheep of 1,100 each. As he may not like the business or the locality, it would be more prudent at first not to purchase a range. If he is willing to incur greater risks to secure the proprietorship of an extensive range at a moderate price, he may go higher into the country, where the land belongs to the State. A 640-acre certificate of State land can be bought for about $200, or a certificate of the alternate lands granted to railroads as low as $100. Generally the expense to secure a patent, including certificate and cost of surveying, would amount to about 50 cents to the acre. As two acres are required for a sheep, it will be seen, from the statement of increase before given, that the command of a very broad range is required to make the increase available; and that, with such a command, there are chances for very large profits. The adventurer, if he has a family, must place them in some of the towns or villages most convenient to his range. His personal presence on his range will be indispensable for his success, and he will find ample occupation. But he can safely trust the Mexican *baccierros* when making occasional visits to his family.

The advantages of Texas for sheep-growing are now attracting persons of experience in Australia and English and Scotch emigrants with capital. Besides our informant with his 15,000 sheep, there are others in Nueces and Duval Counties with flocks of ten to twenty thousand head. The Callahan flock, in Star County, the proprietor living at Laredo, numbers sixty thousand head. When we see how rapid the increase is, and that there are 80,000,000 acres of land still unlocated in Texas, we can see that, if there is no legislation to disturb the wool business of the country, and the Mexican and the Indian depredations are checked, it will not be many years before Texas will rival Australia. Mr. Shaeffer states, as an illustration of the rapidity with which sheep-husbandry is advancing in this State, that in 1876 San Antonio received but 600,000 pounds of wool, which is sent through Galveston. In 1877 she received 2,000,000 pounds. The wool of Nueces and the neighboring counties is shipped from Corpus Christi. In 1866 there were shipped only 600,000 pounds. This year there will be shipped 6,500,000 pounds.

The following statement, illustrative of the profits which may be derived from sheep-growing in Texas, was made to us by Col. John S. Ford, a State senator, and formerly a member of the congress of Texas before annexation. We give it exactly in the language of Colonel Ford, as noted by us and subsequently read to him:

Dr. Thomas Kearney, formerly collector of customs of the port of Corpus Christi, and Major James Carr, made in 1870 or 1872 an investment of $5,000 in sheep-husbandry; bought ranch and buildings about sixty miles northwest from Laredo, Webb County, Texas, the land, about 13,000, acres and the sheep well improved. At the end of five years Dr. Kearney sold out his interest to Carr, that is, one-half interest, for $20,000. In August, 1877, Carr refused a $60,000 offer, which he had from William Votaus, for his sheep ranch with the sheep; the exact facts being that Votaus offered $30,000 in cash and one of the best-improved places on the San Antonio River, which had cost him about $60,000.

Mr. Shaeffer says that Carr ought to have taken the offer.

Colonel Ford fully confirms the statements about the Mexican and Indian depredations, before made, which extend as far as a hundred miles from the Rio Grande. There is no necessity for this confirmation, however, to any one who will read the exhaustive reports prepared by Mr. Schleicher, of the Texas delegation, in Congress. Colonel Ford says that the Mexicans do not run the sheep off, because the sheep cannot be made to travel fast enough; but they kill the shepherds.

Obstacles to sheep growing in Texas.—Conversations with many intelligent Texans, and the persual of many documents relative to Mexican outrages, have led us to fully adopt the opinion expressed by one of our correspondents, that the most formidable obstacle to the almost indefinite extension of sheep-husbandry in Texas is the liability of the territory to Mexican and Indian depredations. The opinion widely prevails at the North that the border troubles in Texas have been exaggerated for the purpose of provoking a war with Mexico. In our belief there is no foundation for this opinion. The extent of the depredations, and their ruinous effects upon settlements, are proved by incontestable evidence. A peaceful and comparatively inexpensive remedy for the border troubles is strongly urged by influential citizens of Texas. It is the granting a moderate subsidy ($6,000 per mile) to a railroad projected from Galveston to Camargo, in Mexico, near the Rio Grande, a distance of 352 miles.* It is reasonably urged that the road to Camargo—the key to the commerce of Mexico by a land route—would establish friendly commercial relations with Mexico, and heal the irritation which keeps up the border troubles, and thus prevent war; while, in case of war, it would furnish the means of quickly transporting troops and supplies to the most important point of defense. If the proposed road will accomplish this, it will directly promote the interests of the cotton and wool manufacturers of the North.† To Texas, more than any other State, do the textile manufacturers of the North look for the supply of their mills. No other State is making such rapid progress in population, production, and wealth. With an area which exceeds that of the German Empire by about 60,000 miles; with a capacity to produce almost all the products of the temperate zone; with sugar lands on the southern border which could yield double the quantity of sugar and molasses required for our whole consumption, Texas is above all pre-eminent for its resources in textile material. On less than one-half of 1 per cent. of its area it produced, in 1875, one-half of all the cotton consumed in the United States; and 4 per cent. of its area would be capable of producing all the cotton now consumed in Europe and the United States, over 6,000,000 bales.‡ Add to this its capacity for wool-production, and we have a State without parallel in the extent of its natural resources. Such a State should not be grudged the trivial sum required to establish peace upon its borders.

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*No such thorough and satisfactory mode of settling Indian troubles has been discovered as the construction of a railroad through the Indian country. The war-whoop of the savage is never heard within sound of the locomotive whistle. The civilization that is represented by the church, the school-house, and the farm the Indian regards as his legitimate prey; but when it comes clothed with the thunder of the advancing railroad train, he retires from the contest.—*Speech of Hon. William Windom, of Minnesota, in the United States Senate, on the Northern Pacific Railroad.*

†We refer to this scheme as only one of the means of peacefully solving the border troubles. A still broader scheme in the same direction, but with even a more modest demand for government patronage, is the proposal for a government survey of a railroad route from Austin, Tex., to the Rio Grande, and from thence to the port of Topolovampo, on the Pacific; the distance from San Antonio to the western ocean being less than 700 miles. A railroad in this direction would be a peaceful solution of the Mexican question.

‡Report of Mr. Edward Atkinson on cotton at the International Exhibition.

We are compelled to omit much in this paper which is demanded to give a full description of the sheep-husbandry of the South. But neither our object nor our space would permit us to make this paper a *gazetteer* of the South in its sheep resources and production. We have made no reference to Western Virginia, with its splendid sheep-husbandry, including the Panhandle, where the best fine wool in the United States is grown; because this country, from its contiguity, really belongs to the Ohio and Western Pennsylvania wool-producing region. Neither have we made reference to the mutton and combing-wool production of Virginia, Maryland, and Delaware, although it is a very important feature of the husbandry of these States, because there is nothing characteristic and peculiar to distinguish it from the industry of New Jersey. Missouri, as a wool-producing State, belongs rather to the West than the South. We ought not, however, to omit an enumeration of the sheep in the States south of Mason and Dixon's line. On the first of January their numbers were as follows, according to the Department of Agriculture:

Number of sheep in Southern States, January, 1878.

	No. of sheep.
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
Missouri	1,271,000
Total	9,887,600

Number of sheep in the Northern and Western States, January, 1878.

	No. of sheep.
Maine	528,800
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
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
Kansas	156,000
Nebraska	62,400
California	6,561,000
Oregon	1,074,600
Nevada	72,000
Colorado	600,000
The Territories	2,600,000
Total	25,852,300

GENERAL CONSIDERATIONS.

Relation of wool-production to customs duties.—This paper, intended for circulation at the South, where theoretical opinions on questions of political economy differing from our own largely prevail, is no place for the discussion of the vexed questions of free trade and protection. But it would be a false delicacy on our part wholly to ignore the absolute dependence of the sheep-husbandry of the United States upon a wise revenue legislation. The practical fact exists that the revenue of the United States, for a long time to come, must be principally obtained from duties on foreign imports. All, independently of their theoretical opinions, will admit that these duties should be so imposed as to least injure the national industries. Many, who are not theoretically protectionists, will go even further, and admit that the encouragement of a national wool industry rises above all questions of economical theory, and that it comes within those exceptions to the theory of free trade which even Chevalier, Mill, and Bright are compelled to concede, for the necessities of a nation's existence. Wool-growing, unlike the production of any other textile material, can be advantageously pursued in every State of our territory. No single industry can be mentioned so cosmopolitan in its character as that of the production and manipulation of wool, or to which national encouragement can be given with less risk of rousing sectional jealousies. The wool-industry is eminently national in its character, because it subserves the two great primal necessities of a people—those of food and clothing. Sheep, by their manure, are capable of doubling the product of the wheat-lands on which they are raised. Their flesh is the most nourishing of all animal food. A sheep-husbandry, made abundant by legislative encouragement of wool-production, is the most effectual means of diminishing the cost of all animal food to our whole population, and thus may be truly said to reimburse manyfold the alleged increased cost of clothing to our people caused by the protective duties on wool. The wool-industry is a necessity for the highest national development; because it promotes the highest arts of stock-breeding, is an indispensable adjunct to the most advanced form of agriculture, a mixed husbandry, and its pastoral form is the pioneer to new settlements. In its manufacturing department it more than any other industry promotes the highest mechanical, chemical, and decorative arts; and is the invariable precursor of a diversified manufacture, with its attendant results of wealth and culture.

These considerations are suggested, not as claims for high protective duties on wool or manufactures of wool, but as reasons for deliberation and wisdom in fixing the duties on those articles which are required for the national revenue. The most intelligent wool manufacturers admit the justice and propriety of reasonably protective duties on wool, the only means of affording national encouragement to the sheep-industry of the country, which we must have for food as well as clothing. It is doubtful if even Texas, with its wonderful pastoral advantages, could ever compete, without the aid of protective duties, with the Pampas of South America in the production of wool. The cost of transporting wool is so slight, but two cents per pound even from Australia to New York, that distance is no protection; and the Texan flock-master cannot procure labor for the wages of the Indian shepherds of the Pampas; while, like all other producers in this country, he is subject to the demands imposed by American civilization and our high local taxation. Even if the American flock-master could produce his wool as cheaply as the foreigner, he must be defended against the inpouring of foreign sur-

pluses which, without defensive barriers, are liable at any moment to break down our markets.

Adjustment of duties on manufactures to duties on wool.—All the duties imposed for the protection of wool-growers, it need not be said, are paid by the wool manufacturers, who thus labor under a burden from which the cotton, linen, and silk manufacturers are free; all the raw material for the first two being produced at home, and raw silk being free from duty. Notwithstanding the apparently high duty imposed upon fabrics of wool, it is a fact capable of demonstration that, after deducting the duty which the wool manufacturers of this country pay upon the foreign wool which they consume, or the amount by which the domestic wool they consume is enhanced by the wool duty, the wool manufacture of this country, under the existing laws, receives less protection than any branch of the textile industry. The fact that the wool manufacturer must pay the wool duty makes it of the highest importance to him that the relations of the duties on the wool manufactures should be accurately adjusted to the duties on wool. The proper *relations* of these duties is to him of far more importance than the *amount* of the protective duty he may receive.

The American wool manufacturer has to compete with European manufacturers, who invariably have their wool free of duty. Since 1861 our tariff laws have recognized that our wool manufacturers should be placed in the same position as if, like the European manufacturers, their wool were exempt from duty. A specific duty is placed upon the cloth, intended to exactly reimburse the duty paid on the wool. But this specific duty gives the manufacturer no protection, and he has at least equal claims to protection with the wool-grower; for, irrespectively of the wisdom of the policy of any protection, if it is adopted, it should be applied to all domestic industries. Our tariff laws therefore provide, in addition to the specific duty on fabrics, neutralizing the wool duty, an *ad volorem* duty for the protection of the manufacturer. This system of compound duties is the only one which will permit protection to the grower without injury to the manufacturer. It was adopted after great deliberation, has proved highly advantageous to both interests, is attended with no difficulty in its administration, and should be retained.

