BULLETIN No. 27. (B. A. I. 155.)

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY.
D. E. SALMON, D. V. M., Chief.

INFORMATION

CONCERNING

THE ANGORA GOAT.

BY

GEORGE FAYETTE THOMPSON,
Editorial Clerk, Bureau of Animal Industry.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1901.

Fig. 1.—Madam Ladysmith, Three Years Old. Fleece, 8 Pounds.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)

Fig. 2.—Princess Monterey, Ten Months Old. Fleece, 4¼ Pounds.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Animal Industry,
Washington, D. C., November 23, 1900.

Sir: I have the honor to transmit herewith the manuscript of an article entitled "Information concerning the Angora goat," by Mr. George Fayette Thompson, editorial clerk of this Bureau. There is much interest in this industry, and the Department receives thousands of letters of inquiry concerning Angora goats. An effort is made in this manuscript to treat all the topics that have been the subjects of these letters of inquiry.

It is estimated that there are about 400,000 Angora goats in the United States, and that our annual production of mohair is over a million pounds. It appears, therefore, that the industry should receive some attention from this Department, at least in so far as the collection and dissemination of information may be concerned, and I recommend that this article be published as Bulletin No. 27 of the Bureau of Animal Industry.

Respectfully,

D. E. Salmon,
Chief of Bureau.

Hon. James Wilson,
Secretary.

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INFORMATION CONCERNING THE ANGORA GOAT.

PRELIMINARY REMARKS.

The goat has accompanied civilization into all parts of our country—not numerously, but persistently. He is everywhere, and is well known. There are very few people who have not seen a goat, and there are fewer still, no doubt, who have seen many goats. The comic writers, playing upon his peculiar habits, have brought him into disrepute, although these habits, to a large extent, are such as are recommending him for special favor at this time. His fame is as a denizen of vacant lots and back alleys, subsisting upon anything or nothing, and a foe to everything. So far as the general public is concerned, he has not been reckoned with as a useful animal and has been tolerated only as a pet for children.

During more recent years a great interest has been awakened in the goat, and it now seems that he is about to receive the consideration that is due him. One of the causes contributing to this awakening was an article in the Yearbook of this Department for 1898, entitled "Keeping goats for profit," by Capt. Almont Barnes, of the Division of Statistics of this Department. The information which this article contained was widely disseminated. The Yearbook was distributed to the extent of half a million copies, and, besides, in order to meet the growing demand, the article was reprinted separately and mailed to many thousands of inquirers at the Department for information on the subject of goats; and not alone the agricultural papers, but the daily press as well, took up the matter and exploited the good points of the goat industry. The article set forth, among other things, the great value of the goatskins which we import annually, and how we ourselves might easily produce them; the usefulness of the carcass for food, especially of the Angora breed; the exceedingly small expense involved in raising the animal, owing to his habits of feeding upon that vegetation which is in greatest abundance and which other ruminants refuse; the million of acres of land in the United States that might be made available for goat raising which otherwise would remain, as heretofore, unemployed.

The result of this wide distribution soon developed the fact that the goat was present in the United States in larger numbers than was supposed. This is especially true of the Angora breed; in fact, the number of common goats in the United States is less than 50,000. Although

very little has been said or written about Angora goats during the last forty years, they have been extensively bred in the Western States and Territories, especially in Texas, New Mexico, Nevada, Florida, California, and Oregon. In a general sense, all those animals which are a cross in any degree of the Angora goat are considered as Angoras, for the Angora and the common goat readily cross, and the latter frequently becomes the foundation stock of a good flock of fleece-bearing animals.

It is the purpose of this article to deal with the Angora goat only, and the effort is made to answer such questions as have been received by the Bureau from all parts of the country. These answers are based upon the experiences of those who have raised them, some of whom have been in the business forty years and more. Differences of opinion are found to exist on several important points, where each contestant appears to occupy plausible premises; but this is not at all strange when the history of the Angora goat is considered, for it is not certain that all of the animals imported as purebreds were pure; indeed, it is held by some of our leading breeders that there is no longer in Turkey or elsewhere any such thing as a purebred Angora goat. Besides, there has been no general register for Angora stock in the United States until within a year or two, and each breeder has been at liberty to judge points for himself. If a general Angora register had been established thirty or forty years ago, the industry would now be conducted upon somewhat definite lines, and most of the questions now arising as to points in breeding would have been settled. In this connection it should be stated that C. P. Bailey & Sons Company, of San Jose, Cal., have kept a private register of their goats since 1867, but there appears to be no other similar record.

ORIGIN AND HISTORY.

The purpose of this paper is to give prominence to those phases of the Angora goat industry that are of practical importance; therefore a brief space only will be devoted to the history of the breed.

Naturalists generally agree that there are about ten species of wild goats, all confined to Europe and the Himalayas of Asia. These are divided into two groups, as follows:

I. *The ibexes.*—These, according to Hayes, have, as a distinctive characteristic, horns "flat in front, with a horizontal triangular section, furnished with large transversal knots."

II. *Goats proper.*—These, according to Hayes, have horns "compressed and carinated in front," and, according to Wood, "may be distinguished from the ibex and the sheep by the peculiar formation of the horns, which are compressed and rounded behind and furnished with a well-developed keel in front."

The second group is subdivided into two subspecies—*Capra falconeri* and *Capra ægagrus*. The latter is also known as the Paseng, the Bezoar goat, or wild goat of Persia, and is generally accepted as the goat from which the Angora is descended through *Capra hircus*, which is claimed to be the origin of all the common breeds of goats.

As to the parent of the Angora stock, there is a difference of opinion between the two best-known writers on the subject—John L. Hayes, author of The Angora Goat, etc. (1882), and S. C. Cronwright Schreiner, author of The Angora Goat (1898). The one takes the position that it is descended from *Capra falconeri*, the other from *Capra ægagrus*. Owing to the additional information which has been obtained since the appearance of Hayes's book and which is embodied in Schreiner's work, there can hardly remain a doubt of the correctness of the contention that the Angora goat descended from *Capra ægagrus*.

Schreiner, who has made extensive research, has described these two subspecies as follows:

Capra falconeri has a beard which extends from the chin to the shoulders and chest, and long spirally twisted horns, the twist being outward from the base. The males, when old, become whitish all over. The ewes have a beard confined to the chin, and small horns with a slight spiral twist. It is a native of the Western Himalayas, northern Afghanistan, and possibly of Persia; it is also found generally in Cashmere and on the Tibetan side of the Himalayas. Fossil remains show that it is one of the oldest types of goats.

Capra ægagrus[1] is chiefly remarkable for its enormous horns, which are larger proportionally than in any other ruminant animal; they approximate the triangular in form, transversely rigid, and are bent backward as in the domestic varieties, being scimitar-like in shape of curve, and having no spiral twist. Large horns of *Capra ægagrus* measure 40 inches along the curve, but a length of upward of 52½ inches, with a basal girth of 7 inches, has been recorded. It stands somewhat higher than any of the domesticated varieties of the goat (an adult male stood 37 inches at the withers), from which it further differs in its short and powerful neck, its stouter limbs, and slender body. In the female the horns are exceedingly diminutive or are altogether wanting. The fur, which over the greater part of the body is short, is of a grayish brown color, with a black line running along the entire length of the back, while the under surface of the neck and the beard, which is present in both sexes, are of a brown color. In the winter coat the hair on the neck and shoulders is rather longer than elsewhere, and in the same season, in the colder part of the animal's habitat, a coat of woolly fur is developed beneath the hair.

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[1] There is evidence that in classic times this goat was widely distributed over the Grecian Archipelago, although in Europe it is now found only in Crete, the island of Antemelo, in the Cyclades, and perhaps also in Guire to the northeast of Eubœa. Eastward it is found in the hills and mountains of Asia Minor, being especially common in the Taurus range, and it extends thence through Persia into Baluchistan, Sind, and Afghanistan. In India its range does not extend beyond the western side of Sind. It is found in Sind and Baluchistan in hills a little above the sea level; in the mountains of Persia it ascends to an elevation of 11,000 feet to 12,000 feet.—*Schreiner.*

The Angora breed of goats originated in the vilayet of Angora, in Asia Minor, but it is not known when this was. Some have ventured to say that it was 2,400 years ago. There is pretty strong evidence which goes to show that they were a distinctive breed when Moses was leading the Israelites out of Egypt. Goats' hair was spun by the Israelites for curtains and other purposes for use in the temple.[1] In the story recorded in I Samuel (chapter 19) of the artifice of Michal in deceiving the messengers of Saul by placing an image in the bed in place of David and giving it a pillow of goats' hair, is believed by Pennant to refer to a pillow made of the Angora fleece.

The city Angora, or Enguri, the capital city of the vilayet of Angora, is the ancient Ancyra, and is located about 220 miles south by southeast from Constantinople. Angora was the seat of one of the earliest Christian churches, and was probably established by the Apostle Paul. The province is mountainous to a considerable extent and furrowed by deep valleys. It is about 2,900 feet above the level of the sea. Of the climate Mr. H. A. Cumberbatch, British consul at Angora (1895), and quoted by Schreiner, says:

> The climate is extreme. In the months of January and February the thermometer will mark a minimum of 10° F. for several days at a time, reach as far as 0° F., whilst in June and July the maximum readings of 85° F. are maintained day after day, with little or no rain. The country is covered with snow in the winter, rain and snow falling frequently. In 1894 the total rainfall at Angora was 8.12 inches, but that was an exceptionally dry season. For the first six months of 1895 the rainfall was 10.10 inches, which is somewhat above the average; the heaviest rainfall in twenty-four hours having been 1.20 inches.

It was here that this famous goat reached its perfection—and such a state of perfection as has not yet been reached by the goats of either the Cape of Good Hope or the United States. That the altitude, the soil, or the climate, or all of them together, had much influence in producing this fleece-bearing goat is supported by strong evidence. Dr. John Bachman and the Encyclopædia Britannica both state that the fineness of the hair of the Angora goat may perhaps be ascribed to some peculiarity in the atmosphere, "for it is remarkable that the cats, dogs, sheep, and other animals of the country are to a certain extent affected in the same way as the goats." The same opinion was

[1] Take ye from among you an offering unto the Lord: whosoever is of a willing heart, let him bring it, an offering of the Lord; gold, and silver, and brass, and blue, and purple, and scarlet, and fine linen, and goats' hair.—Exodus xxxv, 5, 6.

And every man, with whom was found blue, and purple, and scarlet, and fine linen, and goats' hair, and red skins of rams, and badgers' skins, brought them.—Exodus xxxv, 23.

And all the women whose heart stirred them up in wisdom spun goats' hair.—Exodus xxxv, 26.

And he made curtains of goats' hair for the tent over the tabernacle: eleven curtains he made them. The length of one curtain was thirty cubits, and four cubits was the breadth of one curtain: the eleven curtains were of one size.—Exodus xxxvi, 14, 15.

expressed by Captain Conolly, quoted by Southey (1848): "It is remarkable that wherever these goats exist the cats and greyhounds have long silky hair also—the cats all over their bodies, the greyhounds chiefly on their ears and tails." These statements lead Schreiner to the conclusion that the atmosphere is the chief factor. He says: "At any rate, there seems to be no doubt that a limited and comparatively well-defined region around the town of Angora possesses in a degree unapproached elsewhere in Asia Minor, and probably in the world, those conditions favorable to the development of the soft, silky, lustrous white mohair goat." Too much credit must not be given to the atmosphere of Angora in the production of mohair. That it has a marked influence on animals anywhere is generally accepted. The experience of the Angora breeders of the Cape of Good Hope and the United States shows that, with the best animals, a fleece equal to any produced by Turkey may be obtained. There are other and stronger reasons why the mohair of these two countries is not equal to that of Angora province, chief among which is the adulteration of the blood. Besides, the breeders of this country have learned that the feed of the animal has a telling influence on the quality of the mohair in the same way that it has a pronounced effect upon the meat.

Mr. Henry O. Binns, who had about twenty years of experience with these goats in the vilayet of Angora, says the pure animals were about bred out in 1863. The reason for this was the extensive crossing with the common Kurd goat, reference to which has already been made. As early as 1839 there ceased to be a demand for the spun yarn of Asia Minor, owing to the fact that Europe could spin the yarn at much less cost; but there was a European demand for the raw hair which exceeded the supply. This condition of things led to complications and a mixture of breeds from which the mohair world has not yet recovered. There can hardly remain a doubt, however, that, with the recent renewed interest in the industry, and with the intelligence that the breeders will bring to bear, the Angora goat industry will soon be placed on the highest plane.

THEIR HISTORY IN THE UNITED STATES.

The history of the Angora goat in the United States has been marred by the carelessness or [illegible]ference of occasional writers for the press who have been often [illegible]rate as to dates or facts, and also by others whose interests have doubtless led them into exaggerations. The real facts of its history in the United States, however, are so few and so simple as to prompt that venerable breeder, William M. Landrum, to say that they would make but a very small book.

During the Administration of President Polk, the Sultan of Turkey requested of him that he recommend some one who would experiment in the culture of cotton in Turkey. Accordingly, Dr. James

B. Davis, of Columbia, S. C., was recommended, and he received the appointment. The work done by Dr. Davis appeared to be highly gratifying to the Sultan, and so, upon his return, in 1849, the Sultan, desiring to reciprocate the courtesy of the President, presented him with nine of the choicest goats in his dominion. Col. Richard Peters, writing in 1876, says of these animals: "These doubtless were selected from the herds of Angora, a district of country lying among the Taurus Mountains, which traverse Asiatic Turkey, and which derives its name from its principal city, situated about 200 miles east of Constantinople." It does not seem, therefore, that Dr. Davis encountered any great difficulty in securing this first importation of Angora goats into this country; but the following extract from the Country Gentleman of 1856, somewhat romantic and a little exciting, was signed by one Richard Allen, of Tennessee. The article, in full, shows that he was probably of that class of writers of history whose personal interests were to be subserved:

> It may not be out of place in this connection to remark that great credit is due to Dr. Davis, of South Carolina, for the enterprise he exhibited in the introduction of the goat to this country. He was at the time in the employ of the Turkish Government, at a salary of $15,000, engaged in experiments upon the growing of cotton in the Sultan's dominions. He went out upon the recommendation of President Polk, to whom an application was made by the Turkish Government for the services of some competent Southern gentleman familiar with cotton culture. While there he determined to procure the goat from its native wilds. The story of the journey would be too tedious for my brief letter, and I will merely add that, with an expensive outfit at Constantinople, a perilous journey of months, and the loss of many men and camels, he succeeded in capturing and carrying off eleven of the famous animals, whose fleeces, in the shape of shawls, are so highly prized and coveted by the ladies of all civilized nations and for which prices almost startling have been paid by the wealthy.

Such a tale of fortitude and determination, added to the information in another paragraph in the same letter which stated that the entire yield of the particular flock about which he was then writing had been engaged in the city of New York at $8.50 per pound, from which point it was to be shipped to Paisley, Scotland, for manufacture into the shawls mentioned above, no doubt assisted in the sale of goats at $1,000 each.

In 1863, Hon. George A. Porter, of Baltimore, himself a breeder of Angoras, wrote to Mr. Diehl that, while occupying the post of United States consul at Constantinople, he "procured and shipped for Dr. Davis the first of these goats that were ever brought to this country." Just how much Mr. Porter was acting upon the courtesy of the Sultan it is difficult to ascertain.

Of the nine Angoras imported by Dr. Davis, seven were does and two were bucks. Besides these, according to Colonel Peters, there came in the same lot one purebred Tibet doe, several head of crosses between the Angora and Tibet goats, and quite a number of grade does bred from the common short-haired ewes of the country and his Angora bucks. Plate I shows a pair of the Angoras imported by Dr.

Davis. The first is a buck, weighing 155 pounds and carrying a fleece of 7 pounds; the second is a doe, weighing 102 pounds, carrying a fleece of 4½ pounds. These pictures appeared in the Country Gentleman in 1856 and were furnished that paper by Col. Richard Peters, who was at that time the owner of the goats. Dr. Davis, not being familiar with goats, thought these were the famous Cashmere goats which furnished the fiber for the costly Cashmere shawl, and they were called Cashmere goats for many years after their introduction into the United States. The records show that as late as 1861 Mr. William M. Landrum, the veteran breeder of Angoras, was awarded a silver goblet and $25 in cash for the introduction of the first Cashmeres [Angoras] into California. Hon. Israel S. Diehl, writing on "The Goat" in the Annual Report of this Department for 1863, gives descriptions of different varieties of Angoras in Asia Minor, among which was one variety which might very easily be mistaken for the Cashmere. He says:

> There is also a second or other variety of Angora, or shawl, goat besides those generally described. This goat has an unchanging outer cover of long, coarse hair, between the roots of which comes in winter an undercoat of downy wool that is naturally thrown off in spring or is carefully combed out for use. A remarkably fine species of this breed exists throughout the area to which the white-haired goat is limited, and similar breeds prevail all over the highlands of Turkish and Persian Armenia, Koordistan, and at Kirman; and, although some flocks yield finer fleeces than others, it is called the same wool or under down as the wool of Cashmere and Tibet, and samples of the wool of the Tibetan and the double-wooled goat of the banks of the Euxine show them to be but varieties of the same species.
>
> This goat is of a larger size than those of the more southern Turkish provinces and its wool finer, and is the variety probably introduced by Dr. Davis from Asia Minor as the Cashmere, and now erroneously so called throughout the country, as all the importations of this country, as far as we can learn, were shipped from ports on the Mediterranean or Constantinople, several thousand miles from Cashmere or Tibet, through inhospitable and almost untraveled countries for Europeans, which goes far to prove the so-called "Cashmere goat" to be the Angora.

Mr. Diehl, in the same article mentioned above, describes the Cashmere goat. The difference between it and the Angora of our country will be seen to be distinct. The similarity of the variety of Angora described above and the Cashmere is marked, especially in respect of the downy undercoat. His description of the Cashmere is as follows:

> This variety of the wool-bearing or shawl goat, as it is often called, is spread over Tibet, Northern India, and the regions to the east of the Caspian Sea. It is somewhat smaller than the common and Angora goat. It has straight, round, pointed horns, pendent ears; is covered with straight and falling long, fine, flat, silky hair, with an undercoat in winter of a delicate greenish wool, of but 2 to 3 ounces each, which latter alone constitutes the fabric from which the celebrated shawls are made. Ten goats furnish only enough for a shawl 1½ yards square; but this is often found differing both in color and the quality of the wool, or rather the fine hair, of which the fleece is composed. The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the horns not spirally twisted, and, above all, the fleece being long, straight, fleecy, and white.

This soft undercoat of the Cashmere is known as "pashum," and is the product from which the famous Cashmere shawl was made. Mr. William M. Landrum, who was probably the first in this country to discover that our so-called Cashmere goat was the Angora instead, through investigations made about 1861, also states that there is a difference between the Cashmere shawl and the Paisley shawl. These are often referred to as being the same shawl. While the filling of both shawls was of pashum, the chain of the latter was made from the kid fleece of the Angora. Pashum is combed out in the spring, and is worth, when cleaned, in the country where it is produced, from $1.50 to $2 per pound. A writer in the Penny Magazine (London) in 1838 says:

> The wool is first combed from the animal in the mountains of Tibet, where it is sold for nearly 5 shillings a pound. It is packed in baskets and sent to Cashmere, where it pays a duty on entry. It is there bleached with rice flour, spun into threads, and taken to the bazaar, where another tax is paid upon it. The thread is then dyed, the shawl is woven, and the border sewed on.

So much for the Cashmere goat.

The first (or Davis) importation of Angoras was frequently exhibited at fairs, and always attracted much attention. The reports made by the officials of fair associations were always favorable, sometimes flattering, and as is known, after years of experience, not always correct. The United States Agricultural Society, which held an exhibition in Philadelphia in 1856, awarded to Col. Richard Peters, who was then the owner of the Davis goats, $100 as a special reward. The following report was made upon the animals:

> They have become known as Cashmere goats from the pure white color and fineness of their fleeces, and their undoubted Eastern origin. The fleeces from the bucks weigh from 6 to 7 pounds, those from the ewes from 3 to 4 pounds. The flesh of the crosses is superior to most mutton, tender and delicious, making them a desirable acquisition to our food-producing animals.
>
> The ease with which they are kept, living as they do on weeds, briers, browse, and other coarse herbage, fits them for many portions of our country where sheep can not be sustained to advantage, while their ability and disposition to defend themselves against dogs evidence a value peculiar to this race. They are free from all diseases to which sheep are liable, hardy and prolific, and experience has proven that they readily adapt themselves to all portions of the United States. The bucks breed readily with the common goats, the second cross yielding a fleece of practical utility, whilst the fourth is but little inferior to that of the pure breed.
>
> A flock of valuable wool-bearing goats can be raised in a few years by using grade bucks.

The following extract is from a report of the special committee appointed by the American Institute at its exhibition in New York City in 1855:

> They have examined with much interest the fleece submitted to them, and as well from their own observations as from the results of a microscopic examination made

and certified to by several gentlemen of scientific eminence well known to them, they are convinced that the fiber of these fleeces is identical in character, and fully equal in value, to that from which the highly prized Cashmere shawls were made. The fleeces on exhibition, and now under examination, amount to from 4 to 8 pounds each.

The enterprise exhibited by the introduction of these animals into this country and their propagation can not be too highly regarded.

First. These animals are long lived, such being the case with the whole goat race.

Second. They are prolific, breeding at the age of 1 year, with a period of gestation of about five months, and yielding twins almost universally after the first birth.

Third. They are hardy, experience having shown that they will thrive well in our climate from Georgia to New England, and that they require coarse and cheap food—as the inferior grasses, briers, bushes, etc.—such as is refused by other grazing animals.

Fourth. They produce a fleece of from 4 to 8 pounds, valued at from $6 to $8 per pound in France, or Paisley, Scotland, for the manufacture of those high-priced shawls. These fleeces can be produced, when the animals become numerous, at a less cost than the common sheep's wool and far superior to it.

Another fact of great practical value to our agricultural interests is the facility with which the Cashmere goats breed with the common goats of our country.

From these and other considerations, of the correctness of which your committee have entire confidence, it will be obvious that every encouragement should be shown this new enterprise—a bold and judicious movement.

B. P. Johnson.
Charles J. Goodrich.
James J. Mapes.

A committee for the New York State fair, held in New York City in 1854, reported as follows:

The undersigned can not avoid the conclusion that in the goats imported, and whose descendants have been the subjects of this examination, we have the first-known specimens of that valuable race of animals from whose hairy fleece the celebrated shawls are manufactured known in commerce by the inappropriate name of "red camel's hair." As the fleece does not appear to have deteriorated in the comparatively warm climate of South Carolina, the distinctive character of the race is hard to be obliterated, while in the northern region of the United States this character can not well fail to be permanent. Viewed in this light, the introduction of this animal promises to be of more value to the agriculture of the United States than that of almost any other animal.

James Renwick.
Joseph R. Chilton.
W. H. Ellet.

Many other similar reports were made by committees of fair associations about that time, but those quoted serve to show how favorably goats were regarded. It should be stated here, however, that there are in these reports many erroneous statements. For instance, the goat is not the Cashmere; they drop twins occasionally only, and their fleece never did bring as high as $6 to $8 a pound.

All of the Davis importation of purebred Angoras were purchased in 1853 by Col. Richard Peters, of Atlanta, Ga., with the exception

of one owned by Col. Wade Hampton, of South Carolina; one sold by Dr. Davis to Mr. Davenport, of Virginia, and one to Mr. Osborne, of New York. Colonel Peters later imported others from Asia Minor, which did not prove to be very satisfactory, as they were gummy. The Savannah Republican in April, 1860, said that Colonel Peters was selling his goats at very high prices, having received $1,500 for one buck; that the president of an Illinois fair was so pleased with one of the bucks on exhibiton there that he offered Colonel Peters "the weight of the buck in silver for it." Colonel Peters is looked upon as the real founder of the Angora goat industry in the country. Although Dr. Davis had crossed the Angoras with common goats to some extent, it was Colonel Peters who demonstrated the possibility of erecting an excellent fleece-bearing flock by judicious crossing with common goats. Other importers were Hon. W. H. Stiles (1860), 8 head; Diehl & Brown (1869), of Ohio, of 135 head; Price Maurice,[1] of Australia (1870, 1871, 1872, 1873), who imported 16 bucks and 168 does for his sons, who were settled at Fort Clark, Tex.; John S. Harris (1876), then of California, now of Oakley, Idaho; C. W. Chenery (1867), of Massachusetts. A. Eutychides (1869?), a native of the province of Angora, brought over a flock numbering 175 and made a vigorous effort to bring them more largely to the notice of the American public. After several years of doubtful success he returned to the Old World to engage in farming in Thessaly.

John S. Harris says that, with the exception of Hon. Israel S. Diehl, he is the only man who ever went into the province of Angora for the mohair goat; other goats that were imported came through agents.

These are about all of the earlier importations from Asia Minor. Of recent years some excellent individuals have been brought from Cape Colony. Turkey has since 1881 prohibited the exportation of Angoras, and Cape Colony, observing with jealous eye the rapid progress now being made in the United States, has placed an export duty upon Angoras of £100 ($486.65). W. Hammond Tooke, writing of the mohair industry of Cape Colony in the Agricultural Journal of the Cape of Good Hope, says they have nothing to fear from Turkey or Australia, but that the United States gives them more concern, as the breeding of Angoras for mohair is no longer considered an experiment in the United States.

Previous to the outbreak of the civil war there were many fair-sized flocks in the South and Southwest. There were smaller flocks in many of the Northern and Western States. Mr. Diehl, in 1863, mentions flocks containing from 300 to 1,200 and more in Atlanta, Ga.; Gallatin and Nashville, Tenn.; Russellville, Frankfort, Paris, and

[1] This statement is made upon the authority of Gustav A. Hoerle; but C. P. Bailey says he has never been able to verify the presence of this importation in Texas, and I am informed that Col. W. L. Black, of Texas, also fails to locate them.—G. F. T.

Georgetown, Ky.; Greenville, Lebanon, Montgomery, and Bucyrus, Ohio; Green County, Ind.; Chicago, Decatur, and Evanston, Ill.; St. Louis, Maramee, and Fayette, Mo.; Baltimore, Md.; Leavenworth, Kans.; Brownsville, Pittsburg, Washington, and Philadelphia, Pa.; New York City, N.Y.; Boston and Belmont, Mass.; Austin, Tex.; and in the States of Iowa, Michigan, Minnesota, California, and in other localities. So it will be observed that they were so distributed as to test in a most excellent manner the several phases of our climate upon them. On account of the civil war, however, little or no progress was made in the South, where the largest herds were located and where most interest was manifested, until about 1866. Soon after the close of the war they spread out into the West, principally into Texas and California, where the natural conditions were most favorable, and where they have, quite unknown to the public, increased wonderfully in numbers and, in the light of recent events, in importance also.

In the spring of 1861 Colonel Peters sold two 16-months-old bucks to William M. Landrum, of San Joaquin County, Cal. They were sent from Atlanta to St. Louis by express; thence by steamer to Fort Leavenworth, and thence on foot to California with a wagon train. They subsisted on the journey by browsing on what other animals rejected, and arrived at their destination uninjured and in good condition. Mr. Landrum exhibited them at the State fair the same year, being awarded a silver goblet and $25 in cash. One of the goats, after siring about thirty kids, died of snake bite; the other one, famous on the Pacific coast under the name of "Billy Atlanta," lived to be 10 years old, and then was accidentally killed. He had sired about two thousand kids. This buck won the sweepstakes prize over all competitors at every State fair down to his death; and Colonel Peters stated in 1876 that his numerous descendants were scattered all along the Pacific coast, and that "his blood courses in the veins of over one-half the Angora flocks in that part of the Union, estimated to approximate 70,000." Colonel Peters further stated "that about one-third of the purebreds introduced into California were contributed from the first and original (Davis) importation of 1849, and that their blood is present in probably two-thirds or three-fourths of the Angora stock on the Pacific coast."

Mr. Landrum was in California from 1850 to 1883, after which time he went to Texas. He is now at Laguna, Uvalde County, Tex., and, with his sons, is still interested in the Angora goat industry. The Chenery importation was shipped by the British consul in Angora to Constantinople, where they were sorted by Mr. John R. Thompson and the American consul, and shipped by a sailing vessel to Boston.

Ten head of the Chenery importation were taken to California and disposed of as follows: A pair to C. P. Bailey, San Jose, at $500 each; a pair to Thomas Butterfield & Son, Watsonville; a pair to William M. Landrum, San Joaquin County; a pair to Mr. Pierson, Santa Cruz; and a pair to Flint & Sargent, Monterey County. This lot was the

beginning of the breeding of thoroughbred Angoras in California. Prior to this but two Angora bucks had been taken into the State—the two which were sent by Peters to Landrum.

The Diehl and Brown importation was first taken to Ohio; and afterwards the entire lot, it is believed, was taken to California, where the goats were widely disseminated through the State, some of them bringing as much as $200 a head.

In 1875 William Hall bought of Butterfield & Son their entire flock of 150 goats for about $17,000. The same year John S. Harris joined Hall as a partner, and the following year went to Turkey and purchased ten does and two bucks. These also went to California. It is said that the blood of this importation was felt beneficially in every good flock in the State.

In 1893 C. P. Bailey imported from South Africa two bucks. Pasha (see Pl. VII) was one of these, and his get has been sent to nearly every State in the Union. In 1899 Mr. Bailey imported another buck from Cape Town. This animal is the last importation into the United States.

The statement has already been made that the first goats taken to California were purchased of Colonel Peters by Mr. Landrum. In 1872 Mr. Landrum purchased all the goats under 8 years of age which Colonel Peters then owned and took them to California.

Mr. Julius Weyand, secretary of the Angora Goat Breeders' Association of California, in a report to that organization in 1891, gives a brief review of the industry in that State. He says that in 1885 there were about 100,000 Angora goats in California, but between that date and 1889, owing to the admission into the United States of mohair as carpet wool, and thus paying but 2½ cents duty per pound, the number decreased to 55,000. Mr. C. P. Bailey is authority for the statement that practically all the goats in California are of the Angora breed.

Large flocks of Angoras have been sent from California and Texas into Nevada, Oregon, and Washington, where they have been divided into smaller flocks and become the property of many different farmers. Texas has also sent many over into New Mexico.

Although the foregoing facts show that the Angora goats have been slow in gaining a standing among the industries of the country, it can hardly be doubted that there are now in motion such energies as will place the industry upon a rational basis. It is believed that the Angora industry is already emerging from the chaos which has enveloped it for fifty years past, and that it will soon be as firmly established as any other stock interest in the United States. A recent issue of Wool Markets and Sheep says:

> After careful review of the situation, past and present, the Angora goat industry of this country we clearly conceive is destined to be one of very great importance in our agricultural economy. Our broad acres and diversified geological and climatic conditions give ample scope and abundant suitable conditions for the carrying on of the business to a large extent and profitable issue.

DESCRIPTION OF THE ANGORA GOAT.

Mr. Israel S. Diehl, bearing a commission from the Commissioner of Agriculture, visited the province of Angora in 1867 to investigate the mohair industry. Here, where there were once in operation 1,700 to 1,800 looms working up the mohair fleeces, he found but a few hundred remaining, struggling hopelessly against the fatal competition of European machinery and the aggressive policy of the European Governments. The fleeces were exported to Europe for fabrication, thus rendering Turkey tributary to the monopoly then existing in this industry in Europe. The European demand for the raw material was so great and the facilities to fabricate it so much better and cheaper that Turkey was compelled to export the raw mohair. In order to meet the demands for manufactured mohair the Turkish growers, without wise foresight, began the practice of crossing the Angora upon the common Kurd goat of that country. The inevitable result of such a policy was to bring about to a large extent the conditions which have obtained in the United States, namely, a breed of Angoras of uncertain purity. This fact, coupled with the belief that proper care was not exercised in selecting the animals exported to this country and that they have been carelessly bred here, has led some excellent judges of Angoras to express the belief that there are really no purebred Angoras in the United States.