American mills the only market for domestic wool.—We have deemed it proper to refer to these highly important relations of a wisely-adjusted tariff to the wool manufacture, because the prosperity of wool production and sheep-husbandry at the South, and its further extension, absolutely depend upon the prosperity of the American wool manufacturers. It has been shown elsewhere that the value of all the wool exported from this country does not equal the value of the playing-cards which we have imported. For many years to come the sole market for the wools of the South must be her own mills and those of the North. It it doubtful if the South will ever be able to export wools to foreign countries in competition with Australia, the Argentine Republic, Southern Russia, and the Cape of Good Hope. The wool-growers of the South will, therefore, best advance their own interests by favoring the national policy which promotes, by reasonable and just provisions, the interests of their consumers, the manufacturers.

Wool-growers' associations.—The Southern wool-growers should, besides, establish direct relations with their consumers, the manufacturers, and consult them in regard to the character of wools required for fabrics; but, above all, should encourage the erection of woolen-mills in their own country, that their market may be at their own doors. They should also cultivate relations with the wool-growers of the North and

West, and enter into that community of sentiment and purpose required to make a great national wool industry. For this purpose, as well as for general improvement, wool-growers' and sheep-breeders' associations should be formed in each of the Southern States, as has been done in many States at the North and West. Nothing has contributed so much to the marvellous improvements which have been made of late years in this country as these associations. As an illustration of the high standards of excellence secured by these associations, we give in a note the programme of the Annual Fair of the Sheep-Breeders' and Wool-Growers' Association of the State of New York.*

*Annual fair of the New York State Sheep-Breeders' and Wool-Growers' Association at Hemlock Lake, N. Y., May 1 and 2, 1878.

CLASSIFICATION.

Prizes are offered on each division of three classes of sheep, as follows: First class.—AMERICAN MERINOES. *Div.* 1.—Bred for constitution, form, weight of fleece, quality adapted to manufacture of domestic woolens. *Div.* 2.—Bred for constitution, form, fineness of fleece, quality adapted to manufacture of broadcloths and similar fabrics. *Div.* 3.—Bred for constitution, form, length of staple (2½ inches at one year's growth being required), quality adapted to manufacture of delaines and similar fabrics. Second class. *Div.* 4.—COTSWOLDS. *Div.* 5.—LINCOLNS. *Div.* 6.—LEICESTERS. Third class. *Div.* 7.—DOWNS, or MIDDLE-WOOLED.

PRIZES.

Prizes are offered in each of the above divisions as follows:

For the best ram, three years old and over, diploma; second best, $10; third best, $5.

For the best ram, two years old and under three, diploma; second best, $10; third best, $5.

For the best ram, one year old, diploma; second best, $10; third best, $5.

For the best pen of three ewes, three years old and over, diploma; second best, $10; third best, $5.

For the best pen of three ewes, two years old and under three, diploma; second best, $10; third best, $5.

For the best pen of three ewes, one year old, diploma; second best, $10; third best, $5.

SWEEPSTAKES.

The following sweepstakes premiums are offered in each of the seven divisions:

For the best ram of any age, diploma.

For the best flock of not less than fifteen, including at least one ram, owned by exhibitor sixty days next preceding the fair, diploma.

For the best stock ram, and ten of his progeny, diploma.

For the best pen of three ewes, of any age, diploma.

Entrance-fee for sweepstakes premium, $2 in addition to membership.

No sheep competing for the above prizes are required to be shorn.

SHEARING AND SCOURING TEST.

For the best ram's fleece, $5; for the best ewe's fleece, $5. For the best ram's fleece, scoured, $5; for the best ewe's fleece, scoured, $5. For the best fleece of scoured wool, in proportion to weight of carcass, $5.

Sheep competing for the above prizes must be shorn on the grounds, and weighed before and after being shorn. Age of fleece to be given in each case. The committee in making their awards shall make weight and quality combined the leading consideration, and shall withhold the award entirely where there is not sufficient merit. Entrance-fee, $1, in addition to membership, for each sheep. Exhibitors to furnish their own shearers.

Prizes of $5, $3, and $2 will be awarded to the first, second, and third best shearers.

REGULATIONS OF THE FAIR.

1. All premiums may be competed for by residents of the United States, or any other country. Persons competing for premiums must be members of the association, by the payment of $1 during the current year.

2. No pens shall be allotted to exhibitors until the first morning of the fair, and then in the order of application. (The allotment of pens will be under the direction of the general superintendent.)

3. Sheep competing for premiums must be entered and brought upon the showgrounds on the first day of the fair; and they must not, without a special permit from

Sheep-husbandry by the colored population.—We must not ignore a present serious obstacle to sheep-husbandry in the South, which is constantly referred to in the reports to the Department of Agriculture, viz., the destruction of sheep by dogs and the depredations of lawless negroes. It is said that public opinion among the masses of voters who at present control the representatives in many of the State legislatures will not permit the enactment of suitable laws to restrain the nuisance of dogs. "Local laws," says Mr. Peters, "for the protection of our flocks from man and beast, should be promptly enacted." "The main obstacles to the industry here" (South Carolina), says Colonel Watts, "are dogs, thieving negroes, indolence and ignorance. The presence of the shepherd and the Spanish sheep-dog will remedy the first, and education the latter." Happily the latter influence is now producing results in the South such as the most sanguine friends of humanity could not have dreamed of ten years ago. It was shown at the national convention of the teachers of the United States, recently held in Washington, that schools are being organized and conducted in the South after the best systems of New England and Europe; and that the most hearty co-operation exists between the great educators of the North and the South. Let there be added to this influenee the education which is effected by interest. Let the colored people of the South have the means pointed out to them for their *material* improvement. What means so simple and ready as the encouragement of sheep-growing among these people on a moderate scale in the rural districts? Supposing, with a population of 4,000,000 colored persons in the Southern States, there are 400,000 families, and each family should have 6 sheep, there would be 2,400,000 animals producing wool and mutton—more than at present in all New England. This great accession to the wealth of the country would be nothing compared with the civilizing and humanizing influence of the pastoral occupation upon the population and the habits of thrift which it would engender. How many thousand country boys at the North have got their first notions of economy and accumulation from having for their *own* the products and increase of a single sheep! The colored race, from their natural gentleness, take most kindly to the care of ani-

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the general superintendent, be removed therefrom before the second day; nor, on the second day, until the general superintendent shall, by direction of the executive board, make public proclamation that all exhibitors are at liberty to withdraw their sheep.

4. Exhibitors will be required to answer, under oath, according to their best knowledge and belief, the questions of the examining committee touching the age of their sheep, the age of their fleeces, the manner in which they were last shorn, the amount and kind of feed during the year preceding the fair, their general treatment, and any special treatment intended to affect their condition or appearance.

5. No person shall act as a member of a viewing committee who has any direct or indirect pecuniary interest in any sheep submitted to the inspection of said committee for a premium.

6. No premiums shall be awarded except on animals of superior merit, and then only such of the premiums as the viewing committee shall consider them entitled to. (Thus the third premium, or the second and third premiums, may be drawn, while the first is unawarded.)

7. All reports of viewing committee shall be made in writing and signed by the members of the committee agreeing to them. (Printed blank forms of reports, with instructions to viewing committees, will be delivered to the latter.)

8. The viewing committee shall deliver their reports to the president or secretary at or before 9 o'clock a. m. on the second day of the fair.

9. The society reserves the right to pay the premiums in full, if the receipts are sufficient after paying expenses; otherwise, to pay *pro rata*, according to receipts of the fair.

10. All sheep intended for exhibition must be upon the ground at 12 o'clock m. the first day of the fair, at which time the entries will close.

11. All sheep over two years old competing for any prizes offered by the society must have been closely and evenly shorn the previous year.

mals. Negroes, it is well known, make excellent shepherds, as they make capital hostlers. There are but few colored families which could not afford to purchase two or three ewes. The profits in that favored country, though small at first, would be sure. The increase would be limited only by the perseverance of the shepherd, and his command of land for pasturage—probably the chief obstacle. Let sheep culture, upon ever so modest a scale, generally prevail among the colored people of the South, and dogs and thieves, white or black, would quickly disappear under the vigilance of a self-constituted police, more effective than any the law could provide; though laws would follow and would be enforced.

Question of overproduction of wool.—The question will naturally arise: If the South grows wool according to her capacity, will she have a market for her production? To the question proposed in this form no other than a negative answer could be given. But the practical inquiry is this: Is there any reason in a probable glut of the market from an enlargement of the area of production which should deter a Southern farmer from embarking in wool-growing? And to this question we unhesitatingly answer, No. The fears of overproduction, which give the disciples of Malthus and Ricardo so much apprehension, are rarely realized. They are never realized, except temporarily, in the great staples of manufacture. Production usually limits itself by its own operation. Thus, California, it is said, has reached its limit in wool production by occupying all its pasture-grounds or by converting them from the domain of the crook to that of the plow. Lands in Vermont, Ohio, New York, and Michigan, first improved by sheep, have become too valuable for growing sheep for wool mainly; and these States are becoming producers of sheep for mutton and combing wool and rams for breeding. High production of wool in one quarter of the world is usually attended by diminished production in another. While Australia has increased the numbers of her sheep so wonderfully, Germany has fallen off from 50,000,000 in 1850 to 25,000,000 at present, and France from 32,000,000 in 1839 to 24,000,000 in 1872. Thus, with all the supposed rapidity with which the production of wool has been increased throughout the world of late years, the actual consumption of raw wool in the United Kingdom, the Continent of Europe, and North America, has increased at the rate of but about 2 per cent. for each year of the last decade. The consumption of clean wool in the United States is set down for 1875 at four and one-third pounds per head of our population. This is far short of what we ought to consume for the required comfort of our whole population; and of what we would consume, if the producing and consuming power of our people were adequately developed. It is doubtful if half of our population wear the woolen underclothing required for health and comfort. Persons well informed in the trade in articles of this description have made the following curious estimate:

> With a population of 35,000,000, we may suppose that there are 8,000,000 who, from poverty, mildness of climate, or other causes, do not wear stockings; leaving 27,000,000 who will use at least 3 pairs per annum, requiring 81,000,000 pairs, or 6,750,000 dozen, the value of which, at $3 per dozen, would be $20,250,000. Estimating that there are 18,000,000 males, one-half of whom will wear knit shirts and drawers, and allowing one shirt and one pair of drawers to each of the 9,000,000 males per annum, 1,000,500 dozen will be required, at $12 per dozen, of the value of $18,000,000. Estimating that there are 17,000,000 females, one-quarter of whom will wear undervests and drawers, and allowing only one garment to each, 375,000 dozen, at $12 per dozen, of a total value of $4,500,000, will be required; making the whole value of the above staple goods alone required for American consumption $42,750,000,

This statement illustrates how slight an increase of the consuming power of our population is required to expand the wool manufacture,

and to create a home demand for the raw material such as never exsited.

But the production of wool at the South will be so gradual in its increase that it will be a long time before it has any sensible effect upon the markets. It should be gradual, to be healthy and natural. It should spread through the example of intelligent and cautious farmers. A sudden and general enthusiasm for sheep-husbandry at the South would be as undesirable as the *morus multicaulis* and silk mania of 1839, which stopped the silk culture in many of the Southern States, where it might otherwise have been now successful. Despite the few brilliant exceptions in Texas, the *bonanzas* in sheep-husbandry are as much fictions of the imagination as the pastorals of the poets. We do not tempt our Southern friends with the promise of—

> A fleece more golden than that found in Greece,
> Which venturous Jason on his Argo bore
> From the lulled dragon and Colchian shore.