These conditions have produced various types of Angoras, even in Asia Minor, and a minute description of one would not apply to all. Some strains have fox-like ears, while others and generally preferred ones have long pendent ears. In this country care must always be exercised to cull the offcolored kids out of the flock. These may be the result of atavism, where a cross was made upon a common goat either red or black; but it is reported by some that different colors are found in the province of Angora among what were supposed to be purebred animals. Mr. Gustav A. Hoerle, one time corresponding secretary of the American Mohair Growers' Association, and an authority of note on Angora goats, mentions having yellow and red goats in his own herd, and said that "some of the kids became quite a variety show."

Mr. S. C. Cronwright Schreiner, of Cape Colony, in his excellent work on "The Angora Goat," has compiled the descriptions of almost all writers on Angora goats. He quotes Mr. Henry O. Binns, who spent twenty years in the mohair districts of Asia Minor between 1864 and 1886, and who studied them during that time, as follows:

> The pure Angora in his prime is about the size of a five-months-old Cape [Cape of Good Hope] kid, with small thin horns, wooled all over the body, their hair almost covering the eyes; exceedingly delicate, and so subject to disease that no one cared to keep him. What is to-day called the purebred Angora is like the English thoroughbred horse—the result of crossing and recrossing until body, class, points, etc., have attained to what is generally considered that the thoroughbred Angora ought to be.

Mr. Schreiner's opinion of what a purebred Angora is, given on page 58 of his book, is as follows:

I think it is certain that the original purebred white mohair goat was a small, very refined, delicate animal, of great beauty, clipping at twelve-months' growth of fleece about from 2 to 4 pounds (according to age and sex—kids considerably less) of dazzling white, fine, soft, silky, very lustrous mohair, curling in ringlets from 10 to 18 inches long, with merely the minimum of oil in its fleece requisite to the growth of hair of the highest excellence, so small in amount as to be inappreciable to the unskilled observer. It was perfectly clothed in every part; it had short, silky, curly hair about the face and down the lower parts of the legs to the hoofs; a soft, silky, curly "kuif" (tuft on the forehead), and small, thin, light-colored horns. The ewe was of course smaller and finer than the ram, and had only one kid at a birth (of this there is abundant evidence).

Although Mr. Schreiner thinks the Davis importation to this country was among the best bred goats that ever left Turkey, it will be noticed from the pictures of two of them shown herein (see Pl. I, p. 16), which were said by Colonel Peters to be excellent, that the mohair does not extend "down the lower parts of the legs to the hoofs." It is doubtful if any such Angoras may be found existing at this time, however probable they might have been in their original purity.

The following is quoted from Dr. John Bachman,[1] of Charleston, S. C., who was appointed by the Southern Central Agricultural Association of Georgia to report on the Angoras belonging to Colonel Peters, of Atlanta:

The Angora goat, more especially the varieties it has produced, is described by Hasselquist (1722–1752), Buffon (1707–1788), Pennant (1726–1798), and others as in general of a beautiful milk-white color, with short legs, and black, spreading, spirally twisted horns. The hair on the whole body is disposed in long pendent spiral ringlets; its ears are pendulous, and the horns of the female, instead of divaricating as in the male, turn backward, and are much shorter in proportion.

Mr. Diehl[2] (1863), adopting to some extent the same language as Dr. Bachman used, describes the Angora as follows:

The Angora goat, and more especially the varieties it has produced, are probably the most valuable of all the goat family, and have been ably described by Naturalists Buffon, Pennant, Hasselquist, and travelers as good-sized animals, generally of a beautiful milk-white color, with short legs and wide-spreading, spirally-twisted horns. The wool is described as a very beautiful curled or wavy hair of silvery whiteness, with a fine downy wool at its base, and this hair is disposed in long, pendent, spiral ringlets on the whole body. The horns of the female, instead of spreading, as in the male, turn backward, and are much shorter in proportion. Those of the male are long, spirally twisted, but the size and direction are very different from the common goat, being generally extended from 15 to 30 inches in height on each side of the head, while those of the female are near the ears. The hair, or wool, often sweeps to the ground, and is usually from 5 to 12 inches long, especially in the older bucks, but then not so fine.

This brief description, he said, applied to all the Angoras which he saw in western Asia, Europe, and in this country, which amounted to

[1] "Report on Asiatic Goats," United States Agricultural Report, 1857, p. 58.

[2] "The Goat," United States Agricultural Report, 1863, p. 222.

several thousands, except as to a difference in ears, for, while some had pendent ears, others which he examined had ears exceedingly small and short.

Mr. Diehl also mentions a variety of this goat in Angora which was hornless. There is reason to believe that an intelligent system of breeding would produce such result. Such an end has been attained with cattle and is entirely feasible with goats.

In this connection, interest will be manifested in a note from Col. William L. Black, of Fort McKavett, Tex., who says he has an interest in a flock of hornless Angoras in Iowa. He says that there is no doubt that it is a "distinct breed." His experiment the first season was seven hornless kids from eight does with horns, and the second season (1900) he raised "fully 90 per cent of hornless kids." Hornless Angoras, however, were not very rare in Asia Minor, and it may be that there were some in the vilayet of Angora. They were called Kastamoonee[1] Angoras, taking the name from the vilayet of that name. The vilayet joins that of Angora on the north and forms a part of the northern boundary of Asia Minor. Several years ago Mr. William M. Landrum imported one of these Angoras. He was known as "Hornless Johnnie." Mr. Landrum was not very proud of this animal, as would appear by this from his pen in 1899:

> He sheared 10 pounds at six months, but his hair was too coarse for anything but wigs. I bred him to a lot of purebred Angora ewes and got the best lot of bucks for low-grade ewes that I ever saw; got $50 premium for them over purebred Angoras. I paid $2,000 for him, and lost him the second year. If he had lived I would have injured my purebred flock with him. As it was, I killed for mutton several ewes got by him from purebred ewes to get them out of the flock. I could not certify them to be pure Angoras.

It is to be hoped that Colonel Black's efforts to originate a hornless variety will produce better results than were obtained from Hornless Johnnie. Of course, the presence or absence of horns need not necessarily have any influence upon the qualities of a goat.

Probably the best description of the American Angora is that given by Mr. Gustav A. Hoerle, which is given below. Reference is to first-class animals, and not to grades of various degrees:

> The body should be long, and the rounder the better; the back straight, with shoulders and hips equally high from the ground; shoulders and quarters heavy and fleshy; chest broad, indicating good constitution; the legs should be short and strong; the head is in shape like that of a common goat, but less coarse and cleaner cut; the horns are heavy, with an inward twist, inclining backward and to the outside.
>
> Except just the face and legs, from the hocks and knees down, the entire animal should be densely covered with mohair, and neither the belly nor the throat nor even the lower part of the jaws should be bare, but should have a good covering of fine, silky mohair, and with the finest specimens the mohair tuft on the forehead should be well developed. The mohair should hang in long, curly ringlets. However, not every Angora goat which shows these perfectly curly ringlets of the mohair

[1] This name is variously spelled—Kastamoonee (preferred by Lippincott), Kastamouni, Kastamuni, Castambool, Castambul, Costambone.

must necessarily be considered a thoroughbred; whilst, on the other hand, there are quite a number of really handsome and valuable thoroughbreds whose hair has not that much-desired shape, owing entirely to climatic and nutrimental influences, as well as to advancing age. Thoroughbreds and all nonshedding grades can easily be recognized by the peculiar shape of "points" of their mohair, each end showing plainly that it has been "cut off," instead of running gradually to what is called a "steeple point," which is found with the hair of all kids and of shedding grade Angoras. The plainer and longer this blunt point shows toward the end of the year the better is the fiber of the mohair, and the more valuable is the hair for combing purposes and the smaller the percentage of noilage and waste. After shedding, as well as nonshedders after shearing, the mohair grows very rapidly for some months. It grows slower toward the end of the year, and, with very bad climatic and nutrimental influences, almost stops growing entirely. Therefore, if the late fall shearing is practiced, Angoras need good care during winter. The more even in length and quality the mohair is on all parts of an Angora body the better. When in full fleece the body of a fine thoroughbred Angora should appear like a right-angled square, with no gaps or deficiencies of covering, especially below the belly.

Mr. Hoerle is encountering some opposition to his ideas of the nonshedding varieties. Because of this difference of opinion the Bureau submitted the question, "Do thoroughbreds (fourth cross or above) shed if not sheared?" to a large number of the breeders of the country. A summary of the replies received is given elsewhere (see p. 79).

A characteristic of the common goat that is very objectionable is the ever-present offensive odor from the bucks; in the Angora breed this odor is entirely absent, except at the rutting season, and then it is noted in a slight degree only. The odor in a fleece of mohair is milder than that in a wool fleece, and is not at all offensive.

NAMES OF THE BREED, THE SEXES, AND THE MEAT.

NAME OF THE BREED.

There was no difficulty in dropping the name "Cashmere" as soon as it was known that the Angora goats did not belong to that breed, but there are a few uninformed persons who still refer to them as Cashmeres. Owing to the prejudice existing against "the goat," it has been suggested and strongly urged by some that the easiest and quickest manner of ingratiating the Angora goat with the people is to drop the word "goat" altogether and call them simply "Angoras." In other words, it is proposed to pretend that this animal does not belong to the goat family. It would still be a goat notwithstanding, and students of science would forever be pointing out the pretense. Besides, the use of the name "Angora" alone would almost certainly lead to the commission of errors. Everything of American origin is referred to as being "American," and the various animals from the vilayet of Angora could with equal propriety be called "Angoras." For instance, the long-haired cat from that province is quite well known in this country and is called an "Angora."

The American people desire to know things by their right names. This is a principle more deep seated than mere prejudice. A great amount of prejudice had to be overcome before the tomato was generally used for food, and we can imagine in a degree what was said of the first man who ate an oyster or a mushroom. But these "poisonous" and "nasty" things are now recognized everywhere not only as delicacies but as most nourishing food. So will it be with the flesh of Angora goats when it is generally known that it is palatable and nutritious. A perusal of the many reports received by the Bureau of Animal Industry shows that there is no objection to Angora goat meat in those localities where these goats are raised.

The Angora has everything to recommend it—nothing to condemn it; and there seems to be no real good reason why its identity should be lost by dropping the name "goat." Whoever sees the animal can not fail to admire it, and whoever eats of it is quite certain to like it if he is at all fond of mutton; and the prejudice against it will disappear as the industry expands and develops throughout the country. Indeed, a knowledge of the Angora goat shows that the existing prejudices will not hold against it; that those prejudices are based upon the reputation of the common goat.

NAMES OF THE SEXES.

There are no well-established names for designating the sexes of goats. The male is indiscriminately called "male," "sire," "buck," "ram," and "billy," and the female, "doe," "ewe," and "nanny." Oftentimes a writer uses two or more of them in one article, showing that he has not adopted any of them. One of the questions submitted to the men was this: "As to designation of sex—do you call the male "buck," "billy," or "ram," and the female "ewe," "nanny," or "doe?" More than half of those who replied called the male "buck," and nearly half called the female "doe." The objection of one writer that the plural of the female, "does," conflicts in reading with the verb "does," will not hold, as a sentence will not "make sense" with the one word used for the other. In this bulletin it has been decided to refer to the sexes as "buck" and "doe."

The castrated animal is called "wether," as with sheep. In Cape Colony he is called a "kapater," and the sheep wether is there called a "hamel;" but there is no reason why we should adopt these terms.

The young is called the "kid." There seems to be absolute unanimity in this matter.

NAME OF THE FLESH.

Our correspondents are apart in the use of the terms "Angora mutton" and "Angora venison" for the flesh of the Angora goat, but the greater number of them call it by the former name. Those who pastured their goats upon some grass or clover as well as upon browse,

and then finished their fattening with grain, produced a meat so nearly like the best lamb that it required experts to detect a difference; these people use the term "Angora mutton." In other instances, where the animal is fattened by browse alone, there is imparted to the meat a game flavor, which may be intensified or reduced by the character of the browse; people who use the meat under these conditions call it "Angora venison."

Some correspondents, with evident thoughtlessness, refer to the meat as "goat meat." This is a serious blunder if a successful effort is to be made to popularize the use of Angora mutton, as there is a wonderful difference between the flesh of the common goat and that of the Angora. For this reason the prefix "Angora" should never be omitted.

THE USES OF ANGORA GOATS.

A large class of people in some way have become possessed of the opinion that the goat is practically a useless animal. They do not reach conclusions upon investigations, however, and do not discriminate between the different breeds. To them a goat is a "goat," and there the argument ends. Investigations prove that the Angora goats are not only classed among the most useful of the domestic animals, and have been so classed for thousands of years, but their usefulness is manifested in a variety of ways. The fleece, called "mohair," furnishes some of the finest of fabrics among ladies' goods and is used in various other manufactures; their habit of browsing enables the farmer in a wooded locality to use them to help in subjugating the forest; their flesh is exceedingly delicate and nutritious; the milk, though not so abundant as with the milch breed of goats, is richer than cow's milk; their tanned skins, though inferior in quality to the skins of the common goat, are used for leather; their pelts make the neatest of rugs and robes; they are excellent pets for children; a few of them in a flock of sheep are a protection from wolves and dogs; their manure is noticeably helpful to the grass which follows them after they have cleaned away the underbrush. These are all vital subjects of varying degrees of importance, and will be considered here under appropriate heads.

BROWSING AND PASTURAGE.

Ability to clear brush land.—Goats are browsers by nature, and there is no vegetation they will eat in preference to leaves and twigs of bushes. While this fact would at once establish them as an intolerable nuisance in an orchard or garden or any other place where desirable shrubbery is growing, it also shows that they may be of great value in many localities where it is desirable that underbrush be destroyed. They are omnivorous eaters and seem particular to avoid that character of vegetation which other kinds of live stock prefer. Every leaf

and every twig within their reach is greedily eaten, even to most of the bushes and weeds that are considered poisonous to other ruminants, while a remarkably few weeds are passed by. They will desert the finest clover and blue grass for such an outlay.

The inherent tendency to climb leads them to hillsides and rocky cliffs, and they prefer such situations to any of a level character. Here nature meets their necessities by dwarfing the bushes so they may be browsed easily; the soil is quickly drained in the event of rain—for they do not like wet land; and the stones serve to keep the feet trimmed properly by the wearing process. This is the situation that the goats would choose; but the farmer might choose to turn them into a dense mass of brush and weeds anywhere and they will at once begin to convert it into the most beautiful pasture.

In those localities where valuable land is completely subdued by brush the goats are considered of more value for the purpose of clearing it than for their mohair or meat. They thus become one of the farmer's important tools. Their value in this respect must be measured by the value of the land which they will render cultivable. It is said that in Oregon, where Chinamen had been paid as high as $20 an acre for clearing off brush, goats had done the work even better. Sprouts will spring up behind men's work, but goats will keep them down until they cease to appear. True, the goats require more time than men, but their work is better. In this connection an article which appeared in the Country Gentleman of January 11, 1900, is of special interest:

> In 1870 Mr. Landrum exhibited ten head at the Oregon State fair. They were put in a brush pen, where they ate out the brush and peeled the saplings during the fair. As the Willamette Valley was covered with brush and farmers were paying Chinamen $20 and Americans $22 per acre for grubbing, Mr. Landrum suggested the employment of goats instead; and, to demonstrate their effectiveness as substitutes for grubbing, he left them on 3 acres of slashed brush. At the end of the first year the roots were dead and discolored, and at the end of the second year they were rotten and the land mellow for the plow. Then he drove up his California herd of 2,400, the result of fifteen years of breeding, and sold them in small lots from Jacksonville to Portland, scattering them throughout the Willamette Valley. He says he sold as many more later to go to Oregon, where there are now 80,000 head, mostly in lots of 25 to 300. * * * He believes that they are more profitable than any other farm animals. They have cleared hundreds of thousands of acres of brush land in Oregon now in cultivation.

Through the courtesy of Dr. J. R. Standley, of Platteville, Iowa, three illustrations are presented which, as he naively states, shows woodland "before goating, during goating, and after goating." Words can not possibly emphasize the work of goats as brush destroyers so strongly as these illustrations. The first (Pl. II) shows simply a dense mass of hazel, plum, crab apple, several varieties of oaks, and weeds as high as the fence. This land was as nearly like that shown in the other

illustrations before goats were turned in them as it was possible to find. The second (Pl. III) shows a piece of land while goats were operating on it. It will be observed that the brush is dead, and that the weeds only appear to be alive. The third (Pl. IV) shows the "finished product" after two years. The goats had been in the tract shown in Plate III but twelve months when this photograph was taken. The shrubbery that was too large for the goats to "ride down" was cut down, the goats completing the work by eating the soft twigs and leaves. The last piece is ready for cultivation or for pasture for cattle, sheep, or horses. When the goats were first turned into this tract it was as full of brush as the tract shown in Plate II, and they were allowed to run upon it but two years.

The beneficial effect of the goats is not all in the clearing of the land of brush. In many parts of the country nutritious grasses "come in" after the goats have done their work. In the tract shown (Pl. IV) blue grass has by natural methods formed a most excellent pasture. The final result is that the goats not only put such character of land in condition for cultivation, but actually go further by converting a wilderness into a good pasture, thus preparing the way by cheapest methods for sheep, cattle, or horses.

Dr. Standley says that in that part of Iowa where he lives "100 Angoras to each 40 acres of this land for two years would make it as clean as a lawn and as perfectly set in blue grass as a lawn." He has 500 acres of such land cleared in this manner. This land now supports one steer to each acre, whereas before it was cleared there was not enough grass on an acre to make a sheep or goat a single feed. The same experience is reported by Mr. Q. M. Beck, of Beargrove, Iowa, who says: "After running them on such lands here a few years we have a fine blue-grass pasture."

Dr. Standley's experience in the employment of goats for clearing land is extensive, and thousands of goats have been taken into Iowa upon his recommendation. It will interest the readers of this paper to see the following from his pen:

> Land can be cleared of the worst brush known to this country for a little less than nothing by Angora goats. Some one asks how. Simply this: Angora goats will pay a profit and live on leaves and weeds, leaving the land cleaner and nicer than can be done in any other way. Many persons have the idea that goats bark the trees and in that way kill them. They also think that goats wholly eat the hazel and other small brush. There is nothing in this. Goats are no worse to bark trees of any kind than sheep. The way in which goats kill brush is by continually cropping the leaves, which serve as the lungs of the brush. The continued cropping of the leaves makes the brush, as it were, sick, caused by lack of nourishment. This sickness sinks to the very extremity of the roots, thus preventing sprouting. Any and all kinds of bushes are in this way easily killed. Some kinds of brush and some kinds of stumps are of course much harder to kill than others. Many varieties are entirely killed by one summer's trimming of the leaves. Almost any are killed by two years'

trimming. To clear the worst brush do not cut anything that the goats can reach or bend. The tallest or largest is better not cut. All trees and saplings should be cut, and the goats will keep all the sprouts down. If stumps are allowed to sprout one year before the goats are turned in, the sprouts need not be cut. About 200 goats for 40 acres of brush will in two or three years make the land as clean as a garden. If the pasture has only patches of brush, turn in a few goats and it will make more grass for other stock than if the goats were not in. They eat very little grass when they can get leaves. Goats even like weeds better than grass. In clearing brush land in the old way by grub and plow there are always left many eyesores in the way of brushy nooks and bends and steep places which can not be plowed.

There are millions of acres of land in nearly every State in the Union which might be much more than doubled in value by the use of Angora goats at no cost at all. Commence and count the worth of your land, then the fencing, and see if you can afford to leave your brush land so nearly worthless for all time. Then count the cost of grubbing and plowing, if indeed such land is susceptible to the plow. No man can afford to grub and plow brush land in this day and age of the world any more than he can afford to plant a large field of corn without a planter. In hilly or mountainous portions of the country the Angora goat can be made to do a great service in the way of clearing the underbrush, when the land will bring grass after the brush is gone. It would surely be a paying business to buy up large tracts of rough land in the mountain districts, or indeed any brush land in the United States, and clear the brush and set in grass. Afterwards, if the owner liked other stock better, he might dispense with the Angoras. In many places where the country is too bare to furnish sheep with sufficient feed goats will do exceedingly well. In many places where leaves are abundant and there is scarcely any grass, making it impossible to profitably keep sheep, goats will do admirably well.

While Dr. Standley's experience is that goats will not to any appreciable extent peel the bark off shrubbery, the experience of others is quite the reverse. Mr. H. T. Fuchs, of Tiger Mills, Tex., writes in the Farm and Ranch of October 6, 1900, that one summer he purchased some Angora goats which came from a range where they had killed out all the tall sumac trees. On his own range was much of this brush, and his goats had never touched it. It was a treat for the newly purchased goats, and they "peeled the bark nicely and cleaned off every sumac tree in the pasture as high as they could reach (about 6 feet), and in a few days you could see the white, smooth-peeled trees with their dead tops for miles all over the pasture." He adds that fifty men with hatchets could not have done the work so fast or with so much pleasure. Further, he says the goats that had all along been in the pasture "took the hint and went at the bark peeling also." All of which goes to show that the goat is an intelligent animal and is capable of learning much by observation.

Mr. Q. M. Beck, of Bear Grove, Iowa, writes that he had goats on a 23-acre tract, fenced, in one corner of which were 5 acres of clover suitable for hay. The goats not only cleared the way for the clover, but ate the browse instead of the clover. The goats were turned into this piece last June (1900), when they could hardly be seen on account of the brush, while now (September) they can be seen anywhere in it.

Of no less interest is the following extract from an article by Col. William L. Black, of Fort McKavett, Tex., who writes from an experience of many years:

The brush question is a most serious one in a great many of our States. So long as land can be kept under cultivation the brush can be kept down; but when it is once thrown open to pasture briers and brush of all descriptions begin to grow and soon cover the entire surface. Even in our own State of Texas many millions of acres are growing up into brush thickets and will sooner or later become worthless for pasturing cattle, and in many of the Western Territories the same conditions exist. It is supposed that this has been produced by an increase in the rainfall, but I am inclined to think it is not altogether due to this fact. That brush and trees are indigenous to many of our so-called arid districts can be very easily proven by the great quantities of roots that the present inhabitants dig out of the ground for fuel purposes. Not a tree can be seen for hundreds of miles, yet these great roots can be found almost everywhere on the prairies and are a substantial witness to the fact that there was an abundance of trees there at some time or other. Before this portion of the United States was occupied by the white man it was a common practice of the Indians to burn the high prairie grass every fall or winter in order to hunt wild game that was so abundant in this part of the country. Buffalo and deer were as common then as cattle and sheep are now, but the grass was so high in places they could not be seen, and the Indian would burn it off to be able to hunt them more readily. This undoubtedly destroyed much of the growth of trees and, in my opinion, is the true explanation of the roots that are now found in many parts of west Texas, New Mexico, and other Western Territories.

The question is a very important one; and if the goat can be used to keep this growth back, it is certainly well worth the attention of many of our landowners, who may, in a few years, find their land practically worthless. A personal friend writes me that "many pastures are growing up to oak brush and hazel brush in the North, and in New England they are bothered with ferns (called brakes), berry bushes—blackberries, raspberries, etc." This kind of fare would be "peaches and cream" to a goat, and in a year or two the owner would be relieved of a great nuisance, the goats would grow fat, and the land would be restored to a proper condition for grazing other stock on it. Another correspondent in Massachusetts speaks of a certain small island he owned which was so densely covered with brush as to be utterly valueless except to grow mosquitoes. I hear of many parts of the East that are seriously troubled with brush, where many thousands of acres are of no use for grazing purposes, and the profit in farming will not justify the cost of grubbing it. In the Southern States many farms have become worn out and are growing up into brush and weeds. The Angora goat is the proper animal to employ to put these lands in a condition either for cultivation or grazing cattle. But a number of my correspondents have asked me what they could do with the goats after they had cleared the land. In reply to this I will say they can well afford to slaughter them and feed them to hogs, but this is not necessary now. The fashion has changed since I slaughtered goats for their hide and tallow, and there is no trouble in selling all the goats you send to any of our large meat-packing markets.

Mr. E. H. Jobson, having in mind the markets as well as the clearing of land, writes as follows:

The best and most effective way to clear brush land with Angora goats is as follows: It will not be necessary to put up a very high fence; 4 feet of close fencing is plenty and will be sufficient to keep the goats in. The proportion of goats is two and one-half to three goats to an acre of ordinary thick brush land. I believe the cheapest way to clear your land is with yearling wethers, as will be seen later on. If wethers

are used, you must fence off one-third of the land you desire cleared, so the goats can not get to it. The proper time of the year to turn them loose on the brush is after the spring rains have ceased, which is usually about the 1st of June. By this time the leaves will be well matured, and the goats immediately proceed to strip the brush of its foliage, which leaves the stems and branches exposed to the hot sun, which cooks them and kills the brush from its deepest roots to its topmost branches. The hot sun being the most effective, and there being no rains to revive the sap, it makes quick destruction of the brush. By the time that the goats will have the largest portion of the land cleared it will be well along in August, and it will now be time to turn them in on the piece of land fenced off at the start, which is fresh and abundant. In connection with the brush feed allow them one ear of corn a day, and at the end of six weeks they will have cleared the remainder of your brush land, and the corn you have been feeding them will have them in prime condition to be thrown on the market, where they will bring as much as, if not more than, you paid for them. The result is that you have cleared your land, at most, at an actual cost of 50 cents an acre, and besides that, your land is now ready to set in blue grass, which will enable you to rent it to sheep growers at $2.50 per acre, thereby causing the idle land to produce an income rather than a constant incumbrance of taxes, with no profit at all.

An illustration of the value of Angora goats in clearing land is given by Mr. Abe Blackburn, of North Yamhill, Oreg., who says that he now has a pasture that will keep 200 sheep which did not have grass enough to keep a goose when he turned his goats into it a few years ago. The goats have killed out the brush, and the grass has taken its place.

The following quotations from others who have had experience with goats as brush destroyers show how well the work is done, and, to some extent, the character and kinds of brush eaten:

When confined in small bushy pastures they have been profitable in clearing the land. Some of the finest vineyard lands in California have been cleared by goats. A farmer in western Oregon, who has for several years run a small flock of goats in a pasture with dairy cows, says the pasture now produces double the grass it did before he purchased the goats. Lands formerly producing nothing but brush and ferns are now covered with clover and bunch grass. A farmer in Iowa writes as follows: "Their value as brush-land cleaners can hardly be estimated. To a person who has never seen the results of the application of Angoras to brush lands, a ride through my blue-grass pastures is a revelation. Where three years ago the ground was densely covered with an undergrowth of hazel, crab tree, oak, blackberry, and other brush, it is now growing the finest blue grass. At present I have over 600 acres which have been reclaimed, and a conservative estimate would be that the value of the land had thereby been enhanced at least $10 an acre."—*C. P. Bailey, San Jose, Cal.*

Angora goats like a variety of food; they live principally on leaves and young and tender barks and twigs of bushes and small trees, but, if necessity compels them, they will also eat weeds and grasses, and for a time do well on them. The quality of a goat pasture, therefore, depends upon the amount and variety of brush, especially evergreens—as cedar, hemlock, live oak, holly, etc.—which it contains, for on these, as well as the tender bark and twigs of all kinds of bushes, they live principally in winter; and the more of it they find the less grain and hay do they require during the cold spells.—*G. A. Hoerle, Ridgewood, N. J.*

For clearing out thickets and undergrowth of all kinds there is nothing better than these goats. Their pasture will soon look as clear as a cleaned-up picnic ground as

high as they can reach when standing on their hind legs. In this way they can reach 5 or 6 feet high, and they bend down everything they can reach with their fore legs. The brushier the range the better, and the more different kinds of brush and weeds on their range the better they will thrive.—*H. T. Fuchs, Tiger Mills, Tex.*

They more than pay for the expense of keeping them by clearing my land. They clear off the willows, haws, buck brush, and squawberries and leave a good blue-grass pasture where there was a nuisance in the first place.—*J. D. Lewis, Colo.*

He will eat buck brush, black oak, hickory, and all other kinds of brush, jimson weed, ironweed, smartweed, and every other weed that grows, leaving the grass for other animals that will feed after the goats.—*R. C. Johnston, Lawrence, Kans.*

There is good grass here (Wyoming), but my goats won't eat buffalo grass. They will browse on sagebrush, grease wood, scrub cedar, scrub pine, laurel, and willows; but they refuse to eat the best grass that grows.—*W. W. Eheler.*

In Arizona the principal and favorite browsing is live-oak brush.—*J. F. Holder, Ariz.*

The statement is made in a previous paragraph that goats are omnivorous eaters, apparently preferring those kinds of vegetation that other animals do not eat. The information in the quotations just given indicates that they will feed upon a great variety of plants. With the object in view of ascertaining the different kinds of plants that these goats feed upon, the Bureau requested several stock raisers in various States and Territories in the country to report answers to the question, "What kind of browse do your goats have?" Some information of this character is in the quotations above and more will be found in the replies copied below, credit for the statements being given to the State only:

All kinds of bushes, such as scrub oak, cedar, etc., in Texas. In this part of New Jersey most everything that exists in Texas, except scrub oak and live oak, may be found.—*New Jersey.*

Black oak, sumac, buck bushes, briers, and all kinds of weeds. They will not eat grass if they can get browse.—*Missouri.*

Buck bush, elders, sumac, prickly ash, briers, grapevines, jack oak, ash, sycamore, basswood, and hickory. The latter they do not seem to care much for.—*Kansas.*

Brush, weeds, and grass.—*Texas.*

In southern New Mexico they have live oak and mahagony. They do best on scrub oak.—*New Mexico.*

Oak, hazel, vine maple, ash, willow, rosebush, thimbleberry, blackberry, buck bush, service berry, crab apple, haw berry, soft maple, and some fir.—*Oregon.*

Mostly mountain oak and other classes of underbrush. They will not eat grass if brush is obtainable.—*New Mexico.*

Oak and hazel.—*Oregon.*

Maple, hazel, willow, fir, thimbleberry, cascara, vine maple, cherry, alder, and salol.—*Oregon.*

Willow, ash, and buck bush on low, swampy land in summer time, and straw and fir brush in winter months.—*Oregon.*

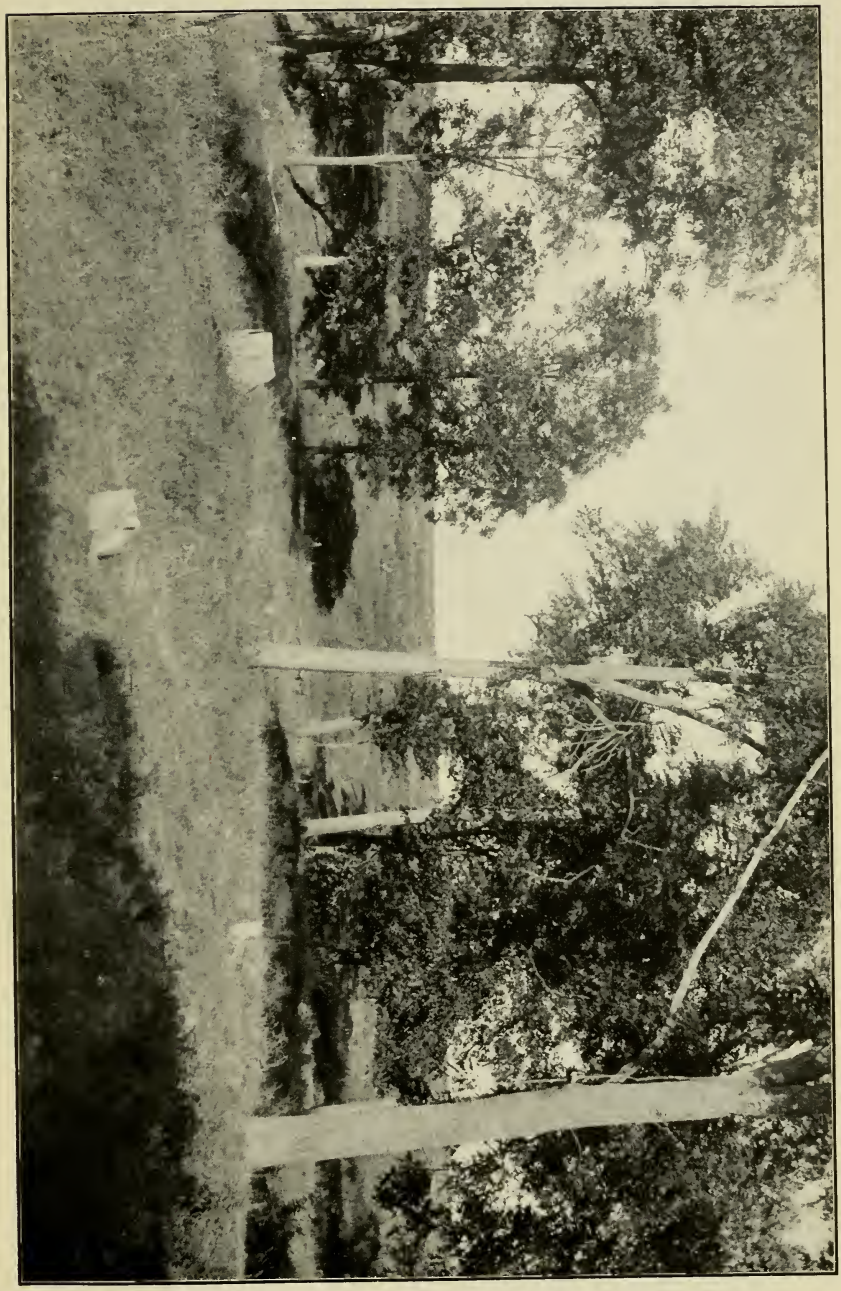
Apple, fir, oak, ash, willow, maple, and poplar.—*Oregon.*

BRUSH LAND "BEFORE GOATING."