But we would allure them to an indsutry more certain of remuneration, from a moderate investment, than any other which can so easily be introduced upon their farms, and, what is far more important, an industry which will be the precursor of that diversified culture through which alone agriculture can be made permanently profitable.

In conclusion, we would express our obligations to Mr. Peters of Georgia, Mr. Watts of South Carolina, Mr. Young of North Carolina, and Mr. Shaeffer of Texas for the valuable statements and information furnished to us; and to Mr. C. W. Jenks, of Boston, for the high intelligence and zeal manifested by him in the collection of much of the material embodied in this paper.

APPENDIX.

SHEEP HUSBANDRY IN NORTH CAROLINA.

The developments of science and practical experience have revolutionized public opinion on many important subjects during the present generation. Man's cupidity, as well as necessity, has urged him to important changes of sentiment, or, more properly speaking, has induced him to develop to our intelligence many errors under which our fathers labored, and has opened doors to new enterprises, through which the progress of this age has advanced his material prosperity far beyond any period in his history. This progress is not destined to be staid; but, on the contrary, as step by step new developments are unfolded, new fields will be presented for exploration, and new enterprises opened for the employment of his energies. Looking back from the threshold of the last quarter of the nineteenth century to its commencement, we perceive that more has been accomplished in scientific and practical development than is recorded in the history of combined centuries of man's preceding existence; and yet all that he has done has been simply to develop and turn to his use the blessings given by his Creator in the beginning.

During this period, cotton has been introduced into the Southern States of our Union, and become their great staple, and made one of the leading productions of our country, and, entering largely into the channels of commerce, has contributed no small share in building up that interest. The labor system of the South favored its cultivation, while the soil and climate suited its growth and development. The profit attending its production induced its cultivation in States too far north of the line of latitude suiting the tender nature of the plant to render it a reliable and remunerative staple to the planter. The recent change of labor in the Southern States renders it important that those more northern States which border on the cotton belt should turn their attention to productions that promise better remuneration.

The State of North Carolina, lying on the northern border of the cotton belt and between the 34° and 37° of north latitude, possesses a medium temperature of climate, free from the severities of blighting cold as well as from the debilitating and parching heat from equatorial influences. Thus relieved from the extremes of climate, North Carolina possesses that equable temperature which is peculiarly healthful and invigorating to man as well as to all animated nature. This geographical advantage is enhanced by its topographical formation. With a sea-coast of near three hundred miles extent, washed by the waves of the Atlantic, it reaches back westward until it embraces the towering heights of the Blue Mountains. From the exhaustless fountains of this mountain region flow the thousand streamlets which form her Catawba and her Yadkin Rivers; and from her table-lands, which gently soften down toward the coast, a thousand other never-failing brooks and rivulets are gathered into her noble Cape Fear, her Neuse, her Tar, and her Roanoke Rivers, all flowing eastward, watering abundantly every district of the State, and emptying their waters into the Atlantic.

The mountain portion of North Carolina, embracing some twenty counties, possesses a soil unsurpassed for fertility by any similar extent of mountain country on our continent. Here the celebrated blue-grass is an indigenous growth, and the mountain sides and alluvial valleys alike make the finest meadows of this favorite and never-failing pasturage. The winters here are short, and free from that intensity which characterizes more northern latitudes. This mountain portion of the State softens down eastward into a hill and dale plateau, embracing as many more counties, and this is succeeded by a lovely champaign country, extending to the Atlantic coast. The soil of this extensive mountain and upland country, embracing some sixty of the ninety-one counties in the State, is varied in character, a large proportion of it having a rich clay subsoil, yields abundant crops of the cereals and of cotton and tobacco, and the balance, having an admixture of sand, is more easily cultivated, and, with light fertilization, yields quite as abundant harvests. All is susceptible of the highest degree of improvement, and all produces native, as well as sown and cultivated, grasses to a high degree of perfection. The remaining counties, embracing the tide-water district of the State, have large districts of rich alluvial soil, which have long been an Egypt from which thousands of our fellow-citizens north of us have been provisioned. Within the limits of the State there are fifteen hundred miles of railroad, traversing it longitudinally, latitudinally, and diagonally, penetrating its mountains at different points, and now vigorously pressing through to a connection with the Mississippi and Ohio

Valleys. These highways of travel and freight open up every portion of it, and make connections at Wilmington, Morehead City, and New Berne, on its own seaboard, and the ports of Charleston, S. C., Norfolk, Va., and the cities and markets of the North.

This portraiture of the State of North Carolina presents an area of 45,500 square miles, and embraces all the varieties of soil and climate to be found in the most favored latitudes and most desirable localities on the earth. Nature has not distributed her gifts here with a partial hand, by bestowing lavishly upon one section and withholding to impoverishment from another, but, by an even and uniform meting out, renders every portion desirable. From the sharp frost-line of its mountains to the sunny bays and lakes upon its coast, where ice is rarely seen, a uniform, equable temperature pervades the State.

The radical change in labor in the last dozen years renders necessary a corresponding change in the system of agriculture, which must in future be pursued by the people. He who will present a proper direction for the enterprise of agriculturists will be their benefactor. Our ideas on such matters are naturally influenced by our business of life, our education, or other circumstances which bend the twig and fix the inclination of the tree. Being sensible of these influences, the writer might feel more diffidence in presenting sheep-husbandry to the consideration of those interested in the future of North Carolina, as the leading occupation of its people, did he not feel satisfied that an intelligent examination of the subject must lead the investigating mind to sustain his conclusions.

If the preceding description of the temperature, topography, and general characteristics of the State be correct, the reader who is familiar with sheep-husbandry will at once perceive its adaptation to that pursuit. Every one desiring to inform himself more particularly in regard to the representations here given is invited to direct his investigations with the view of scrutinizing its correctness and reliability.

Twenty years' experience in manufacturing the wools grown in the State has familiarized the writer with the manner in which our sheep have been cared for, and has convinced him that, without great natural advantages, their utter neglect would long since have exterminated them from the soil. There are but few plantations in the State upon which there was not to be found a flock of sheep, intended to be *only* sufficient to furnish the wool necessary to clothe the family and furnish an occasional mutton. These sheep were generally the "native" breed, rarely improved by crosses upon foreign blood.

As a general rule, these small flocks never entered into their owner's estimate of his valuable property, and they were never so treated. In the spring they were shorn of their fleeces and turned outside their owner's inclosures to seek their summer support in the forests and waste lands over which they chose to roam, and to run the gauntlet for life among hungry hounds and gaunt curs, almost as numerous as themselves. All that might escape, and were able to find their homes in the fall season, and would seek its inhospitalities for the winter, would be admitted within the gates, and permitted to eke out a scanty living in the denuded fields and corners of worm-fences, which is supplemented by a morning and evening allowance of corn-fodder, which the compassionate and appreciative owner *allows* to be fed to them by a boy who has not yet attained sufficient size to be otherwise useful, the only protection against the rains and occasional storms of winter afforded to a majority of these flocks being such as their instincts lead them to seek by hovering on the sheltering sides of barns and out-buildings that may be accessible. A tumble-down or a waste-house on a plantation is a perfect asylum for them. Yet, under this treatment, the flocks of the farmers keep their numbers full, and occasionally multiply beyond their wants. Of necessity, their fleeces are light and inferior. Whenever an effort has been made to improve the stock by crossing upon Merino or other approved blood, the effect is satisfactory and lasting. From the universal custom of turning the entire stocks into the common "range," the impression of a Merino, Southdown, or other importation would manifest itself upon the flocks of entire neighborhoods. So apparent is the improvement thus made that in purchasing the surplus brought to market there would be no difficulty in recognizing the wool from a neighborhood that had been favored by some enterprizing farmer having imported from Virginia or Pennsylvania a pair of blooded animals. Without any change in the mode of treatment, these improvements are known to be distinctly manifest in neighborhoods thirty years after their introduction. Being able to withstand all this hardship and neglect, and promptly to respond to every effort to improve their quality or condition, it is evident that there is in North Carolina an adaptation of natural gifts to their peculiar wants.

In the tide-water and contiguous counties, where the influence of winter winds from the mountains is not felt, "where the snow spirit never comes, and where spring flings her flowers into the lap of winter," these generous animals find a sustaining pasturage the entire year upon the wire-grass which grows spontaneously through the otherwise barren pine-forests. Being thus independent of their owners, they keep in uniform good flesh, grow to better maturity, and furnish better fleeces than in the upper portion of the State. Though here they know neither their "owner nor their master's crib," they contribute largely to clothing and feeding his family.

Standing on Mount Mitchell, on the western border of the State, the most elevated point between the Mississippi River and the Atlantic, looking eastward the mind's eye reaches the waves of the Atlantic, 500 miles distant, and sweeps over an area of 45,500 square miles, embraced within the State lines, watered by thousands of tributaries to noble rivers, which gush from the mountain battlements stretched across the western border of the State, whose waters, flowing eastward, tumble over innumerable falls, as though nature had given them not only to beautify the landscape but to invite the enterprise of man to their utilization. From the broad plateau below a thousand other never-failing fountains send forth their pure waters, which mingle as they flow onward to swell the grand arteries which convey them to their common reservoir. Through, over, and across this grand prospect numerous railways stretch their lengths, over which freighted trains are sweeping to and fro, bearing out the productions and bringing in the commerce of the country.

Of this immense territory it may be said there is not a square mile of soil which is not susceptible of being made to produce a remunerative yield of tillage, and not one upon which would not ordinarily be found a good natural pasturage for sheep; nor is there a square mile of it upon which, when sheep were introduced and cared for, would not, year by year, be improved by their presence and pasturage upon it. There is no part of the State which does not possess immense natural advantages in soil and climate over the Southdown hills of England, the sterility of which rendered them almost uninhabitable until sheep were introduced upon them, by which they have been converted into the greenest meadows of the island. In the mountains and hill country more winter provisions would be required than in the balance of the State; but the shortness of the season would not demand much expense nor render the care of flocks burdensome. In three-fourths of the State no other winter provision would be necessary than the sowing of grasses and small grain for their pasturage, and the providing of cheap shelters from occasional seasons of inclemency. The farmers have practiced the habit of grazing their sheep upon their fields of small grain during the winter, which, when judiciously done, rather contributes to than detracts from their yield at harvest. In the pine lands and tide-water portion of the State, they do live independent of the care of man, but would certainly reward him for care and attention.

If climate and soil are adapted to sheep-husbandry, Nature has furnished her share of the requisites. Man must supply the flocks, and, in obedience to the divine command, till the earth for their subsistence. Sheep-growing in certain of the States of New England, where pasture-lands are worth five or ten times as much as in North Carolina, is the staple business in its rural districts Its people look to their flocks, as the Southern planter does to his broad acres of cotton, for their income. There the severities of a Northern winter lock up all Nature's supplies, and render all domestic animals dependent upon the hand of man for protection and food for one-third of each year; yet that enterprising people have converted these States into a vast sheep-walk, and, subduing all obstacles, have developed the wool-bearing capability of sheep to a degree heretofore unknown. A contrast between the advantages and disadvantages of New England and North Carolina, in regard to this profitable enterprise, is invited, and the advantages of the latter will be apparent. If, with the natural disadvantages under which they labor, they have developed so great a profit in this pursuit, why should not North Carolina become animated with the abounding presence of this valuable animal? Why should not her hills and dales be made vocal with bleating flocks, and the song of the shepherd awaken her echoes as they float over her fertile vales and picturesque landscapes? Why should our farmers, year after year, spend their hard earnings for commercial fertilizers, and wear out their physical energies in toil and labor to make money enough to buy more artificial manures, to enable them to grow more cotton, when the presence of 100 sheep upon their lands would enrich five acres every month in the year far better than their purchased fertilizers; and would, at the same time, pay them in wool and mutton a better per cent. upon their value than their cotton does upon their labor and expense?