(Photograph furnished by Dr. J. R. Standley, Platteville, Iowa.)

BRUSH LAND "DURING GOATING," AFTER TWELVE MONTHS.

(Photograph furnished by Dr. J. R. Standley, Platteville, Iowa.)



Brush Land "After Goating" Two Years.

(Photograph furnished by Dr J R Standley, Prattville, Iowa.)

We have almost all kinds of browse in Arizona, but scrub evergreen oak predominates. We have millions of acres of it, too.—*Arizona.*

Oak, hazel, ash, fir, and madrona.—*Oregon.*

Live oak, post oak, hackberry, elm, black persimmon, black jack, mesquit, mountain cedar, wild plum, etc.—*Texas.*

Several kinds of oak, sumac, grass, and weeds. They will eat almost any kind of underbrush.—*Texas.*

Brush, weeds, briers, mullen, and thistles.—*Iowa.*

All of the undergrowth common to southern Iowa—plum, hazel, four or five kinds of oak, elm, three or four kinds of willow, crab apple, and buck bush (sometimes called turkey berry).—*Iowa.*

Browsing supplements feeding.—The browsing habits of goats is important in connection with the question of feeding. In some places they obtain enough browse to carry them through the winter. This is especially true in the Southwest, where there is so great an abundance of live oak. If snow is on the ground, or for other reasons the goats are deprived of opportunities for foraging, the trees are cut down for them. They pass though the winter in good condition with other feed. Wherever they are deprived of opportunities for browsing, they must be fed. Browsing saves feed. As far north as Nevada Mr. Bailey's goats subsist the winter through on sagebrush.

Browsing adds game flavor.—It is noted that many of the correspondents heretofore quoted state that it is the browsing of the Angora that gives to the meat the game flavor, thus leading some to name the meat "Angora venison." It is also stated that when deprived of browse and fed on grass and grain the game flavor disappears. There is no reason why this should not be true, for it is a well-known fact that flavor may not only be fed into meat, but into milk and eggs as well.

Common goats as brush destroyers.—The fact must not be overlooked that the brush-destroying habit is common to all kinds of goats. The common goats will do the work as well as the Angoras. The latter are employed for the purpose because they are more plentiful and because there is profit in their progeny for breeding purposes, their mohair, and their meat.

Preserving brush land for browsing.—Up to this point consideration has been given to these goats as a means of clearing land for pasture or for cultivation. There is much brush land in the United States which will support goats but is good for nothing else. If this is to be devoted to goat raising, it is, of course, not desirable that the brush be entirely exterminated. In this event a goat raiser should have several fenced areas and change the goats from one to the other frequently. They should not be permitted entirely to denude one field before they are transferred to another. It is true, however, that no matter how perfectly a woodland may be cleared of brush it will be

covered over again with briers and brush in a few years if constant attention is not given it. It is not difficult to overpasture such land, and if the goats adopt the "peeling" practice the brush and trees will have greater difficulty in recovering.

Grass and weeds as pasturage.—Considerable interest has been manifested in the Angora industry in those localities where browse is not available and where grass and weeds form the only pasturage. A great many inquiries of this character have come to the Bureau, and the Bureau, in turn, has referred the matter to the breeders of the country. The replies received have been numerous, and show a difference of opinion. The predominant opinion, however, seems to be that the goats thrive best under the conditions most nearly like those of their original home. It is certainly the best argument to say that goats prefer any kind of browse to the most nutritious of grasses, which is true, and therefore browse is better for them than grass. While the more economical conditions obtain where there is an abundance of browse, it is not definitely settled that the goats will not thrive well on common pasture grasses. It is the opinion of the writer that this question is still an open one, as some successful breeders have had goats on the grass range for thirty years. From the standpoint of the goat's preference, there is no question that browse is the better food, and this in itself is a forceful argument.

There is always expense in connection with pasture grasses, but there is little or none with browse. One of the chief reasons why goats are receiving so much consideration at this time is that they are practically inexpensive feeders, and so all items of expense must be figured on if profit is to result. Pasturage, unlike browse, is not available all the year through. Therefore in prairie locations feeding in winter is a necessity. One of the recommendations in favor of Angora mutton is that it has the flavor of venison. This flavor is imparted by the browse, and is absent in the mutton made from grass or grain feed. Many claim that the animals make a better growth among the bushes than on open pastures, and that the quality of the fleece is much better. Contrary to this, however, is the opinion of Mr. Philo Ogden, of California, who says: "The fact is that the brush disappears from my range and the fleeces become heavier, with less wax or gum, and has more luster. Further, 75 per cent of the young stock are larger than their parents and shear more and finer hair." He says, also, that his experience in raising Jersey cattle was similar, in the respect that as they were taken out of brush pasturage and grown on grass pasturage they obtained a larger frame, so much so that sales failed because of a suspicion that they were not purebred.

Opinions of several correspondents of the Bureau are given in the paragraphs following:

It is not advisable to raise goats for their mohair on farms on which they will be obliged to feed to a large extent on grass and forage plants which are suitable for sheep.—*H. M. Williamson, Portland, Oreg.*

My experience is that on plains, and with grass as the only food, thoroughbreds would not do well, while the lower grades may do fairly well so long as the altitude is sufficient. Usually the mohair is somewhat dry and coarse where grass is predominant.—*G. A. Hoerle, Ridgewood, N. J.*

Where there is grass and brush, they leave the grass and eat the brush. They prefer browsing.—*Cook & Buck, Oskaloosa, Kans.*

Brush and weeds are the proper feed for goats, but they will do fairly well on grass alone.—*Harris & Baylor, Montell, Tex.*

They must have some brush.—*U. S. Grant, Dallas, Oreg.*

Experience has proven that they will do as well on prairie farms as on any other place, but they should have artificial shade for hot weather.—*E. H. Jobson, Lake Valley, N. Mex.*

High-bred stock will do specially well.—*V. Cladek, Larwood, Oreg.*

They will do well anywhere that they can get green food.—*Abe Blackburn, North Yamhill, Oreg.*

Angoras will do well on prairie farms if they are changed into different fields often or have a large pasture.—*Oscar Tom, Angora, Oreg.*

They do well on prairie farms, but do better on bushy or hilly land. One of the advantages of Angoras is their adaptability to rugged bush land which is unfit for other stock.—*C. P. Bailey, San Jose, Cal.*

Angoras will do well on grass and weeds, but will do much better if they can get considerable browse also.—*Josephus R. Barnette, Globe, Ariz.*

Only in small numbers will they do well on grass and weeds, but where they are kept in large numbers they need a good deal of brush and timbered country. Of course, they will do well on prairie if they get some corn.—*H. T. Fuchs, Tiger Mills, Tex.*

They will do first-rate on prairies, where grass and weeds are the only pasturage; but they will then have to eat the feed which the other stock require, whereas, on brush ranges the capacity of the land for carrying sheep and other grass-eating stock is not lessened by the presence of Angoras.—*W. G. Hughes & Co., Hastings, Tex.*

I pastured two summers on grass and clover, and they did as well as when on leaves and weeds. I am confident that a farm cleared of brush can successfully be used for Angoras.—*J. R. Standley, Platteville, Iowa.*

They need a great variety of feed and rough range, with plenty of pure, clear water.—*W. T. McIntire, Kansas City, Mo.*

They do well while the grass is green, but do not like dry grass or weeds, and always do better when they get some brush. They will have to be fed in winter on prairie farms.—*H. I. Kimball, Maxwell City, N. Mex.*

Pasturing with other stock.—So far as the goats themselves are concerned, they may be kept in the pastures where there are sheep, cattle, and horses. Their presence is in no way obnoxious to any of these animals. It has already been pointed out that a few of them in a flock of sheep are a protection against dogs. However, it is not best for the goats that they be kept in pastures with horses. This is especially important if there are kids, as the horses have a habit of playfully chasing any animal that is not large enough to defend itself, and they are apt to strike the kids. It is also important that the kids should not be in pasture with hogs, which are liable to eat them.

Number of goats to an acre.—This is a question frequently asked, but certainly no thoughtful person expects a definite answer. The number will depend, first, upon the object in pasturing on brush land, whether it is to kill the brush or to use it as a permanent pasture; and second, upon the quantity of feed obtainable. While one acre might be as dense as a jungle, another might have small thickets alternating with grass plats. Thus it will be seen that a definite answer can not be given to this question.

MOHAIR.

Quality of the fiber.—The word "mohair" is the technical name for the fiber of the Angora goat which is used in the manufacture of fabrics. The word comes to us, through the old French "mohere," from the Arabic "mukhayyar," meaning mohair cloth.

Besides the mohair there grows upon the Angora goat a short, stiff hair, which is technically known as "kemp"—a subject that will be discussed in another paragraph. It is held by some writers that this short hair does not occur on the pure Angora, and that where it does appear it is upon Angoras that have been bred up by crossing upon the common goats; in short, that it is a relic of the common goat. This argument seems plausible, at least, for two reasons: First, there is no certainty that any Angora goats now in existence are absolutely purebred, as many years ago the Turkish breeders began the practice of crossing upon the Kurd goats, and thus vitiating the blood; second, it is noticeable in building up a flock by crossing upon the common goats that the short hair is very prominent in the first cross, and gradually grows less as the crosses become higher.

The uses of mohair in manufactures are discussed on page 44 and need not be repeated here. The properties of this fiber which render it desirable are length, fineness, luster, strength, elasticity, and specific gravity, and these are relatively desirable in about the order given. There is no difficulty in securing length and strength, but the other properties must come by the most painstaking care by breeding. Having length, strength, and luster, the manufacturer wants the fiber as fine as can be bred. Good mohair averages about one five-thousandth of an inch in diameter; or, expressed otherwise, 5,000 hairs may be laid side by side in solid contact within the space of 1 inch.

Many mohair growers assert that the quality of the fiber depends largely upon the climate and the feed; and all are agreed that the fiber becomes coarser as the animal grows older. Schreiner says:

> If goats are to produce the best fleeces they are capable of, they must be maintained in uninterrupted good condition. They must have a variety of food, principally shrubs and aromatic plants, and lead an active life; they must, if possible, have running water to drink and be kept free from dust; they must not be kraaled (or shedded) except when absolutely necessary; they must have clean sleeping places and must not be crowded together.

The wide range of prices of mohair in the market is due to various causes, but to none so much as the unevenness in quality of fibers. As compared to the total production in the United States, the quantity of first-class mohair is exceedingly small. The tendency has been to breed for length of fleece and size of animal. While both these qualities are desirable, it ought to be plain to anyone that profit does not lie in these directions wholly.

Mohair in a general sense is an expansive term, covering the fleeces of goats of various Angora crosses. The fleece from a cross between an Angora buck and the common "nannie," although scant, coarse, and of uneven length, is unfortunately called mohair, just the same as that from the best animal. The fleece of the second cross is better, and that of the fourth and fifth crosses very good, provided, always, that first-class bucks have been used. The complaint of the manufacturers is that very little first-class mohair is produced in the United States. It has been demonstrated, however, that a first-class fiber can be produced here. Mr. Meeker, late consul at Bradford, England, the leading mohair market of the world, recently wrote as follows:

There has been on exhibition at this consulate for the past week an American-grown mohair fleece forwarded to Bradford by Mr. C. P. Bailey, of San Jose, Cal. The fleece is that of a 2-year-old graded doe and is understood to have been grown on Mr. Bailey's ranch in Nevada. The quality of the hair has been the wonder of all who have seen it. It has been closely examined by several of the leading mohair dealers and importers, all of whom have expressed the highest opinion of it. One of them, Jonas Whitley, ex-mayor of Bradford, said: "I have now in my warehouse about $200,000 worth of mohair, both Turkey and Cape, and I am entirely sincere when I state that there is not a better fleece in the lot. I will buy all the American mohair like that that may be offered me at the market price. Should it uniformly equal this fleece, I do not know but what I would pay more than the market price. * * * I unhesitatingly say that the sample fleece is as good mohair as is grown."

A well-known spinner of New England is quoted by Mr. Bailey as saying that—

The American mohair is better than any brought from abroad; it is smoother, makes a smoother thread, and runs spindles faster; it is silkier and softer, and I can pick out cloth made from it without looking.

Mr. G. A. Hoerle says:

Samples of our best mohair which were sent to England were classed as equal to the best Turkish, while the best Cape hair was as much as 2 or 3 cents lower, a fact which proves that even if we finally should have to ship mohair to Europe it would, in the long run, pay as well as selling at home.

Those American breeders who have been taught to believe that the mohair of the Cape of Good Hope is so much better than that produced here will find encouragement in the following from Mr. S. B. Hollings, writing to the Midland News, Bradford, England, under date of April 27, 1900:

When I state that the vast majority of mohair clips produced in Cape Colony does not fill the bill of our manufacturers I state the whole and sole reason why Turkish

sorts have been called upon very extensively in preference to that grown in South Africa. * * * I am stating a plain fact that Bradford users do not think that the Cape clip is as yet within 25 per cent of the general excellence of that grown in Asia Minor, and that much remains to be done before users here will avail themselves of that produced in Cape Colony in preference to that grown in Turkey.

The encouragement is not in the fact that the Cape mohair is so much poorer than the Turkish product, but because ours is no worse than that of the Cape. Although the annual product of the Cape of Good Hope is about 12,000,000 pounds and ours only 1,000,000 pounds approximately, the growers there recognize the importance of the American industry. Mr. W. Hammond Tooke, after discussing the Australian possibilities in this industry, says "the United States of America should give us more concern." In the same article, published in the Agricultural Journal of the Cape (May 25, 1899), he states that the breeding of goats here for mohair is no longer considered an experiment, and that the mohair is "much like a large part of that produced in the Cape, consisting of rather low grades, short and crossbred, and only suitable for combination yarns and for mixing with Turkey hair."

As illustrative of the superior value of the mohair from Angora vilayet and Cape of Good Hope, the following table and statement are copied from Schreiner's work (p. 44). The figures represent the average of the four years 1891 to 1894:

	Angora.	Cape.
Mohair goats.....number..	1,230,000	2,891,233
Mohair.....pounds..	3,360,000	9,982,709
Per goat.....pound..	2¾	*a* 3½
Total value of mohair.....pounds sterling..	200,000	419,501
Per pound	1s. 2¼d.	*a* 10 7/12d.
Money yield of mohair per goat	3s. 3⅛d.	2s. 11½d.

a Nearly.

The superiority of the Turkish hair is at once apparent, there being a difference in its favor in the above figures of nearly 4d. per pound, and also a difference in its favor in the net return per goat of nearly 4d., although the Turkish goats shear three-fourths of a pound of mohair less per goat than the Cape goats.

Mr. George B. Goodall, of the Sanford Mills, Sanford, Me., points out, in a recent letter to the Bureau, the defects of the American-grown mohair taken as a whole. His mills consume more than a million pounds of mohair annually, some being the domestic product and some the Turkey product, and thus he speaks from large experience. He says:

Before the domestic mohair growers can expect to get anywhere near Turkey prices they must do away with kemp and aim for a fine stapled hair instead of breeding for coarse, heavy fleeces, as many do. The coarser the fiber, the lower the value to the spinner. We often get small shipments of domestic fleeces as choice and fine as

those grown in Turkey, which goes to show what can be accomplished with care and brains. The trouble is more with the grower than with the goats and the climate, for what one man can do another can do.

There are in these quotations hints enough to point the proper course for those goat raisers who desire to make their mohair crop a paying one. If an Angora goat is of most profit in clearing land of brush (as is the case in some localities). his work will be done just as well if he produces at the same time a first-class fleece; thus he may become more valuable. There is no reason why Angoras should have the preference for such work over the common goats, except that they may be profitable in other respects at the same time; therefore the better the fleece produced while destroying brush, the greater the value of the goats.

Influence of age and blood on fiber.—Reference has already been made to the fact that the fiber becomes coarser as the animal grows older. The fiber is also coarse upon younger animals of the lower crosses. The best fiber grows upon the animals of best blood; and among these that upon kids, yearling wethers, and does, in the order named, is preferred. The best fiber is usually very curly, in ringlets rather, but not kinky. It loses its curl and becomes thinner on the goat, coarser, and straighter as the animal grows older. A fiber of best quality is shown on the left of Plate V. It will be noticed by careful examination of this illustration that the samples become less curly as arranged from left to right. The reason for this is that the samples are coarser toward the right. The last sample in the illustration is from an old buck, the one next to it from an old doe, while the two samples on the left are from kids.

The weight and length of fleece.—The weight of the fleece is always a subject of inquiry and is a difficult question to answer, because of the controlling circumstances—such as climate, feed, care, and, above all, the degree of Angora blood in the animal. The briefest answer, and probably the best one that can be made in a general way, is that of Mr. C. P. Bailey, and is as follows:

> Half-breed goats scarcely shear enough to pay for the shearing; three-fourths bred goats shear 1 to 1½ pounds, worth 15 to 20 cents; seven-eighths bred goats shear 2 to 3 pounds, worth 20 to 30 cents; fifteen-sixteenths bred goats shear 3 to 5 pounds, worth 30 to 40 cents.

He adds the important statement that the fourth cross, or fifteen-sixteenths, is the lowest grade that he would use exclusively for mohair.

It would be a difficult matter to state what is the average length of an annual fleece, but 10 inches would probably not be much out of the way. There is on record an account of mohair measuring 20 inches. Mr. U. S. Grant, of Oregon, reports a buck with a fleece 19 inches long. In the southern part of the country, where shearing is done twice a year, the fiber must necessarily be shorter. This is a disad-

vantage, as the spinners prefer a long fiber. Schreiner shows (p. 119) a picture of a buck carrying a 13-months' fleece, weighing 16 pounds, which touches the ground. The feet of the animal are just visible.

The weights of the fleeces in the United States are much greater than in Turkey and about the same as in the Cape of Good Hope. With reference to Turkey, Schreiner says: "It would seem that 14 pounds for rams and 8½ pounds for ewes are about the maximum weights of really first-class fleeces, and that if these weights are much exceeded the quality of the hair is inferior and a good deal of the weight is due to oil and dirt." In the Cape of Good Hope buck fleeces have surpassed 15 pounds and ewe fleeces 11 pounds. Information at hand indicates that the average weights of fleeces in Oregon exceed those of other sections of the country, especially in the warmer portions. This reminds one of the opinion of Colonel Black, that the fleece will be increased 1 pound in weight by moving the goats to the colder Northern States.

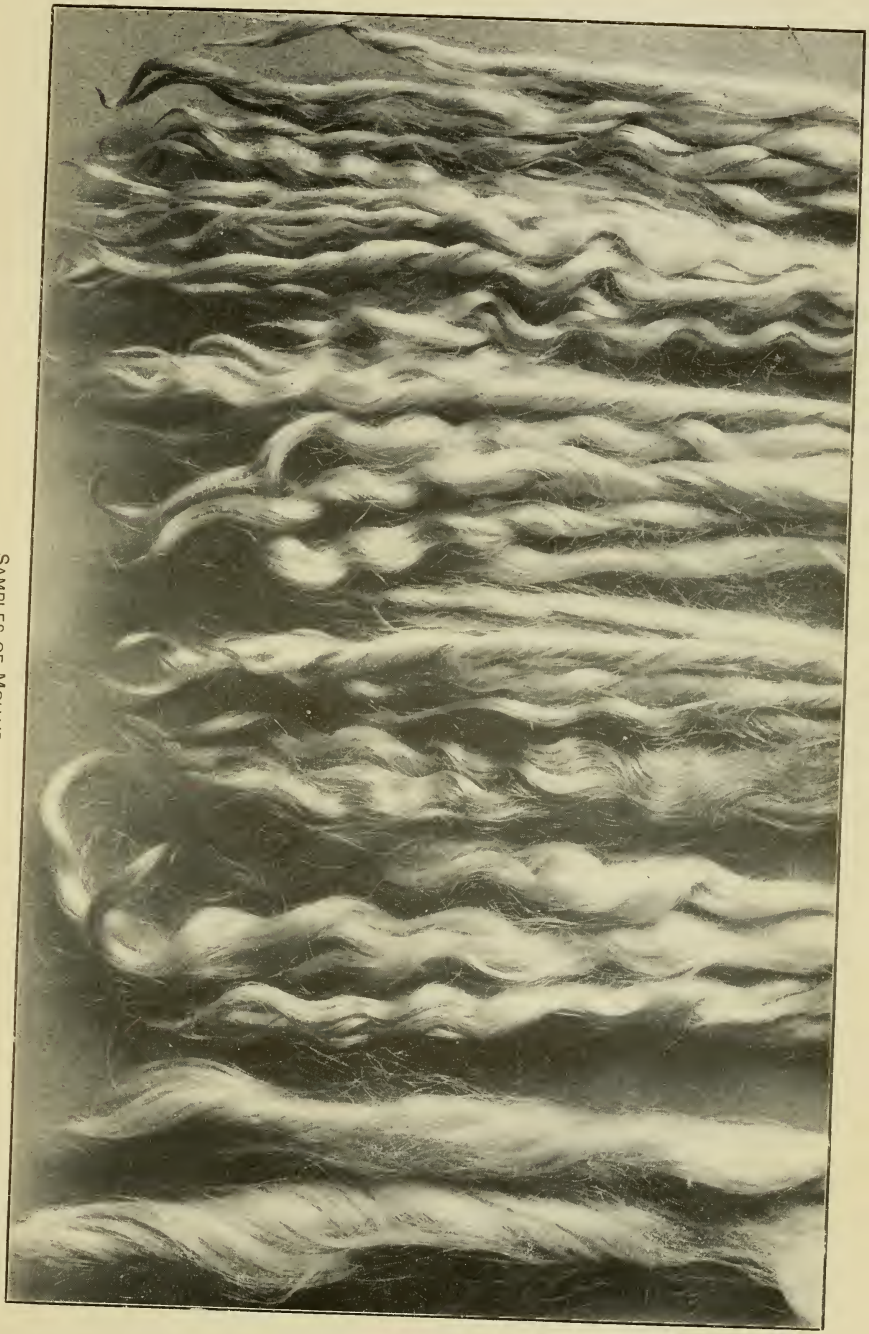
Schreiner says that the goats must not be crowded together in quarters if the best fiber is to be obtained, and Hoerle says that "goats running together in small herds will shear from 25 to 40 per cent more than when running in large herds." The size of flocks is discussed in another place (see p. 75).

The influence of semiannual shearing upon weight of fleece is also discussed elsewhere (see p. 76).

Kemp.—The term "kemp" used in connection with mohair refers, in a collective sense, to the coarse hair of the goats, and is especially noticeable in the lower grades. Hoerle says: "Kemp is the coarse, dead-looking hair all through the mohair, about 2 to 4 inches long, which I consider to be the degenerated remnants of the long, coarse, dead-looking outer coat of some common goats. It is usually thickest on the hind quarters of badly bred goats." Its presence in mohair always reduces the price in proportion to the amount that is present. The reasons for this are various—the hair is coarser than the mohair; it is lusterless; it is of various short lengths and must be removed, in doing which there is a heavy loss of mohair; and it will not, except to a limited degree, take the dyes used for mohair. This last statement is a striking fact and ought to be the means of prompting the mohair growers to strive to breed it out. Whether or not it can be done entirely is an open question, but it is believed by many prominent breeders that it can be done. Schreiner, however, considers kemp a part of the fleece that can not be eradicated completely.

C. P. Bailey & Sons Company say:

> Kemp is a coarse white hair which grows from a separate root sheath between the mohair and is usually thickest upon low-grade goats. It is most noticeable along the backbone and around the tail and upon the thighs. We have never seen a goat entirely free from kemp, nor have we ever seen mohair from any part of the world



Samples of Mohair.

(Photograph furnished by Harris & Baylor, Montell, Tex.)

DOES, TWENTY-ONE MONTHS OLD. FLEECE OF NINE MONTHS' GROWTH.

(Photograph furnished by Dr. J. R. Standley, Platteville, Iowa.)

that was entirely free from it. Kemp may be best detected by separating the mohair upon the thigh of the animal and closely inspecting the roots of the hair. It will be seen as short, coarse, lusterless fibers closely intermingled with the long, silky mohair.

After the mohair sorter has done his work with a fleece the fiber is scoured, dried, and straightened, and then put upon a combing machine. This machine separates all fibers, whether of kemp or mohair, of 4 inches in length and under. Kemp of a greater length than 4 inches remains with the longer mohair. If there is much of this long kemp after the first combing, the fiber passes through a second combing, the machine being set to throw out the kemp and mohair of greater length.

The residue of these two combings, being a mixture of kemp and short mohair, is called noilage. The first lot of noils is about 2 inches long and the second 4 or more inches long. The length of the second noils will vary with different grades of mohair, depending upon the length of the kemp present.

Some mohair will shrink 40 per cent in weight in the first combing and 15 per cent in the second. The mohair thus combed is used in the fabrication of plushes and fine dress goods, while the noils go into the manufacture of carpets, blankets, hats, etc.

In a recent article in the Oregon Agriculturist, Mr. George B. Goodall says:

> A majority of the mohair growers in this country little realize how much kemp has to do in keeping down values of their clips. If they could spend a few hours in our sorting and combing rooms the lesson learned would be of great value to them—more than could be obtained by reading. In watching the combs at work they would notice some making 5, 10, or 12 per cent of noil or waste, while others will be taking out 30 or 40 per cent. Ask the comber the reason of this and he will reply that one lot has a much larger amount of kemp than the other. One fiber of kemp takes out five or six good fibers which should go into yarn. It may not generally be known why kemp is such an objection, but when we state that it will not take color, but remains nearly white in the goods after passing through the dye bath, you will understand why I write so strongly on this point. If you want to form some idea of how a fabric looks made from kempy mohair yarn, just look at a man's hair that has commenced to turn gray, especially dark or black hair.

Through the kindness of Mr. Goodall the Bureau of Animal Industry has received some samples of low-grade plushes for car seats which show the effects of kemp in mohair. Although in this case dyes were used which acted to some extent upon the kemp, the coarse, dull-colored hairs are easily seen. An effort was made to photograph the samples for reproduction in this paper, but it was impossible to bring out the details sufficient to show the kemp, although it was plainly visible, under certain lights, in the plushes.

The following is taken from Mr. E. H. Jobson's Angora Goat Raising:

> In the first crossing of goats the kemp hair will be paramount in appearance with the mohair and will be very coarse, and as the animal becomes better graded the shorter the kemp will be, and it also generally becomes of a finer fiber as the pure

blood is infused. Upon examining the best grade of goats that we have we find that the kemp is very short, probably only three-fourths of an inch in length, and the mohair on one of these goats is 8 inches long and weighs 5 pounds, while the kemp on the second goat is just as scarce and of the same length; also the mohair is of the same length, but the weight is fully 2 pounds more than it was on the first goat: herein lies the difficulty. Both goats have the same appearance so far as examination can determine, but the second goat is inferior to the first because the fiber of his hair is much coarser than the other and contains more of the kempy blood; hence the difficulty in examination appears in the quality of the fiber, which can be detected only by an experienced eye.

The kemp hair will always be known by its being shorter and very coarse and of a chalky-white appearance. It is particularly noticeable on account of its having no luster, which is characteristic of all mohair. The first place that kemp becomes extinct on a goat is on shoulders and neck—i. e., on the sides and along the ribs—and the last place for it to become extinct is along the top of the neck, down the backbone, and on down to the hocks, the hocks being generally the final place for the disappearance of the coarse hair; also you will find kemp to predominate on the belly. Do not understand me to say that the kemp becomes entirely extinct, for it does not, but it is covered up with the mohair and can be seen only by throwing the animal down and examining him carefully, and if he is apparently free from kemp you can examine him on the places above mentioned and you will invariably find more or less kemp, and generally you will find considerable all over the body. A good way to examine the hair is to pull out a small lock and spread it out in the hand, and you can readily discern any coarse hairs that may be in it. It is supposed by the best authorities we have that there are no goats in the world that are absolutely free from kemp, although it is confidently expected by many of the prominent breeders that it is only a question of a few years more of careful breeding until we have a kempless goat.

In addition to the above, Mr. Jobson writes to the Bureau his opinion that there have not yet been produced any goats absolutely free from kemp, but he believes that the intelligence of the Americans will enable them to produce such goats, and he himself proposes to devote several years to the effort. He proposes to begin this work upon the assumption that there is nowhere an absolutely pure Angora goat—that there is at present in all of them in some degree the blood of the common breed.

The discussion of kemp will close with quotations of the opinions of correspondents of the Bureau who have had experience in raising Angoras. It may be stated that a large majority of these men hold that kemp never disappears entirely. The quotations follow:

I don't think that there are 500 Angoras in the United States, thoroughbreds or crossbreds, that are entirely free from kemp. Judging, however, from what I have seen in former years, freedom from kemp can exist, even with second and third crosses, provided the right kind of common does are mated with really kempless bucks. Such experiments were made with bucks of the Price Maurice importations to Australia, of which one buck and two does came to Texas. Mr. Schreiner, the Cape Colony authority, says that none of the pure bloods (so called) imported into Cape Colony from Turkey were free from kemp, and, further, "that kemp can and will be entirely eliminated from our [Cape Colony] best stud goats of our most intelligent breeders I have no doubt whatever," with which opinion I fully agree.—*G. A. Hoerle.*

In all crosses it will still remain, to some extent at least, on some parts of the body; for instance, on the belly.—*H. T. Fuchs.*

It will never disappear.—*Harris & Baylor.*

If only the pure-blooded Angoras are used as sires, kemp will be imperceptible in about six or eight generations.—*Col. William L. Black.*

There is but little in the very best.—*Abe Blackburn.*

There is not much after the first cross.—*Oscar Tom.*

In the fourth cross it nearly disappears, but never entirely.—*C. P. Bailey.*

I can not find kemp in my thoroughbreds, although I have found it in billies that I bought for pure. I think it can be bred out with proper care in selection of billies.—*George A. Houck.*

Other deleterious features.—The very short hair, mane, kemp, and the hair that has been cut twice in shearing are, together, called noils, and this must all be combed out before the mohair can be spun. The noilage in Turkish mohair is only 15 to 20 per cent. In our domestic product it runs as high as 40 per cent. Noils are worth only 14 to 16 cents a pound, the same as short wool for blankets.

In some sections of our country, where the climate is dry and the soil distinctly alkaline, the natural animal yolk disappears from the mohair, leaving it dry, frowsy, and harsh. The dust of the fine alkali soil penetrates the fleece, so that much of the mohair grown in those sections is loaded with it, amounting in some instances to 40 per cent in weight.

Markets and factories.—Two of the questions which the mohair producers were asked to answer were: "Do you have any difficulty in disposing of your mohair?" and "Where do you market your mohair?" The answers to the first question were all firmly in the negative except in one instance, where an Arizona producer replied: "I have no difficulty in disposing of my good mohair, but my short and kempy stock goes slow and at a low price (23 cents)." There is much encouragement in these replies to those who may fear that the markets may not demand the supply. The ingenuity of the manufacturers in working the better grades into woolen fabrics and the poorer grades into plushes which make good car seats, horse blankets, hats, etc., has, no doubt, opened the way for the consumption of all that may be produced.