The changed circumstances of the people of North Carolina calls for a change in their agriculture. Millions of wealth have been realized in less favored countries by the growth of sheep; and it is an enterprise worthy the investigation of her people. This article is not written with the view of presenting the profits of husbandry, or of contrasting it with the present agricultural pursuits of her people, but to show the adaptation of the State to its successful pursuit, and to call attention to its natural advantages over countries where it is profitably pursued. It is hoped that the intelligent people of the State will investigate the subject, and that those engaged in it elsewhere may be induced to direct their attention and inquiries to the State; and there is no doubt of the facts presented being found to be as stated.

The profits of sheep-husbandry are not now, as heretofore, dependent mainly upon the fleeces; but the discoveries of science in this our enlightened day enable the growers to offer their mutton in the markets of Europe as sweet and as fresh as it is found in our own city shambles.

JOHN A. YOUNG.

CHARLOTTE, N. C., *January* 8, 1878.

MARTIN'S DEPOT, LAURENS COUNTY, SOUTH CAROLINA,
December 22, 1877.

DEAR SIR: I am requested by my friend, Governor Hampton, to send you some details of my experience in sheep-husbandry, in which I have all my life been engaged, in this State, Georgia, and Texas. From my early manhood I have personally known, and visited in their homes, the most intelligent wool-growers and sheep-breeders of the North and South—such men as George Campbell and others, of New England, and Richard Peters and others, of the South. Dr. Randall, of Cortland Village, N. Y., was for thirty years my friend, and an authority to whom I always had recourse; and whose most valuable work, "Sheep Husbandry at the South," was written at the special request of the late Governor Allston of this State, to encourage wool-growing in South Carolina. From all sources, at home and abroad, I have sought information, and have obtained the best examples of the various breeds. In fact, sheep-husbandry has been the one occupation I have preferred above all others; and I have no hesitation whatever, after long experience, in affirming it as my fixed belief that it might be made *the* most valuable industry of the South, and for the successful pursuit of which, in all its varieties, this section has more facilities than any other portion of our country. I will note down facts in my experience as they occur to me, and you can arrange and use them as you choose.

We are not far from the central portions of the State.

The country is a rolling upland, with a light-gray soil and heavy clay subsoil.

The prevailing grasses are the crab and Bermuda and wild clover.

The breeds of sheep I have had and tested are the common native, Bakewell or New Leicester, New Oxfordshire, Southdowns, French and Spanish Merinoes, and the African Broad-tails.

With me the Spanish Merinoes have proved the most profitable, the first of which I had from the flocks of Dr. Randall.

I have crossed the Merino with nearly all the above-named breeds.

I am inclined to think that good native ewes make the best cross with the Merino, and make a more salable sheep than any of the above-named full-bloods.

I am now breeding the Merino and Broad-tailed.

If I were raising wool as the primary consideration, I would by all means raise the Merino. They do not mature so early as the other breeds; but, when matured, make as good mutton as any breed I have ever raised. But if the principal object should be to raise mutton for the markets, I would certainly recommend the African Broad-tailed sheep, because they mature earlier; but, in my husbandry, I make the wool the first, the mutton the secondary, consideration. But, were the question one of long-combing wool for this locality, I would cross the Cotswold ewe with the African Broad-tail ram, for all the range of country *here*, this side the Blue Ridge.

The annual cost of keeping my sheep, I charge up at $1 per head. The *actual* cost I have found to be not over 60 cents per head.

As to the per cent. of profit my sheep pay. If they are full-blooded, they will average not far from $10; and, making that, they give about 20 per cent., allowing the lambs to pay expenses; but if they are only half-breeds, they will not average more than $1.50 per fleece.

My average annual clip of unwashed wool, per sheep, from full-blood Merinoes, is 7 pounds, the average price of which last season was 22 cents; this season, 28 net to me here.

I think the cost per pound of wool gives it to you as net gain, for it must be a very poor and very badly managed flock in which the lambs and manure will not pay *all expenses*.

The average number of my lambs raised is, from my Merinoes, about 80 per cent. Compared with the ewes kept, they are not, as a rule, as good nurses as most of the other breeds, some of which will rear nearly 100 per cent. of their lambs. I have always sold my lambs for herding, stock sheep, &c., not to the butcher.

Our common sheep can be had here for $2 per head; Merinoes, from $10 to $20. The price in market here for grown mutton-sheep would be from $4 to $5.

My pasture has been broom-sedge and Japan clover (*Lespedizea striata*), until after harvest; then we give them the run of the grain-fields. For winter pasturage, I usually sow rye lots for the ewes and lambs, and give all the flock the run of oats sown in August and September; also, allow them the range of the corn-field and the cotton-fields. As a mixed food, cotton-seed is wholesome, economical, and profitable. My sheep are very fond of it; after feeding on green barley all day, they will eat cotton-seed with great relish. Some feed is needed in this section for three months, as there are few cultivated grasses; with herdsgrass and clover cultivated, much less time for feeding would be needed.

Sheep are usually very healthy in this section; there are no epidemics nor prevailing complaints here among them.

The main obstacles to the industry here are dogs, thieving negroes, indolence, and ignorance. The presence of a shepherd and the Spanish sheep-dog will remedy the first, and education the latter.

We utilize the manure from the sheep—housing them in winter, and littering the stalls frequently—throwing it broadcast for rutabagas, in July or August, or in drills, as the case may be. In summer I use John H. Ruchman's portable fence, the best iron wire, and keep at the rate of 1,000 sheep to the acre a week, the value of which I regard as equal to about 400 pounds of guano the first year; and its effects are perceptible for severel years. My belief, from careful experimenting, is, that 52 acres of land can be so well fertilized in twelve months with 1,000 sheep as to be rich soil for five years following. The effects of such manuring are wonderful.

The sheep are great helps to the farmer in eradicating useless weeds, such as the cockle-brier, which they eat with avidity, either dry or green. In fact, there are few plants with us they will not eat.

I think all varieties of sheep can be successfully and profitably raised in our State. On the rich bottom-lands of the coast, the African Broad-tails—or a cross, as I have suggested, with the Cotswold—which would give a variety that would thrive in any climate South.

In the middle district, near the lands under rich cultivation, the Bakewells and other varieties of heavy sheep for mutton. In the section where I am, and up to the line of the Blue Ridge, the Merinoes, and on the Blue ridge itself the Merino; and I should also strongly recommend the Cheviot, so successful in the districts of England and Scotland of similar altitude and climate.

And here, in closing, let me say, in view of some of the industrial wants of the country, I think this last section of our State, the Blue Ridge Mountains, can, with moderate care and expense, most successfully furnish all the facilties needed for the best combing wools, and the alpaca and Angora goat. In fact, I have no doubt on this point. Even here, 75 miles from the mountains, I have for six years grown most successfully the Angora goat, whose flesh I regard as superior to any mutton, and whose fleece, properly handled, could there be made more profitable than any wool-growing. This I can say from actual carful experience with the Angoras, which are of Asia Minor stock, meeting here few obstacles to their profitable breeding, and which, in the Blue Ridge, just beyond me, would find an exact counterpoint of their native soil and climate. Aside from their flesh and wool, there is another advantage they offer, which in the mountains beyond would be most valuable. In a cross I have made with a pure Angora buck and a Maltese ewe-goat, I have raised a ewe-goat that will give four quarts per day of as good milk as any cow on my plantation. The feed of one of my cows will keep twelve goats. My cows must have certain food, or they will not thrive. My goats will eat anything, almost, and do well; and with this advantage, also, that their milk and butter are not in any way affected by their diet.

It is not, therefore, at all an open question with me, after years of practical experience, whether the Angora, alpaca, and kindred races of the goat tribes would thrive in our Blue Ridge. They would be more profitable in that locality than any other branch of husbandry.

If the present *status* of the wool-growing industry can be maintained, we can, in my judgment, grow all the varieties and product needed for home consumption, from the cheapest carpet wools to those needed for our extra-fine broadcloth, imitation cashmeres, or the cloths for piano-manufacture consumption.

I have now on my table a Silesian wool, measuring say 1,800 ha irs to the inch, and which cost the consumer here $1.50 in gold per pound. With none of that ridiculously extreme care which the growers of electoral wool exercise in their flocks, Mark Cockerell of Tennessee (near Nashville), has raised Saxony wools of a fineness of over 2,000 hairs to the inch, and could sell it at a handsome profit at $1 per pound. In fact Mr. Cockerell claims there is more margin of profit in it than in the growth of a mere ordinary wool.

Our country's enterprise, demand, climate, soils, and constantly improving animals, if present encouragement in wool-growing is not interfered with in any way, can supply any call that can be made upon it; and, from my knowledge of the South and its resources, I believe no part of our country can furnish so many facilities in this direction, and no one section more than my native State of South Carolina.

J. WASH. WATTS.

JOHN L. HAYES, Esq.,
Secretary of the National Association of Wool Manufacturers, Boston.

EXECUTIVE CHAMBER,
Columbia, S. C., December 24, 1877.

I fully concur with the views expressed by Colonel Watts in the within paper. He is a gentleman of great experience, intelligence, and integrity. I doubt if he has his superior as a shepherd in the South.

I heartily commend his sentiments, as hereby expressed, to all who are interested in wool growing and its manufacture; which industries I believe to be most vitally connected with the future development and prosperity of the South.

WADE HAMPTON.

ATLANTA, GA., *January* 1, 1878.

SIR: Hon. Alex. H. Stephens, of this State, has expressed a wish that I furnish you with facts as to the facilities the State of Georgia can offer in sheep-husbandry, growing out of my thirty years' experience in that industry here.

If you will bear in mind that we can grow oranges in the gardens in the southern part of the State while snow lies on the highlands and the mercury may be at zero on the northern borders, you can see that the diversity of soil and climate associated with such extremes would give great variety to the products of the State.

Nature has given us three marked divisions—Middle, Lower, and Upper Georgia; the altitude rising with the latitude. Each of these sections has its own special advantage for wool-growing, and it can be profitably pursued in either section.

I will begin with the lower part of the State, across the entire width of which there is a belt of country of an extent northward from the coast and the Florida line, say, from 100 to 150 miles. It is the land of the long-leaf pine and the wire-grass. Flocks of native sheep, as high as 3,500 in number, are found here and there scattered over the surface, receiving but little care or attention, except at the annual gathering for shearing and marking. Very little can be said either for the quantity or quality of the wool per head raised here. I am aware that it has been claimed for this section that its present advantages are as great for large flocks as the ranges in Texas and California. I do not subscribe to this opinion. The pasturage of this section, called wire-grass, affords fine grazing for sheep in the spring; but, for permanent and continuous food, it cannot be relied on. A fair experiment in sheep-raising, uniting good attention, selection, and crossing, with a determination to secure the best developement in frame and fleece, has not been made in this section for many years. If it were properly attempted, by combining Bermuda with the wire-grass for spring and summer pasture, and red winter oats for one or two months in winter, for the ewes and lambs, I think the results would prove of the most satisfactory and profitable character.