As to factories, there are more than a sufficient number in this country to manufacture the product; in fact, many of them do not attempt to use mohair for the reason that the supply is so limited. These factories of the United States are all in the East, and the principal market for the mohair is New York. The marketing center of the world is Bradford, England, where practically all the product of Cape of Good Hope and Turkey is sold.

Very few of the mills will purchase direct from the producer. They

find it preferable to buy from the commission merchant, as he separates and classifies the fleeces, and the purchaser is enabled to make personal inspection. A few producers ship their mohair to Boston, and others, especially some of those in the Northwest, sell to commission men in Portland, while others of the West sell in San Jose, Cal.

Production.—The production of mohair will be considered elsewhere (see p. 82) in connection with the world's production and the imports and exports.

MANUFACTURES OF MOHAIR.

One of the reasons why the mohair industry has lagged so in this country during the fifty years since the introduction of Angora goats is that the use of mohair goods was subject to the caprices of fashion. It would not be strictly correct to say that the industry has even got beyond the influence of fashion, but it is at least nearly so. There is now a steady demand for the product of our country, and much is imported besides. Dame Fashion is still whimsical toward all-mohair goods, especially dress goods, but the mohair is mixed with other fibers for producing fabrics of strength and luster, and the home supply is not nearly equal to the demand. Because of the limited and uncertain supply, some mills which have at times used mohair no longer attempt to secure it. They are prepared to use it as soon as the supply will warrant the undertaking.

Mr. George E. Goodall, president of the Sanford Mills, Sanford, Me., who has kindly furnished the Bureau with valuable information, states that his mills consumed 840,000 pounds of domestic mohair and 460,000 pounds of Turkish mohair in 1899, a total amount of 1,300,000 pounds. While these mills are believed to be the largest consumers of the domestic product, there are thousands of pounds consumed by other mills (see p. 82). This proves, first, that there is a good demand for mohair, and second, that the usual estimate of the domestic production in 1899 as being between 600,000 and 800,000 pounds is far below the real amount.

Only a small percentage of the domestic product of mohair is of superior quality, as has been shown in previous pages. The greater amount is of inferior quality from various causes: First, the fleece from the crosses, beginning with the first cross, is called mohair, and is indeed worth something; second, all of the crosses up to the fourth or fifth have a great deal of kemp in the fleece (it never disappears entirely from any cross); third, efforts have been directed too persistently toward producing a large fine-looking animal, the fleece being a secondary consideration; fourth, the staple, when of superior quality, is often too short.

Many grades of mohair are mixed with silk and wool in a large variety of fabrics in which it formerly was not used. It is made into

dress goods known as mohair, and much of what is usually called alpaca is nothing less than mohair. The fine fabric called camel's-hair goods is also of the best mohair, and not from the camel, as we would suppose from its name. "Chamal" is the Arabic word for camel, and the Arabs called the Angora goat the chamal. Mohair braids contest the markets with silk braids and are never out of fashion. The ways in which it is used with silk and wool are numerous. It adds to these fibers not only its brilliant inherent luster, but great durability as well. The growers of mohair are fond of quoting Dr. Davis, who stated in the Agricultural Report for 1853 that "I have socks [of mohair] which I have worn for six years and are yet perfectly sound." He is also quoted as saying that while in Asia he saw wrappers of mohair used by the natives which, they assured him, had descended from sire to son for three generations.

Mr. William R. Payne, an authority, is quoted below on the uses of mohair:

> The most important product of the Angora is the long, silky, wavy fleece, used either pure or in connection with wool, silk, linen, or "carlton" in a variety of fabrics for house furnishings and ladies' goods, brilliantines, linings, braid, plushes, astrakhan cloth, furniture coverings, curtain material, knit goods, fancy effects in shawls and dress goods, and numerous other textiles. * * * The short, low, and crossbred hair is used for blankets, lap robes, rugs, carpets, and low goods generally, but even then is worth more per pound than most sheep wool, varying from 10 to 21 cents per pound. The uses for mohair are increasing every year, and new outlets are being found for it as manufacturers are advancing in the variety of their products.

THE MEAT AND THE MARKETS.

The meat.—In building up a flock of Angoras from common goats (a subject which is discussed elsewhere) the males must not be permitted to grow into bucks of breeding age; and even among the high grades there are comparatively few bucks that should be retained as such for breeding purposes. They should be castrated early. The great majority of these wethers, especially if they are of the first or second cross, do not produce sufficient mohair of good quality to warrant flock raisers in keeping them. These should be converted into meat as soon as large enough. Those wethers and does which produce a fair quality of mohair may be retained for that purpose for a few years and then killed for meat. They are not, however, so good for this purpose as the younger animals.

There is a deep-seated prejudice, as has already been stated, against the use of goats of any kind for meat. This is founded upon ignorance rather than experience. The most ill-smelling "billy" of the worst possible type is by many made the standard of goat meat for the whole of the goat family. As far back as Abraham's day we read of goats being used for meat (very likely Angoras), and this, too, when

there were many cattle and sheep. Certainly no prejudice existed against them at that time.

There is not much to be said about the meat of the common goat. It is not so generally used as that of Angoras. The flesh of their kids is considered very fine, and in some sections of the country goats of all ages are killed for meat. There are comparatively few common goats in the United States, and no attempt is being made to put them upon the market. The current report that goats are sold to the packers in the large cities for canning purposes is true in the main, but refers to the Angora grades. The discussion of this question in this paper deals with the Angoras of all grades.

The flesh of the Angora is exceedingly nutritious and palatable. Shropshire lambs, which are considered as among the best kinds of meat, are said not to be superior to a well-fed and well-cooked kid. In the Southwest these animals are as readily sold for meat as sheep, and the market has never been overstocked. A gentleman in Texas found a ready market for his canned Angora mutton, but was compelled to close his cannery because the supply of goats was not nearly sufficient to supply the demand. In the Northwest the principal use of the Angora is for clearing bushy land, and consequently they are not so extensively used as food. However, in nearly every locality there some have been killed for mutton, and there has never been a derogatory statement concerning its quality, so far as the writer is able to learn.

In Cape Colony it is said that the old does are slaughtered to furnish meat for farm hands and young wethers are sold to butchers in the town. In California many miners purchase Angora wethers in preference to sheep wethers for salting down for winter use, because, as they state, the Angora contains less fat, is more easily kept, and is just as palatable.

Mr. John L. Hayes, in the Overland (1870), said that, in order to test the qualities of Angora and sheep mutton, a dinner was to be prepared with the two kinds of meat, and that the guests were not to be informed as to which was sheep and which was goat, but they were to decide upon the merits of the dishes.

Twelve disinterested men were invited to partake of the dinner and express their opinions of the various dishes they had eaten. Four decided in favor of the sheep's and eight in favor of the goat's flesh; and since that breeders in Monterey County have no difficulty in selling their goats to the neighboring butchers for the same price paid for the best mutton.

Mr. E. H. Jobson, of Lake Valley, N. Mex., is authority for the statement that the wealthy people of St. Louis recently began eating young Angora mutton and that it is now a regular portion of their fare.

One of the questions to which the Bureau sought replies is as follows: "In your opinion, what are the relative values of Angora flesh and mutton?" Several answers to this question, with other quotations upon the same subject, are given herewith:

As a food there is no meat that is purer or more tender. It is better than mutton, as there is not that excessive fat to contend with that is found on sheep. This is a good feature in the Angora venison. In their feeding habits they are very similar to a deer, which alone is sufficient proof of the merits of their food qualities. A young kid is as dainty a morsel as can be found in the meat line. The wealthy people of St. Louis recently took up the fad of eating young Angora venison, and, as a result, it is now a regular portion of their fare; and that fad had done a great deal toward obviating the prejudice which has so long existed against the Angora venison as a food. Angora mutton is now being sold on the market at a fraction of a cent less than sheep mutton.—*E. H. Jobson, Lake Valley, N. Mex.*

If Angoras are castrated or spayed when early kids, and properly fed before marketing, and if this is not done too far away from the slaughterhouses, certainly not more than a two-days' ride (road travel), their meat is fully as juicy as Southdown mutton, while, on the other hand, it is never greasy. This is not only my experience in Texas, but was also that of Mrs. Sarah K. Barmore, of Rockland County, N. Y., who kept a flock of grade Angoras and sold the progeny to her neighbors, principally summer residents from New York City. She emphasized the point that her customers preferred it to ordinary mutton, because it was not greasy. Feed Angoras as much as you choose, they will never lay on fat in thick layers all through the meat, as in the case of other domestic animals. They gain, rather, like deer, in meat principally, which has a slight venison flavor.—*Gustav A. Hoerle, Ridgewood, N. J.*

It is a curious fact, but true, that black-haired animals have darker skins and darker meat than white-haired animals. This accounts for that whiter appearance of the Angora goat flesh, which enables the dealer to market it as mutton. The black hair, from a poetic standpoint, casts its perpetual shadow on the viand and leaves it shaded. The goat flesh is a pleasant and healthy meat. It should be so, since the goat is an eater of clean food, and is possibly the freest from disease of any quadruped.—*Queensland Agricultural Journal, May, 1900.*

The flesh of the Angora goat is said to be superior in flavor to that of any mutton. We have eaten several half-bloods and found them delicious. Some of the meat was put on sale in a local meat market, and the purchasers came back a few days later and wanted more good mutton like that they got the last time. This, we think, is a strong recommendation. The meat is juicy and sweet and has a game flavor.—*Miller & Sibley, Venango County, Pa.*

The Angora is much more nutritious than sheep mutton, especially where the meat is grown on underbrush (leaves), as the following compilation of relative values of feed will show:

Character of feed.	Protein.	Starch, etc.	Fats.
	Per cent.	*Per cent.*	*Per cent.*
Good pasture grass	3.5	9.7	0.8
Rich pasture	4.5	10.1	1.0
Leaves of trees	5.2	15.2	1.5
Red clover	3.3	7.0	0.7

It is often prescribed by physicians for invalids and children for this reason. The meat is excellent, and not distinguishable from mutton of the same age and condition. It is largely sold as such in many of the larger markets, being regarded as a staple in the districts where it is raised.—*W. G. Hughes & Co., Hastings, Tex.*

It is the universal testimony of those who are familliar with Angora goats that the flesh of this animal is far superior to that of the common goat. The Angora is quite as valuable for its flesh as for its fleece.—*Oregon Agriculturist, Portland, Oreg.*

The meat from Angora goats is fully as good as the most juicy mutton. This meat is sought now more than at any previous time.—*Kansas City Drovers' Telegram.*

Anybody who has ever tasted a roasted or barbecued piece of Angora mutton will find it is better than any meat they ever tasted. Angora mutton is worth in the markets about the same as sheep mutton. I sell it to my neighbors at 4½ cents per pound, and in town I sell it at 5 and 6 cents per pound.—*H. T. Fuchs, Tiger Mills, Tex.*

It is better than mutton, being free from the oily taste of sheep meat and partaking somewhat of the flavor of wild meat.—*George A. Houck, Eugene, Oreg.*

Angora mutton is far superior to that of sheep and brings just as much on the market. Being free from disease, why not?—*Josephus R. Barnette, Globe, Ariz.*

Superior, as they live principally upon leaves and weeds, which gives to the meat a game flavor.—*W. T. McIntire, Kansas City, Mo.*

It takes an expert to tell the difference; and, if there is a difference, it is in favor of the Angora.—*Harris & Baylor, Montell, Tex.*

I believe it is superior in that it is absolutely pure, with no superfluous fat, and is as tender as the finest of venison.—*E. H. Jobson, Lake Valley, N. Mex.*

I prefer the Angora or common goat flesh to that of sheep, though I have seen many people who could not tell the difference.—*H. I. Kimball, Maxwell City, N. Mex.*

I consider one as good as the other.—*Abe Blackburn, North Yamhill, Oreg.*

Young goats are fine meat, but old wethers are tough and strong, although good when boiled tender and served cold.—*Oscar Tom, Angora, Oreg.*

The young wethers make the best of mutton. The meat is rich and juicy and free from the strong taste so common to the meat of the common goat. I consider it equal to mutton. We have sold hundreds of head for mutton, always reserving the skins, which are worth green from 75 cents to $2 each.—*C. P. Bailey, San Jose, Cal.*

I think one is equally as good as the other.—*A. T. Waln, Salem, Oreg.*

Angora is very much the best.—*U. S. Grant, Dallas, Oreg.*

It takes an expert to tell the difference, or to tell Angora mutton from venison where the goat had access to brush.—*Cook & Buck, Oskaloosa, Kans.*

I value Angora mutton 50 per cent above sheep mutton.—*V. Cladek, Larwood, Oreg.*

Angora flesh is worth 12 per cent more than mutton.—*Richardson Bros., Dubuque, Iowa.*

It is preferable to mutton, as it does not have the woolly flavor so objectionable to many people. During the browsing season the meat has a venison flavor, but this is lost when corn is fed in the feed lot.—*R. C. Johnston, Lawrence, Kans.*

I am sorry we have no regular market for goat meat. It is as fine as venison when killed in condition and properly cooked.—*W. Brown, Salem, Oreg.*

Local butchers will pay 10 cents per pound for the carcass dressed, the seller retaining the pelt, which brings $2.—*I. McGovern, Libby, Mont.*

Fig. 1.—Angora Buck "Pasha."

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)

Fig. 2.—A Yearling Angora in Cape Colony.

(From the American Sheep Breeder.)

Fleece, 9 pounds. Fleece, 5½ pounds. Fleece, 6 pounds.

ANGORAS, SHOWING FLEECES OF SEVEN MONTHS' GROWTH.

(Photograph furnished by Harris & Baylor, Montell, Tex.)

The markets.—One of the first questions to be considered by a man who is about to embark in stock raising of any kind is the markets for his surplus. This question is first because it is the principal one and all important. The one who proposes to begin with a flock of thoroughbred or high-grade Angoras, such as will yield merchantable mohair, will not need to consider markets, as the increase will be employed to produce mohair; but a large number of flocks will be built up in the future, as they have been in the past, by the use of does of the common breed. This method will necessitate getting rid of every wether for two or three years. All does, of course, are kept for breeding with purebred bucks. It will be ascertained that the fleece of low grades is barely worth the cost of clipping it; that the skin is not so valuable for leather as that of the common goat; and that, as a rug or robe, the pelts are not so valuable as those of the higher grades. Therefore, if there is to be any profit from this part of a flock, there must be a market for the meat.

So many questions concerning this phase of the industry have come to the Bureau of Animal Industry that, in collecting data for this paper, it was decided to go beyond the newspaper accounts and ascertain the facts from the actual producers themselves. The question submitted was, "Do you have any difficulty in disposing of your surplus Angoras for meat?" The answers have been invariably in the negative. It should be said, however, that in the Northwest very few are used for meat. They are considered more valuable there as brush destroyers. The conditions obtaining there are not found in all localities where Angoras are raised. In many places Angoras will be kept where, instead of permitting them to destroy the brush utterly, efforts will be made to preserve brush pasture for them; in the Southwest they are not all required for destroying brush, and thousands must be sent to market.

The reason why goats are not seen oftener in the market reports of receipts and shipments is that they pass as sheep. It is stated, however, that increasing numbers are seen in the larger markets. In the Union Stock Yards of Chicago as many as 8,000 were received in one week last year.

While the goats pass as sheep, they are also sold to consumers as sheep. They have not yet brought as good prices as sheep, and it can not be hoped that they will do so until there is the same demand for their mutton, which will come as soon as the prejudice against goats disappears. The difference is very slight in some places. In Kansas City, for instance, the sheep bring about one-half a cent per pound more than goats. The packers buy them as goats and sell them as sheep in the form of dressed meat or canned.