In the middle portion of the State the Bermuda grass prevails, and, under the cotton system of culture, it was the dread and bane of the planter; but now, for its nutritious qualities and compactness of sod, it is considered by our people as valuable and as reliable as any grass, not excepting the Kentucky blue-grass. It is undoubtedly the sacred or "doub" grass of the Hindoos. It will afford sheep the very best pasturage for six months of the year, in this section of the State, and, if managed as on the pastures in Kentucky, for the entire year.

In Putnam, Hancock, Wilkes, and adjoining counties (formerly the *el dorado* cotton country of Georgia), where the Bermuda has taken possession, there is a future for successful sheep-husbandry, providing, of course, the supervision be intelligent and the business properly conducted and combined with cotton culture. The result must prove highly remunerative, far surpassing anything in the past history of this industry in New England or the Middle States.

My own experience has been, to a great extent, in North or Upper Georgia, in Gordon County. The country is hill and valley, the land changing very rapidly; the pasturage sedge, crab, and other native grasses. Of the cultivated, the orchard-grass, red and white clover, on upland, and red-top, on lowland, succeed admirably. Lucern and German millet are never-failing sources of an ample supply of hay. The former affords from four to five cuttings in a season. Red rust-proof oats—a reliable winter variety, if sown in September—can be pastured during the winter and early spring, and then yield a full crop of grain. The same may be said of barley, rye, and wheat.

The breeds I have tested are the Spanish and French Merinoes, Southdown, Oxfordshire Down, Leicestershire, Asiatic broad-tail or Tunisian, improved Kentucky Cotswold, and native sheep. I have also crossed nearly all of these varieties. Those between the Spanish Merinoes and native and the Cotswold and native have proved most profitable. My present varieties are the thoroughbred Merinoes and the Cotswold, and crosses between the two.

For general purposes of wool and mutton I recommend most decidedly the cross from native ewes and Spanish Merino bucks; the progeny showing marked improvement, having constitution, fattening properties, thriftiness, and a close, compact fleece.

For long combing wools, the best combination flock can be built up on the natives as a basis, using the Spanish Merino bucks for the first cross, and then the Cotswold to give more size and longer staple. If the winters are mild, my flocks require feeding about thirty days; if cold and wet, twice that time. My Merino sheep are very healthy. They have had trouble with the sheep bot-fly, but I have found a liberal use of tar a perfect preventive. By another winter a proper dog law will be enacted, now guaranteed to us in the new constitution.

In all well-situated and well-managed flocks the increase and manure will amply repay all expenses, and leave the fleece clear profit. The fleeces of my flocks, not housed at night, will give an average of seven pounds of wool to the head.

The future history of the sheep husbandry of this State, if intelligently pursued in accordance with its natural divisions, will show three distinct systems: That of North-

ern Georgia will somewhat resemble the industry in Ohio, Pennsylvania, New York, and New England; that of the middle of the State, Kentucky; and that of the southern portion (with shepherds and dogs), Texas, Colorado, and California.

In this connection I may say a few words about the Angora goat, very improperly termed "Cashmere." I have owned these animals from six distinct importations, those brought over by Dr. J. B. Davis, in 1848, proving to be superior in many respects to any of the more recent importations. One of the most valuable, interesting, and remarkable traits of the Angoras is the rapidity with which fleece-bearing goats can be obtained by using thoroughbred bucks to cross on the common short-haired ewe-goats of the country. The second cross produces a goat with a skin valued for rugs, mats, and gloves. The fifth cross (known by many breeders as "full blood") will yield a fleece not inferior to much of the "mohair" imported from Asia. This fifth cross can be readily obtained in five or six years. Thoroughbred bucks should always be used, because the progeny of the "full-blood" bucks vary greatly, and the upward progress is by no means satisfactory. The Angora is a hardy, industrious, and self-sustaining animal, and can be classed as herbivorous. Being active and vigorous, they roam over wide ranges of country, giving value to worthless vegetation refused by most other animals, and will feed and fatten at double the distance from water that sheep can, as they travel faster and endure more. I have for twenty years bred them largely, and have observed the following rules in my selection of stock bucks:

In pedigree.—Dating back to Asiatic importation.

In fleece.—Weight and length of the long, silky, ringleted, white fleece, and its freedom from kemp and mane on the back and neck.

In frame.—Size and vigor, long pendant ears, and upright spiral horns.

If that point has not already been reached, I believe it soon will be, when (as in the history of Merino sheep) finer specimens of the Angora, American bred, may be seen here than can be found in their haunts in Asia Minor.

I have had great success with the Angoras, and regard them as one of the most valuable acquisitions to the resources of our husbandry. They have yielded me more substantial pecuniary profit than any other branch of my extended stock investments. In 1861 I sent out to William M. Landrum, of California, the first Angoras that went there, where they have laid the foundation of what I am confident will be a very extensive and profitable husbandry. There can be no doubt that in the range of the Blue Ridge, extending from Alabama to Virginia, they would find all the requirements of their nature, utilize a vast country, and prove a source of great benefit and profit to all interested.

In reference to the whole matter of sheep-husbandry at the South, after a long experience, in which neither labor, care, nor expense has been spared by me, I may say with safety I know of no investment so likely to yield constant and profitable returns to the farmer, and certainly none so valuable to the acres he occupies. I think the State of Georgia, from its varied climate, soil, and surface, offers unequaled facilities for this industry. We shall need with this the paternal care of the State and national governments for its growth and permanence. Local laws for the protection of our flocks from man and beast should be promptly enacted; while the general government should by no unkindly legislation disturb existing advantages, retard our growing progress, or throw any obstacle in our way. And I may here say that I learn with great surprise and regret that an effort will probably be made in Congress this winter to reduce the duties on wool, or even to give us free wool altogether. I greatly deprecate all such legislative action. Nothing could be more impolitic or disastrous to the sheep-husbandry of this county. No section of the Union—not even California and Texas, with all their great natural facilities—could grow wool against the cheap labor and the inexpensive ranges of Brazil and Australia, to say nothing of our European competitors, the influx of whose combing wools would keep for many generations the fair Blue Ridge of the South without sheep-walks, though it is by nature one of the most favored spots in America for this class of wools, and which also are now so much in demand, at home and abroad, for the great and growing worsted industries of the world.

To us of the South especially (who are just waking up to the importance and value every way of an intelligent sheep-husbandry as one of the most reliable and efficient means to aid us in the restoration of our shattered fortunes) any such unkindly legislation would be instantly and totally destructive. The capital of our farmers, now invested to a limited extent hopefully and profitably in wool-growing, their calculations and expectations being based on the permanence of existing legislation, would be annihilated; while the present encouraging outlook for investment in this industry from outside capitalists would be at once shrouded in gloom and indefinitely postponed.

Respectfully, yours,

RICHARD PETERS.

JOHN L. HAYES, Esq.,
Secretary of the National Association of Wool Manufacturers, Boston, Mass.

MERINO RANCHE, MORGAN MILLS, ERATH COUNTY, TEXAS,
November 13 1877.

SIR: I trust you will pardon the liberty I take in addressing you. My excuse must be the obligation I am under to yourself and the association you represent for many favors in the past, and very recently for the pleasure and profit afforded me by the persual, in the July and September issue of The Bulletin, of your lecture on "Wool-production and sheep-husbandry."

My only regret in reading it has been that your audience had not been in Texas rather than Maine; and here (will you allow me to say?) you are, in my judgment, doing the joint interests of wool-growing and wool-manufacture great service by the utterance of such sentiments as are contained in the paper referred to; and, while thus employed, I firmly believe you are engaged in an educational effort second to none in importance in our country.

I have entered upon the business of sheep-husbandry in this section not alone for the purpose of money making, but also in the faith that I can in this avocation render good service to my country in many ways. The field here is a wide and important one. I believe it is destined to be the theater of most important developments in sheep-hubandry. The facilities, in many directions, for the successful solution of hitherto unsolved problems in this industry are unsurpassed anywhere, and I think ten years from now Texas wool will rank in all respects with the best of the world.

To accomplish this will require effort. I do not hesitate to say to our wool-growers here that the intelligent wool-manufacturers of New England will watch with much interest the future of this great territory; and that the knowledge of that fact, and the sympathy and co-operation it insures, should nerve them not only to grow the most in bulk, but the best in quality, of any wools on the continent.

I have recently brought out here one hundred head of Merino bucks from the celebrated flock of George Campbell, esq., of West Westminster, Vt., and intend them as but the forerunners of a system of sheep-husbandry unexcelled anywhere. If I can be successful, I think I may be useful in no small degree in more firmly cementing the bonds of our common country. For, while it may seem a strange thought to many, I have the impression that no one influence in the industries of the Union can be made more mighty for good in a moral, industrial, and political sense than an intelligent, harmonious, co-operation of the interests represented by the wool-growers and wool-manufacturers of these United States.

Very respectfully, yours,

CHARLES N. JENKS.

Hon. JOHN L. HAYES,
Secretary of the National Association of Wool Manufacturers, Boston.

EXTRACT FROM FORTHCOMING REPORT OF THE COMMISSIONER OF AGRICULTURE OF TENNESSEE.

EAST TENNESSEE FOR SHEEP.

The climate embraced within the limits of Tennessee is peculiar, in the fact that it is greatly modified by reason of mountain elevations, and is not what latitude alone would determine. Take the tops of the Unaka Mountains on the east, and throughout the hottest summer months the average temperature on Roane Mountain does not exceed 54 degrees. In the valley of East Tennessee we find the climate not so much modified by elevation as by the direction of the winds, which rush up the valleys from the south-west laden with a fructifying moisture, and producing a highly genial, productive, and healthy climate. The mean temperature here in summer is not far from 74 degrees.

Take these two divisions of the State, lying side by side, and the sheep will present great constitutional differences. The Cotswold, Leicester, Southdown, nor any heavy breeds, would not do well upon the admirable grazing grounds found upon the bald places on the mountain-tops; but the Merino, the Cheviot, and the native mountain breeds would find a home entirely congenial to their constitution and habits. The natives found on these mountain heights are as fleet as the deer and as healthy. The wool is white, soft, firm, lustrous, and true, and the sheep show a beautiful adaptation to the locality which they occupy. It is said, by those experienced in sheep-raising on these mountains, that the higher the grazing-grounds the better the wool. On the other hand, carcasses increase in size as the grazing-grounds approach the valley, until the largest size of carcass is met with in the many long, straight, and beautiful valleys that characterize the great valley of East Tennessee.

It may be well to mention here that the grasses which flourish upon the slopes and tops of the Unaka Mountains are exceedingly luxuriant and nutritious, and form a

thick mat all over the surface. Blue-grass herd's-grass, white clover, mountain meadow, Randall grass, and many wild but valuable kinds, are so intermixed as to supply constant grazing throughout the summer months. But these grasses are confined to the soils of metamorphic origin. The Sandstone Mountains are naked and bare, producing only greenish briars, lichens, mosses, and ferns.

Though cool, the climate of these mountains is exceedingly moist. For fully half the time in summer the tops are wrapped in cloud and mist; and rains are remarkably frequent in summer, and snows in winter. The frequent rains keep the grasses in a growing condition, and an equal acreage of pasture upon the rich, black, fieldspathic soils of the mountain will probably supply double the grazing that it would in the valleys below. In no part of the celebrated blue-grass region of Kentucky is the sod better or thicker than upon the balds of some of these mountains. For wool-producing sheep this region has no superior in this or any other country, if they could be provided with suitable protection against the chilling rains. The cold blasts of winter may be averted by the sheltering coves. The tropical heats of the valley in summer are unknown upon these airy heights.

CUMBERLAND MOUNTAIN FOR SHEEP.

The Cumberland table-land is 2,000 feet above tide-water, with a dry sandstone soil and an exceedingly cool and pleasant climate in summer, the mean temperature being about 71 degrees. The air is dry and bracing. During the summer months the surface of the earth is covered with tussocks of fine nutritious mountain grass, giving ample sustenance for sheep for eight months in the year. In addition to the wild grasses herd's-grass, clover, and orchard grass, with slight attention to manuring, will grow well. Wild pease also furnish a nutritious herbage. The soil can easily be made to yield sufficient supplies for winter feeding by sowing in stock pease—a food not only healthful for sheep, but highly relished by cattle.

To be successful in sheep-raising on this table-land, the breeder must be careful to build shelters for protecting his flocks from the middle of November until the middle of March. The climate is very rigorous in winter, and the keen northern and northwestern blasts will speedily impair the health of the improved though tender breeds. The native sheep are very healthy, and rarely suffer from any disease, though they are not profitable, the wool being coarse and short and the carcass light and lean. This arises, however, more from neglect than local cause. It should never be forgotten that thrifty flocks may be raised wherever industrious men and good breeders live, and that the best flocks will degenerate where inattention and neglect are practiced.

The advantages offered by this mountain region for the economical raising of sheep are:

1. The cheapness of the lands. Lands may be bought at almost a nominal price on the Cumberland Mountains. Though high and healthy, the soil in comparison with that of the valleys is poor and unproductive. The price for wild, highway-pasture lands varies from 50 cents to $3 per acre, depending mainly upon nearness to railroads and markets. Care should be taken, though, to investigate the titles thoroughly; for one of the most unwise acts of our past legislation was the opening of a land-office, and allowing every one to make his own surveys, and receive a grant for lands based upon such surveys. Oftentimes it happened that the same land had been entered in whole or in part by others. The possession of a land-grant does not carry with it in this State a title, but the title rests with the oldest grant, assuming it to have been regularly entered at first. Let strangers beware of purchasing mountain lands without a rigid investigation of title. I am led to make these remarks because complaints have reached this office that persons have been swindled in purchasing land-grants. There is no difficulty about securing good titles to valley lands; but there is danger that a person may buy land upon the mountain with a grant from the State, bearing the great seal of authority, and have no title.

2. The second advantage these mountain lands offer for sheep-raising is in the wide range of pasturage. The open woods permit the luxurant growth of nutritious herbs and grasses throughout the summer, and will subsist millions of sheep for eight months in the year without any other care than salting.

3. A third advantage may be found in the dryness of the sandstone soil, which insures exemption from many of the diseases fatal to sheep. No foot-ail, no braxy, no impaired organs of digestion, no blind staggers, and, indeed, no other disease than old age, or starvation through want of care, has ever attacked them. Nor do flies annoy or vex flocks as they do in the lower plains.

There are also some disadvantages attending the rasing of sheep upon this mountain. The pasturage is so extensive that they often stray off and are lost. There is also the calycanthus, that on some of the slopes grows vigorously, bearing seed readily eaten by sheep in winter, and which is a deadly poison. To guard against this, sheep should be driven up and fed before the rigor of winter and the scarcity of grass compel them to devour such fatal food. Another drawback will be found in the distance from market. While the wool may be easily conveyed to shipping points at a smal

cost, mutton sheep would suffer much in flesh by being driven long distances. Of all this region, embracing more than 3,000,000 acres, less than 500,000 acres are within easy reach of railroads or navigable streams.

My own impression is that the Merino sheep, if properly cared for, would prove a profitable investment on these mountain lands. One precaution would be necessary, and that is to keep the bucks from the ewes until about the middle of November, so that the lambs would come after the rigorous winter weather is over.

ADDITIONAL FACTS BEARING UPON THE CULTURE OF ELECTORAL WOOLS IN THE SOUTH.

An address delivered before the National Agricultural Congress, in New Haven, Conn., August 29, 1878, the writer, the compiler of the preceding pages, says:

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 fiber 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 Humphreys' flock, and, subsequently, Saxon sheep, had been imported by Messrs. Wells & Dickerson. In answer to my inquiries, I obtained the following 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 Saxon 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 picklock. 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 Centetnnial, 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 Triadelphia; 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 merinoes.

"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-quarters 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 anything. 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 Merinoes.'

"'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 considerations.'"

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 fiber. Thus we find what will be to most of us an unexpected addition to the American resources for sheep-husbandry.

SHEEP-HUSBANDRY IN CONNECTION WITH THE CULTURE OF TOBACCO.

In the address referred to, the writer presented the following facts, which will be instructive to the tobacco-growers of the South:

The valley of the Connecticut furnishes an 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 200 to 600 sheep, buying in the fall and selling in the spring. We have bought, directly after shearing, 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. Merinoes 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 1, yarding them close, from 40 to 50 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 200 sheep from December 1, and 85 more from December 24, 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 8,000 to 10,000 yearly, mostly coming from Michigan, some from Ohio; but Michigar Merinoes 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 1,000 to 2,000 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 2,000 were fatted. 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 50 to 150 cords, costing from $8 to $10 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 15 to 30 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 *car* 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."

RECENT NOTES ON THE ANGORA GOAT.

[From the Bulletin of the National Association of Wool Manufacturers.]

We have to thank our friend Prof. Spencer F. Baird, the distinguished naturalist, and Secretary of the Smithsonian Institution, for calling our attention to the following article, published in the celebrated English sporting paper, The Field, of June 8.

It has been our object since writing the first full monograph on the Angora goat

published here or abroad to publish all the later information upon this subject in our Bulletin. The paper given below is the most important of the recent contributations. It is important to those desiring to import these animals from their native habitats, as it gives a precise description of the localities where the different varieties prevail. There are two points, dwelt upon by the writer, to which special attention should be given by those proposing the culture of the Angora in this country. The first is that the high and dry plateaus where these goats flourish in Asia Minor have an "abundant growth of oaks, either in the form of trees or scrub bush, the leaves of which furnish the goats with their favorite food, not only while green in summer, but dried for winter use." This suggests the fitness of regions in the South, where oaks abound, for the culture of these animals, and shows that where grasses do not abound, as in many districts of the South, abundant forage can be supplied by the dried leaves, gathered and cured, of course, when green.

The second point is the course adopted in Asia Minor to obtain an increase of the flocks. The writer observes that, "with regard to the breeding of the mohair goat and cross-breeding it with the common species, there are two different theories. One is that the best mode of beginning a flock is to commence with a few thorough bred goats of both sexes and trust entirely to the natural increase. * * * The alternative plan is to introduce a small but choice collection of thorough-bred rams, and cross the common ewe-goat with these. In three to five years a large and valuable flock is collected, only limited by the number of common goats procured at first." "Theorists," he says, "object to this system, that perfect purity of breed cannot be reached; but practically every trace of underbreeding can be eliminated and the standard of the pure goat reached. * * * In practice, a combination of the two methods has been found the most profitable; that is, a small flock, consisting of say ninety thorough-bred ewes and ten pure Angora rams, kept carefully apart, and used as a feeder for as many common ewe-goats as are procurable."

This is precisely the plan which we would recommend to breeders in this country, only with the injunction that even the most perfected cross-bred ewes should be invariably crossed by an absolutely pure-bred ram, and that even the best cross-bred rams should never be used *or sold* for breeding. Without the persistent use of pure rams no good results can be obtained. By this plan we feel reassured that the Angora-goat husbandry, in suitable localities, can be successfully and profitably conducted in this country.

In our original paper on the Angora goat we announced the following conclusion: "The Angora goat, and the domestic goat of Europe and this country, having descended from separate sources, the obtaining of good results from the crosses of the two races is theoretically improbable, and is demonstrated to be so by the best experience in Europe." As we stated in a recent article on sheep-husbandry in the South, later observations of experiments in Australia, and especially in the Cape of Good Hope, have led us to modify the conclusion above quoted. We must now admit that good fleece-producing animals may be founded on the common goat. The conclusive fact establishing this is the one stated by the Messrs. Bowes, in their wool statistics for 1878, that the first shipment of mohair from the Cape of Good Hope, made in 1865, consisted of but 6,804 pounds. In 1876 the quantity reached 1 298,455 pounds, "and the quality has been very much improved." It is not possible that this vast increase could have been made except by breeding on the common goat. The excellence of the product of the graded animals is proved by the highest test; it has become a regular article of commerce.

The greater part of the enterprise devoted to the Angora-goat culture in this country has been frittered away, and has been productive of no results. Breeders who crossed pure animals upon common goats have sold the grade animals as if they had all the excellences of the absolutely pure goats. The purchasers, in their turn, breeding the grade bucks to common goats, have been naturally disappointed in the results, and have let the breeds run entirely out. The failure has come from attempting to derive profit from the sale of the graded animals, instead of from perfected fleeces. A fair and intelligent experiment in Angora-goat husbandry on a large scale, such as is made in sheep-husbandry, with the sole object of obtaining the largest product and the utmost excellence of fleece, has hardly been made in this country. When the experiment is fairly made on the mountains of Virginia or North Carolina, with sufficient capital, a foundation of absolutely pure animals, and with time enough allowed to complete the improvement of the flock (five or six years), we feel confident that it will be highly remunerative. Our manufactures will absorb all the fleece that can be grown here for many years to come; or, the fleece being worth about twice as much abroad as the best Lincoln hoggett wool, it may be profitably exported.

Professor Baird informs us that inquiries were made of him, by practical manufacurers, in relation to the "Van" mohair. This question is partially answered in the article quoted below, and further by the following statement:

"Some years since, Mr. A. Eutichedes, a native of Asia Minor, came to this country, bringing a flock of Angoras, of his own selection, from his native land. He finally

settled in Virginia; but, becoming discontented, went back to Smyrna. He sold his goats to Mr. F. S. Fulmer, of Appomattox County, Va. In answer to a request for information as to a variety of Angora goat known as the 'Van,' Mr. Eutichedes writes to Mr. Fulmer, under date of June last—

"'Van is a province in Armenia, near Kars. The goats of the province produce about one million pounds of an inferior mohair, of four or five colors. The goats there shear about three pounds per head, worth about half as much per pound as the fleece of Angora. On no account advise any friends of yours to go into Van goats; for their mohair is too coarse, and never sells for more than half what the true Angora mohair brings.'"

"*The Angora or Mohair Goat; its Naturalization in British Colonies.*—At the last meeting of the British Colonial Institute, Mr. Gavin Gatheral, vice-consul at Angora, read a paper advocating the naturalization of the Angora goat in suitable parts of our Colonial Empire. The Angora goat (the *Capra hircus* of naturalists) is a native of the central plateaus and mountains of Asiatic Turkey. From a very early period, efforts have been made to introduce them into Europe. In 1554, specimens were imported into Holland, but with little success, the climate being unsuitable, the humidity destroying the length and luster of the fleece, which makes this staple esteemed as next in value to silk.

"The climate and soil of Central Asia Minor are of extreme dryness, with an average elevation of 2,500 feet above the level of the sea, and an abundant growth of oak, either in the form of trees or scrub brush, the leaves of which furnish the goats with their favorite food, not only while green in summer, but dried for winter fodder. In addition to the varieties of oak mentioned, these plateaus grow a scant supply of the short, tufted grass. During the intense heat of summer this meager herbage is burnt up; but the goats thrive and find sustenance where any other animal would perish.

"In appearance they are somewhat smaller than the common goat; the fleece, when full-grown, hangs in natural ringlets, almost touching the ground; the head is small and shapely; and both sexes have flat, corrugated horns, from eighteen to twenty-four inches long (according to age), that diverge from the top of the head. On the wide plateaus and in deep gullies of Central Asia Minor, these goats are tended in flocks of from 200 to 5,000 head, generally mixed with sheep. There are few more beautiful objects than a large flock, in full fleece, scattered over some rugged mountain-side, under the unclouded blue of an Asiatic sky, their snowy fleeces glittering like silver in the brilliant sunshine, and the small bronze bells hung on the necks of the rams chiming as they move about. They are very tame, and will readily approach when called.

"The folds consist generally of a sheltered inclosure surrounded by a low wall, and are little used except during continuous rain. The goats return to their evening shelter at sunset. During the heavy snow which sometimes covers the ground for two or three months, the shepherds feed them with chopped straw or dried leaves. There is little expense in grazing them, as one goatherd with a dog—to keep off wolves, which abound—suffices for a thousand head. But in early spring, when the kids are born, they require attention, as the young are singularly helpless during the first week of their lives, and the ewes show little maternal instinct; and if the kids are born during cold or wintry weather, they require to be sheltered and nourished indoors after nightfall. A running stream or good well is indespensable, as the goats drink a great quantity of water; and it is advisable to place pieces of rock-salt for them to lick.

"No ordinary fence will restrain them. They are so restless, energetic, and destructive that cultivated plants in their vicinity have to be carefully guarded, especially ornamental shrubs or hawthorn hedges, and gorse and briers. They will not, therefore, supersede sheep on good grass-lands; but there are immense tracts in many of our Australian and American colonies, now practically idle and valueless, that, were these goats introduced, might be taken up and utilized in the production of a very important staple, both for local manufacture and export.

"With regard to the breeding of the mohair goat, and cross-breeding it with the common species, there are two different theories. One is, that the best mode of beginning a flock is to commence with a few thorough-bred goats of both sexes and trust entirely to their natural increase. The objection to this is the outlay at the outset, and the time that must elapse before a large number can be raised. The alternative plan is to introduce a small but choice selection of thorough-bred rams, and cross the common ewe-goat with these. In three to five years a large and valuable flock is collected, only limited by the number of common goats procured at the outset. Theorists object to this system, that perfect purity of breed cannot be reached; but, practically, every trace of underbreeding can be eliminated and the standard of the pure goat reached; the mohair being as fine, as long, though perhaps scarcely so abundant, as in the thorough-bred, while the silky luster so much valued by spinners is undoubtedly greater. In practice, a combination of the two methods has been found the most profitable; that is, a small flock consisting of say ninety thorough-bred ewes and ten pure

Angora rams, kept carefully apart, and used as a feeder for as many common ewe-goats as are procurable.

"As regards the value of the fleece, both quality and price vary much; but fair average mohair is worth from 2*s*. 9*d*. to 3*s*. 9*d*. per pound, the average yield being five to six pounds, or, say, 20*s*. per head per annum. The flesh of mohair goats in good condition much resembles mutton. It is somewhat firmer in fiber, and quite as palatable; in fact, those accustomed to both prefer it, and it is entirely free from the peculiar odor that characterizes common goats' flesh. The wethers accumulate large quantities of internal fat, which is remarkably firm and white, and makes valuable tallow. The ewe gives abundance of milk, and from it is made that slightly-acid curd called 'yört' in Turkish, so highly praised by Captain Burnaby in his recent work, 'On Horseback Across Asia Minor.' The skin is soft and flexible, can be beautifully cured and tanned, and from it in Turkey is made the best quality of what is known in Europe as morocco leather. The skins, when taken off with the hair, are also valuable articles of merchandise. They command high prices for carriage and drawing-room rugs.

"The statistics of this industry show considerable fluctuations from year to year, varying with the general condition of the flocks and the demands of fashion in Great Britain. Taking the last few years of depressed trade as a minimum, the shipments from Turkish ports to England average 40,000 bales, of 170 pounds each, of good or fair, and 10,000 of inferior, mohair. With regard to skins, &c., there are no reliable statistics available; but the total value at present prices will be a little over £2,000,000 sterling annually. This represents the full producing power of the Asia Minor districts; and were returning peace to stimulate trade in England, the demand would far exceed the supply. Even as it is, the industry is frequently much hampered by the delay and difficulty in procuring supplies; and this fact should induce colonial graziers and capitalists to turn their attention to it. The manufacture is entirely in British hands.

"The mohair-producing district in Asia Minor lies between the large town called Kastambol, near the Black Sea on the north, Koniah to the south, Sivas to the east, and Eskisher to the westward. It yields more than twenty varieties, which are easily recognizable by experts; but the following are the principal:

"The most northerly point at which the mohair goat thrives is Kastambol, a large and fertile province, but too near the moist winds of the Black Sea for the mohair goat to reach its highest development. The fleece, though lustrous, is harsh and coarse. It is somewhat unfortunate that the first selections for export to the Cape Colony, for naturalization there, were made from this district. The facilities for shipment are great; but had other varieties, to be noted further on, been preferred, the result of the Cape experiment might have been more satisfactory.

"Two hundred miles inland and to the southward lies Angora. This province produces five different varieties from as many districts, each of them equal in area to the largest English county. Yabanova (or Strangerfield) produces a heavy lustrous fleece; Tchorba, a mohair so soft and fine that it falls to pieces as soon as shorn from the goat's back; Tchiboukova (or the Reedy Valley) is remarkable for its length and fineness of fiber; Ayash (the Mountain Pass) produces a white but lusterless fleece. The rams of the three first-named districts are undoubtedly thoroughbred. Though smaller in size than those of some other varieties, they have all the 'points' that a practical stock-breeder commends. Sheltered by oak forests during the short but severe winter, and grazed on the valley grass during spring and summer, they seem to find in the alternation everything needed for strength and vigor, as is proved by their being so prolific, the ewes having frequently pairs, and sometimes even triplets, at a birth. Jeevar (or Near Town) is bright and showy, but full of what is technically called stick, or kempy hair.

"Beybazar (or Prince's Market) is so near Angora that the mohair it produces has no marked points of difference. The rams are larger in size, very hardy, and stand a sea voyage well. A few have been recently exported to Cape Colony and California, the result being highly satisfactory. To the northeastward are Tcherkess (or Circassian Village) and Geredeh (or Behind the Mountain), two districts where the mohair goats have been introduced in comparatively recent times. They there develop distinct characteristics, owing to the difference of climate and elevation. The Geredeh ram is a large and powerful animal, covered with a fleece that seems almost black, so surcharged is it with grease; but, when scoured, the mohair is found to be second to none in quality and fineness. The difficulty of access to this mountain region has hitherto prevented any of these goats being secured for export.

"To the eastward are Sivrihissar (or the Turreted Castle) and Etkisheir (or the Old City). Both suffered severely from the two years of successive drought in 1874–'75, and the consequent famine. Many of the goats perished; but the graziers replaced them with stock from other districts, the result being a marked improvement in quality and value.

"Due south lies Koniah, the ancient Iconium; the soil there being of the color

and character of brick-dust. The fleece of the Koniah goat is a reddish brown; and, though this reduces its value as mohair, it is sought after for certain special manufactures. On the frontier of Armenia and Mesopotamia, far to the eastward, is a province called Van, which has hitherto supplied a great weight of inferior mohair, more resembling sheep's wool than goat's hair; but this is the only part of the mohair-producing territory that has been occupied by the Russian invading armies, and consequently may be looked upon as lost to British commerce for many years to come.

"Recent events have greatly facilitated the means of purchasing and exporting thoroughbred mohair goats from Asia Minor to British colonies. In former years it was as difficult to induce a Turkish grazier to part with a ram as to get an Arab to sell his favorite mare; but, war contributions increasing, he accepts the inevitable, and buys and sells like other people. The goats thrive well on shipboard, when properly attended to, so that the risk of loss during transit is small.

"Mr. Gatheral gave the following information respecting the cost of Angora goats:

"Rams, thoroughbred, young bucks from the best districts, two to three years old, with certificate of health and condition, fitness for breeding purposes, £6. Ewes, same age and breed, £3 to £4. Expenses beyond Constantinople depend on freight, which varies much. Delivered in London, Liverpool, or Southampton, for transshipment, cost, freight, and insurance against all risk included, the rams cost from £9 to £10; ewes about one-half. For the Australian colonies they could be transshipped at Malta, thus saving time and expense.

"The animals are always forwarded in pens made expressly, with every facility for water, fodder, and cleanliness. They are sent under the care of shepherds who have had much experience.

"In the course of the conversation which ensued, Dr. Bennett, the Australian naturalist, exhibited magnificent specimens of soft, silky mohair, of a beautiful lustrous white color, the produce of Angora goats naturalized in New South Wales."

ANGORA FLEECE.

The attention of the department having been lately called to the production and manufacture of Angora fleece, the Commissioner ordered an investigation, through inquiries addressed first to wool dealers and then to manufacturers, the results of which are herewith presented.

It is thought best to preface this summary by referring to what the department has previously done in the same line of inquiry. In the annual report of the department for 1863, Hon. Israel Diehl, who had previously been United States consul at Batavia, in Java, in an article entitled "The Goat," gave a very interesting account of two Asiatic varieties of the goat, the Cashmere and the Angora.

THE CASHMERE GOAT.

The Cashmere goat inhabits the range of country from off the Caspian Sea, eastward through Thibet and Northern India. It is somewhat smaller than the common goat, or the Angora goat. Its horns are comparatively straight and round, and its ears pendent. Its fleece is fine, straight, flat pendent hair of silky fineness, and of silver whiteness. Underneath the hair is a coating of greenish wool of very delicate fiber, of which less than a quarter of a pound is found upon each animal. This is the fiber from which Cashmere shawls are made. Ten goats, on an average, will furnish the wool necessary for a shawl a yard and a half square. As there is considerable diversity in the wool from different animals of the same flock, it is not always easy to find material enough for a shawl of perfectly homogeneous texture.

Thibet is on the northern and Cashmere on the southern slope of the Himalayas; hence the latter enjoys a somewhat more genial climate than the former. But the soil of both slopes is sterile, yielding a scanty and precarious vegetation. The goats find for food only buds, aromatic plants, rue, and heather. They are salted once a week, which constitutes about the sum total of actual expense in feeding them. It is doubtful if any goats of this breed have ever been brought to America, though, through some confusion, the name Cashmere has been applied to some of our Angora importations.

Mr. S. S. Davis, of Granville, Ohio, in 1863, had 100 goats which he had purchased as Cashmeres. A careful comparison with Rees' description of the Angora goat, convinced him that his animals were of that breed, and not Cashmeres. Very probably other flock owners have been laboring under the same mistake.

THE ANGORA GOAT.

The original habitat of this animal is Angora, a district of Asia Minor, deriving its modern name from the city of Angora. This district is mostly a table-land of 3,000

GEREDEH ANGORA GOATS.

BUCK MAHOMET. EWES FATIMA AND LULU.

Imported from Asia Minor by Chas. W. Jenks, of Boston, Mass., for Richard Peters, of Atlanta, Ga., January, 1889.

feet average elevation, lying between the Taurus and the Anti-Taurus Mountains. It sometimes rises to eminences within the line of perpetual snow, and again sinks into valleys 1,000 to 1,500 feet deep. The soil of the hills is dry and chalky; the climate is arid, and the herbage scant. Some roving tribes are said to keep their flocks on pasture night and day, driving them up the mountain side in summer and down in the valleys during winter. The flocks of some localities show a marked superiority, which is attributed by the natives to the fact that they are constantly kept on the hills and mountain side where the atmosphere is rarer and more salubrious than on the lower levels, and where a wider range of exercise is afforded. These and other conditions are said to produce healthier animals, and a better kind of fleece.

The Angora goat in Asia Minor presents two leading varieties. The white Angora, the only one which has, to any extent, been imported into America, has large horns and erect ears. Its fleece is called by the natives "flick." It embraces two elements. The outside covering is a long silky hair of silver whiteness, disposed in pendent spiral ringlets over the surface of the body. It is from 5 to 12 inches long, and often sweeps the ground. The fleece of the buck loses fineness with age, and shears from 5 to 9 pounds; the female fleece is finer, shearing from 3 to 5 pounds. The fleece of the ewes and kids is in special request for the more delicate fabrics of ladies' wear. Next the skin is a small quantity of fine, downy wool. Another variety of the Angora is distinguished by coarse hair of darker and variant hues, with an undercoat of downy wool.

The natives of Angora were very sure that their goats would deteriorate if removed from their native habitat; but an experience of a quarter century shows that they thrive in various parts of the United States. Reports from numerous flock owners, representing all the leading sections of the country, were embodied in Mr. Diehl's article. These reports showed that these animals were in thriving condition, producing fleece of superior quality and in large quantities.

MANUFACTURE.

Mr. Diehl was commissioned by the department in 1867 to visit Europe and to investigate the manufacture of the Angora fleece. To test the comparative value of fleece raised in the United States, he secured specimens from flocks in all parts of the country, from Massachusetts to California, and compared them with the foreign fleeces at the Paris Exposition of 1867, and found them fully equal to the best products of Asia Minor, an opinion fully sustained by the European manufacturers to whom he showed them. The latter were delighted to learn of the growth of this fiber in the United States. The supply from Asia Minor was represented as precarious, owing to the barbarous bigotry of the people and the jealousy of the government. The annual supply in the British markets from Asia Minor averages about 3,000,000 pounds. A much greater amount could be used.

Formerly the fleece was spun into yarn at several points in England and at Roubaix, France, and distributed over Europe for manufacture into cloth. The excellency of the French and English yarn was attributed to skilled labor, to improved machinery, and to natural and artificial humidity. From very transparent motives European spinners represented the process of spinning as very difficult and expensive. But this was flatly contradicted by the exhibition at Paris of a great variety of machinery for carding, scrubbing, spinning, and weaving the fleece.

Mr. Diehl was astonished and delighted at the extent, variety, delicacy, and beauty of the fabrics shown at Paris by different nations of Europe and Asia Minor. Shawls, camlets, mohairs, poplins, velvets, delaines, hosiery, yarns, gowns, robes, rugs, tassels, trimmings, &c., were made of this material. Frequently graded fleeces were used, but in most cases the pure-blooded fleece was employed.

Returning to America, Mr. Diehl found but little machinery adapted to this branch of manufacture. He was satisfied, however, of the practicability of its extensive introduction. Our late inquiries show that very little progress has been made since Mr. Diehl's investigations in the manipulation of the Angora fleece. In no case have we found entire fabrics made of this material, yet European fabrics are shown rivaling even silk manufactures in delicacy and beauty and far surpassing them in serviceableness. There is no valid reason why this branch of manufacture should not at once be naturalized among us and made a lucrative employment.

Our inquiries among wool dealers developed but a small portion of the traffic in Angora fleece. It is marketed in the Eastern cities. But few dealers, however, have had anything to do with it. The prices reported ranged from 15 cents per pound for low grade cross-breed fleece to $1.25 for pure blood, marketed in good order. Our correspondence with the dealers showed only the following manufacturing establishments east of the Rocky Mountains as using it, viz: Ætna Mills, Watertown, Mass., Arlington Mills, Lawrence Mass., Washington Mills, Lawrence, Mass., Farr Alpaca Mills, Holyoke, Mass., Sawyer Woolen Mills, Dover, N. H., Providence (R. I.) Worsted Company, Oswego Falls (N. Y.) Manufacturing Co., William Brodhed and Sons, and William Hale & Co., both of Jamestown, N. Y., James Turner & Sons, Kent, Ohio.

Letters of inquiry were addressed to the managers of these establishments, from which we learned that this fleece was not used in making homogeneous fabrics, but in connection with wool or cotton to manufacture mixed fabrics. In some instances the fleece is imported from Europe, but in most cases it is the product of American flocks.

The Ætna Mills, Watertown, Mass., had used 50,000 pounds in two years, constituting about 10 per cent. by weight of the fabrics into which it entered. They preferred pure-blood fleece, but in some cases that of cross-bred animals was used. Some of the stock was imported from Europe but most of it was from California. The extreme range of prices was from 40 to 80 cents per pound, but most of it was from 55 to 65.

The Arlington Mills, Lawrence, Mass., formerly used this fleece, but not lately, on account of the decline in the demand for mohair goods. It was combined with wool to make the filling or weft and woven with fine cotton warp to make the class of goods called mohair, luster, and brilliantines for ladies' dresses. Only thoroughbred fleece from Bradford, England, was used; it was produced in Asia Minor. The latest quotation in the Liverpool market for average Turkish fleece was about 60 cents.

The Farr Alpaca Mills, Holyoke, Mass., use Angora fleece in combination with luster wools for coat linings, &c. Only graded fleece is used, and the supply comes from the Pacific coast with a small quantity from the South. For low grade fleeces the prices have been as low as 10 cents per pound; the highest grades in good condition have brought 75 cents. Some of the fleece was so short in staple and so "kempy" as to be useless in combing. The value of the material is entirely in its luster, but as lustrous goods have passed out of fashion the demand has become quite limited.

Charles Fletcher, esq., proprietor of Providence (R. I.) Worsted Mills, uses Angora fleece raised in Oregon from a cross of Angora goats with Rocky Mountain goats and llamas. The Rocky Mountain goat has coarser hair than the Angora, and the graded fleece has too much kemp in it. The fabrics into which this fiber enters are braids for bindings, dress goods, cloakings, coatings, and lusters. The pure-blood Angora is also used with the bright luster wools from Canada and Kentucky, and manufactured into dress goods and bindings. Some of the raw material came from Turkey, Cape of Good Hope, and South America. The prices for good Asia hair are 80 @ 90 cents; Cape of Good Hope and South America, 70 @ 80 cents; California and Oregon, 20 @ 60 cents. It is stated that the winters of Oregon are too long for the pure-blood Angora goat tending to deteriorate the character of the fleece and to make it kempy. Of the supplies from that State 60 per cent. must be assigned to coarse fabrics, such as carriage-robes, horse-blankets, &c. Mr. Fletcher defines the Angora goat of this country as a cross between the goats from Angora and the llama. This definition will take the flock owners of the country somewhat by surprise.

C. H. Sawyer, esq., of the Sawyer Woolen Mills, Dover, N. H., uses about 1,000 pounds of Angora fleece per annum, at the rate of 5 @ 15 pounds per 100 pounds of wool in the manufacture of certain styles of cloth suited to men's wear. Only thoroughbred fleece is used. The supply comes from London; prices 75 @ 1.25 per pound. This fiber lacks felting properties, which renders it difficult to use with carded wool.

William Brodhead & Sons, of the Alpaca Mills, Jamestown, N. Y., use the Angora fleece principally in combination with combing wools in the manufacture of lusters, serges, braids, and fringes. Their supplies come from Kentucky and California; prices, 50 @ 75 cents. The California clip is largely shipped to England, as the demand for the goods into which it enters in this country is limited.

William Hall & Co., Jamestown (N. Y.) Alpaca Mills, use Angora fleece to give luster to fabrics. Much of it is made into coatings. The material is from California, Kentucky, and Georgia, and is thoroughbred or of high grade. There is so great lack of system in the preparation of the fleece for market that it is discouraging to buy it. The class of manufactures into which it enters requires soft medium wool, to which only the higher grades of Angora fleece, in good condition, can be adapted.

Messrs. D. Goff & Sons, Pawtucket, R. I., use Cottswold and Leicester wools. The Angora fleece requires special machinery. If it could be put upon the market in sufficient quantities and in good condition for manufacturing, machinery specially adapted to its fabrication would be introduced and the demand would become active.

The above facts show that the producers and manufacturers of Angora fleece have not yet arrived at a sufficiently clear understanding between themselves. That a vast amount of the fleece is produced in the country, and especially on the Pacific coast, we are assured not only by facts on record but also by parties who have ample means of knowing the fact. The high price of the fleece compared with sheep's wool and the fact of its importation from abroad shows that it possesses a permanent value for fabrication even in the subordinate role allowed it by our manufacturers. In the report of 1867 there is shown a large amount of looms and other machinery for the weaving of this fiber into cloth. It appears from the preceding statements that if manufacturers could be assured of a full supply of the article in good merchantable condition they would import this machinery and enlarge their manufacturing operations.

On the Pacific coast there is a grand development of fleece production. C. P. Bailey,

esq., president of the Angora Robe and Glove Company, of San José, Cal., estimates the number of Angora goats and their crosses with the common goat on the Pacific Slope at 200,000. Of this number the pure bloods do not much exceed 5 or 6 per cent. Mr. Bailey has a flock of over 4,000 goats, including crosses. He regards the mountain region of the Pacific coast as presenting special analogies of climate and topography to the district of Angora, and consequently presenting the natural conditions which have given this breed of goats such a splendid development in Asia Minor. He estimates the average annual increase of a well-kept flock at 100 per cent. The goats are hardier than the sheep and thrive upon a much smaller subsistence. There is a profit in raising grade goats even for fleece. Grade wethers have sheared as high as 9½ pounds per head. Messrs. Stockton and Buffam, of Mariposa County, California, a great authority on this question on the Pacific Slope, state the average clip of their thoroughbreds at 5 pounds per head. For their whole flock, from thoroughbreds to seven-eights of pure blood, the average is 4 pounds. Their clips of 1874 and 1875, amounting to 1,483 pounds, were sold in New York at 85 cents; in 1876 the best pure-blood fleece brought 90 cents.

Mr. Bailey is president of a company engaged in the manufacture of robes, gloves, &c., of Angora skins. They do not use the fleece to any extent separate from the skin. They manufacture robes, overcoats, parlor and carriage mats, &c. The poorer qualities are made into gloves which, in strength and durability, surpass buck-skin gloves. They make a large variety of whip-lashes, lace, leather belting, &c., from the lower grade skins. The belting is very strong and serviceable. The company uses about 20,000 pelts per annum, and could use double that number if they were accessible. The number of hands employed is between 60 and 70.

Thus it will be seen that this single manufactory requires the slaughter of 20,000 goats per annum, or 10 per cent. of the estimated number in the flocks of the Pacific Slope. This shows the value of home manufacture. The production of Angora fleece on the Pacific coast has been very remunerative. Mr. Bailey, who has been fourteen years in the business of raising these goats, gets $1.50 for a thoroughbred buck. He originally paid $1,000 per pair for thoroughbreds, and subsequently $900 for six wethers of the Brown and Diehl importation.

In view of the forthcoming census now in progress it was not thought best to make any efforts to ascertain the number of Angora goats in the different States. We are satisfied that the results of that inquiry will develop very remarkable and decisive facts in regard to this industry. It offers a grand opening for capital and enterprise, both in the production of raw material and in its fabrication. To a very considerable extent it will supersede silk as a fiber. When the business becomes fully established its products will be cheaper, but even now it has a great advantage over silk in cheaper production. A pound of high grade averages 60 @ 75 cents, while the purest blood will bring less than $1. Silk cocoons average $2.50 per pound.