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Some of the answers to the question submitted by the Bureau are appended:

You ask if I have any difficulty in disposing of goats for meat. None at all. The packers here buy goats as goats and sell them as sheep. They make a difference of about half a cent a pound in favor of sheep when buying, and, as they never sell goats, they save that difference in selling.—*Thomas H. Mastin, Kansas City, Mo.*

None whatever.—*W. G. Hughes & Co., Hastings, Tex.*

Angoras bring now in Kansas City and Chicago within 4 or 5 per cent of the price of ranch sheep, while ten or twelve years ago not half that much could be obtained. Were it not for their unpopular name "goat," the meat would bring by far the highest prices in the retail markets—provided, of course, that they reach the market in proper condition.—*G. A. Hoerle, Ridgewood, N. J.*

I sell readily at the four large markets within 25 to 40 cents per hundredweight of the same grade of sheep. They are purchased by the packers. They dress out more meat than sheep.—*R. C. Johnston, Lawrence, Kans.*

We do not have to dispose of them for meat, as there are parties always anxious to buy. We would have no trouble to dispose of them for meat if we wanted to.—*Richardson Bros., Dubuque, Iowa.*

We do not. It usually sells for a little less than mutton.—*C. P. Bailey, San Jose, Cal.*

There is no sale here for goat meat. Wethers are generally used for their mohair or clearing land of brush.—*Oscar Tom, Angora, Oreg.*

There is not much use being made of them except for clearing land. A few are occasionally slaughtered here.—*Abe Blackburn, North Yamhill, Oreg.*

The demand for mutton goats is greater than the supply. We get good values for the mutton.—*E. H. Jobson, Lake Valley, N. Mex.*

They sell as readily as sheep, but bring from 25 to 50 cents per hundredweight less on the market.—*W. T. McIntire, Kansas City, Mo.*

None sold for meat here.—*V. Cladek, Larwood, Oreg.*

So far all goats are wanted for clearing brush land, and there is no trouble in selling them.—*W. Brown, Salem, Oreg.*

We have a local market which can use three times as much as we produce.—*Josephus R. Barnette, Globe, Ariz.*

Never had a surplus yet, being in demand at fair prices for clearing land.—*George A. Houck, Eugene, Oreg.*

None at all. If fat, the packers will buy them readily. If not, the sheep feeders will buy them for fattening.—*William L. Black, Fort McKavett, Tex.*

Have not. Have used and sold very few for meat, as they are in demand as brush killers.—*J. R. Standley, Platteville, Iowa.*

None at all. I could sell hundreds and thousands as easy as I could sell sheep.—*H. T. Fuchs, Tiger Mills, Tex.*

We do not, but on account of a prejudice against the name "goat," we have to sell at about 50 cents less than sheep bring.—*Conklin Bros., Newville, Cal.*

THE MILK.

The Angora is not primarily a milch goat, and is not often employed for that purpose. The information at hand indicates that the quantity of milk given by an Angora doe is uncertain, and only in exceptional

cases does the amount approach that given by the established breeds of milch goats, such as the Toggenburg, Malta, and Nubian breeds. Some of the records of the earlier importations of Angoras into the United States show that some of them were milked with success. At this time, however, they are not recommended as milch goats; they are more useful in other lines. It is stated upon the authority of some of the oldest breeders in the country that the likelihood of finding a good milch goat among the Angoras diminishes as the grade of the goat is raised. The milking qualities evidently come from the side of the short-haired goats.

The quality of Angora milk is said to be equal to that of any other breed, and more nearly equal to human milk than that of any other animal. For this reason it is considered the best substitute for mothers' milk for infants. An analysis of goats' milk for the British Goat Society, with an analysis of cows' milk for comparison, is shown in the table below. It should be stated that the cows' milk was from a cow which was a winner at a dairy show.

Comparison of analyses of goats' milk and cows' milk.

Element.	Goats' milk.	Cows' milk.
	Per cent.	*Per cent.*
Water	83.21	87.56
Butter fat	7.30	3.63
Casein	4.18	.....
Milk sugar	4.10	8.81
Ash	1.21	.....
Total	100	100

The milk has an additional value in that the animal is practically immune to tuberculosis. Less than a dozen cases of tuberculosis in goats are recorded.

THE SKINS.

The use of Angora skins, other than for robes, rugs, and trimmings as described below, is not very extensive. The skin is of a more delicate constitution than that of the common goat, and so does not make such tough leather. While the skin may be taken as an item of salvage from an animal that has died or been killed for meat, it would not be profitable to raise them for leather alone. If such skins happen to have a good fleece upon them, they will be worth more for robes or rugs, but even then they would not be profitable alone. There must be other sources of profit in addition to the skins. Angora skins are manufactured into morocco for use in binding books, and excellent gloves are made from them which bring from $1 to $1.50 per pair.

An impression is widespread, based upon immature consideration, that Angora skins may soon supplant the great number of goatskins

which we now import for leather, but the quality of the skin precludes any such possibility. Upon this point the Oregon Agriculturist says:

> It is a natural mistake to suppose that Angora goatskins are worth as much, pound for pound, as common goatskins. We have several times noted the fact that this is not the case. Angora skins, after the mohair has been sheared off, will bring only a little over one-half as much per pound as the skins of the common goat.
>
> The only way to keep at home the greater part of the money now sent abroad to pay for goatskins will be to raise enough common goats in the United States to supply the demand.

Hides should be kept clean and should be dried in the shade; sun-dried hides are worthless. If the skins are to be tanned soon after being removed, they may be salted. If they are not to be tanned soon, they should be dried.

ROBES, RUGS, AND TRIMMINGS.

Angora pelts are used quite extensively as carriage robes, and they make up into very handsome ones. There was a time when the buffalo, the wolf, and other wild animals supplied the demand for robes in this country, but the extinction, practically, of the buffalo and the great scarcity of the other animals has forced us to look elsewhere for substitutes. An effort is being made to substitute hides of the Galloway and Polled Angus breeds of cattle, but their high cost will prevent their extensive use.

These conditions have resulted in a greater demand for Angora skins for robes. The skin is sufficiently tough for the purpose, and the fleece is easily dyed any desirable color. This characteristic has enabled unscrupulous dealers to sometimes pass them off on purchasers as the skins of some rare animals. In their natural color, the whiteness and brilliancy of which can not be excelled, the skins of the kids and younger does are made up into robes for baby carriages. There are probably a greater number used for this purpose at the present time than in any other way.

As a general statement it may be said that Angora pelts are worth from $2 to $3. The real value depends upon many things—such as the size of the skin, the length of the fleece upon it, and the time of year that it is taken.

As rugs these skins are found in many households, and they are both ornamental and durable. They may be used in their original whiteness, or be dyed any color to suit. Their softness makes them very desirable.

They are extensively used for trimming for children's cloaks and coats. Some first-class skins have brought as high as $18 apiece for this purpose.

Mr. William R. Payne, of New York City, who has had much experience in handling goatskins, says:

Angora skins properly dressed are used, white or tinted, to manufacture rugs, robes, carriage mats, fur sets for children, trimming for ladies' furs, and also for dusters, horse head tassels, doll hair, and wigs. They are mostly imported raw from Cape of Good Hope and Turkey, and range in value, duty paid, from $1.50 up to $3.50 each, undressed. Domestic skins are worth from 50 cents for kids up to $2 each for large full-fleeced pelts. The low, crossbred, common skins and short pelts not suitable to dress are used by morocco and glove leather manufacturers, and are worth from 15 to 18 cents a pound for large sizes down to 10 and 11 cents for small ones and kids.

PROTECTION FOR SHEEP.

The ability and inclination of the buck to fight varmints has made him in many places a valuable acquisition in herds of sheep. It is said that dogs and wolves will not only not attack a grown goat, but will not venture into a herd of sheep where there is a buck goat. Many owners of sheep in this country recognize the value of the goat in this respect, and keep one or more for the purpose of protection for their sheep. This practice is especially desirable in pastures where there is no herder or immediate oversight. If one or two goats are placed when young in a herd of sheep they will remain with them all the time. An extensive breeder of Pennsylvania says: "While goats do not fear dogs, and will even fight, I prefer to keep dogs out. I have seen them drive a dog out of the yard, and oftentimes a single goat will protect a flock of sheep from attacks by dogs." If they are old and not accustomed to being with sheep, they will in all probability keep to themselves, away from the sheep. They may be depended upon to do this certainly if there is quite a number of them. They are more rapid walkers and more inclined to wander than sheep, and so will flock by themselves. Their protection to sheep will thus prove a failure.

It is quite amusing to see the courage of a doe when she protects her young kid from a dog, or hog, or flock of buzzards. Two of my neighbors' dogs got in the habit of killing my kids, and one doe protected her kid quite a while from the two large, vicious dogs until the neighbor caught one of the dogs and gave him a good whipping, when the goat assisted in this work by butting the dog with all her might. You should train the goats to be brave by taking your dogs into the goat pen with you, and, in case the dog refuses to run from a brave goat, scold the dog to make the goat think that she whipped him. If you had a tame wolf trained in that way you could train your goats to fight wolves.—*H. T. Fuchs.*

ENRICHMENT OF LAND.

The enrichment of land from the droppings of goats is decidedly noticeable wherever they are kept for a year or more. This factor is of no small importance where goats have been employed to clear the brush from land with the object in view of turning the land into grass pasture. Such land, especially if hilly and rocky, is usually in need of fertilizers of any kind if cropping is to be attempted upon it. The manure of goats and sheep is about equal in value. A California firm has been selling Angora manure for fertilizing fruit trees

and lawns for several years. They get $6 a ton (delivered) for it in carload lots. Manure is considered as one of the resources in the best system of modern farming, and it should be taken into account by anyone who is keeping goats or contemplating doing so.

THEIR USE AS PETS.

The purebred Angoras are very graceful, and their beautifully shaped bodies and fine silky hair make them very attractive. There is no animal, except possibly the horse, that is more beautiful than these goats, and no animal is more cleanly in his habits. As pets for children they are very popular, if they can be kept where they will be harmless to vegetation and anything made of cloth. They have all the propensities of the common goat for destroying fruit trees and chewing any kind of cloth and of climbing upon roofs. All kinds of goats are mischievous in the extreme. The Angoras are tractable and are often harnessed to carts, as are common goats, and their beauty makes them more desirable for this purpose.

BY-PRODUCTS.

In the modern methods of economic production and manufacture nothing is permitted to go to waste. Whoever it was that said facetiously that the packers saved every portion of a hog but his squeal spoke the whole truth. The same truth applies as well to the carcass of any food animal. In the case of goats the horns find many uses, and the fat is said to be the best tallow known for the manufacture of candles. Any part of the carcass not useful in any other way is converted into fertilizer.

LOCALITIES ADAPTED TO ANGORA CULTURE.

CLIMATE.

So far as temperature is concerned, no place has been found that is too hot or too cold for Angoras. Although not partial to heat, they will stand it quite as easily as sheep. Shade is essential to success if the sunshine is very warm.

The climate in Angora, where the breed originated and is still supposed to flourish in its more perfect state, is extreme. A temperature as high as 85° F. is registered in the summer and as low as 0° F. in the winter. In Cape of Good Hope, where they are thriving well, the temperature goes higher in the summer, but not so low in the winter. The United States presents a wider range of temperature, where, in southern Texas and New Mexico, it may go above 100° F. in the summer, and in Idaho as low as 30° F. below zero in winter. The range of localities where Angoras have done well is from Guadalupe Islands, in the Lesser Antilles, to Ukamak Island, belonging to the Alaska Peninsula. Mr. M. L. Washburn, superintendent for the Alaska Com-

mercial Company at Kadiak, says: "On Ukamak Island we have a flock of Angora goats, which have increased 60 per cent a year since they were placed there. They have given very good results in mohair, which is of good quality and fine texture." There are a few small flocks in New England and in nearly every State west until the Pacific Ocean is reached. The Western States have many thousands. Mr. William M. Landrum is quoted as follows:

White goats can stand any amount of cold and snow, but sleet and wind are very injurious. On the other hand, they can endure the scorching heat of the Tropics. Their fleece is best at an altitude of from 3,000 to 6,000 feet above the sea level. The fleece never sheds on the Guadalupe Island, 210 miles from San Diego, at an altitude of only from 2,000 to 4,000 feet. I have grown mohair there 2 feet long, of lovely texture. We had 80,000 wild goats roaming on the island without any attention, except in slaughtering season, when we sheared the Angoras and slaughtered from 14,000 to 15,000 common goats for their hides and tallow. The goats all ran wild and took care of themselves. We were not at one dollar expense on them.

In considering Angora culture it is of more importance to study the climate with reference to moisture rather than temperature. It should be remembered that the original home of the goat is high up in the mountains, where the air is not laden with moisture. Under like conditions it thrives best here. Lowlands that are wet or marshy are not at all suitable. The effect of such situations soon makes itself apparent in a flock of goats. Foot rot is apt to give endless trouble, and the feet will need much attention in other respects. Therefore lowlands with much moisture and high temperature are not recommended for goat culture. It is a historical fact that the first effort to transplant the Angora goat outside of Asia was a failure on account of these conditions. This was in 1554, when a few individuals were taken to Holland, but they soon died, owing to the moist climate.

The effect of climate has a great deal to do with the character of mohair. On this point Mr. John S. Harris, of Oakley, Idaho, who is a gentleman of much experience, is quoted:

Mohair grown here in Idaho is very bright when scoured, and, owing to the electric currents which exist in the air, the hair possesses elasticity, a property requisite to mohair. Goats do not grow a long staple here, but owing to the cold it is very dense. Neither do they grow so heavy a fleece as in a milder climate, owing to the dryness of the air. Plenty of green, natural herbage the year round would produce a heavier fleece and ultimately deteriorate its quality.

A high altitude is a locality always preferable in goat culture. This is especially true with Angoras, as the climate in high altitudes seems to have a beneficial effect upon the mohair.

Colonel Black, whose experience covers a period of thirty years, says that the Angora goat will thrive in any part of our country, and the yield of mohair will be greatest in the colder States. He estimates that the yield can be increased fully 1 pound by removing the goats from Texas to any of the Northern States.

CHARACTER OF SOIL.

Almost any kind of soil, except wet and marshy land, is suitable for these goats. Their preference is mountainous or rocky land, where they find it necessary to climb mountain sides and rocky cliffs to browse. Such situations not only afford them satisfaction in climbing and feeding, but the rocks serve to keep the feet trimmed. This is an important matter, for on soils devoid of stones or sand the feet must oftentimes be trimmed by hand.

One of the reasons for the freedom of goats from most diseases is that they require pure water, and in no place is better water found than in the springs and rivulets of hilly or rocky localities. Goats also require much exercise, much more than sheep, and such situations satisfy this inclination.

However, it must not be understood that rocks and hills are essential, although they provide for the goat an ideal situation. As stated above, almost any kind of soil is suitable except wet and marshy land. Goats are not partial to water in any form—in the soil or in the form of rain, snow, or sleet—and they drink a very small amount. Keep the goats dry overhead and under foot.

LAND AVAILABLE FOR GOAT CULTURE.

The habits of goats, as set forth in the earlier paragraphs of this paper, suggest at once to the informed person that there are in the United States millions of acres of land suitable for goat culture which are now serving no economic purpose whatever. Much of this would answer for sheep raising, but much more of it is suitable for goats only.

In the northwestern States there are hundreds of thousands of acres of forest land which, on account of the forest covering, is useless, but when goats clear it of all underbrush and put it in proper condition for cultivation, as they are doing there at this time, the land becomes more valuable for other kinds of farm crops. In other places there is much brush land which it is desirable to have goats transform into good pasture land, and there are also vast acres of mountainous and hilly districts which are ideal locations for Angora goats, but which could be of no importance as pasture or as tillable land.

Capt. Almont Barnes, in the article entitled "Keeping goats for profit," makes some estimates of the amount of unimproved land in the country, basing his calculations upon the reports of the Eleventh Census. He finds that the total amount of unimproved land in the United States is 265,000,000 acres. In Maine there are 6,000,000 acres in farms, of which 3,000,000 are improved; in Georgia are 25,000,000 in farms, of which 9,500,000 are improved. He concludes:

> There is, however, in the United States a large, continuous area, embracing over one-third of the States and Territories, which invites particular attention in connection with this subject. It includes the South Atlantic and South Central divisions

ANGORA GOATS IN YARD; ALSO SHOWS ONE KIND OF SUITABLE FENCE.

(Photograph furnished by Harris & Baylor, Montell, Tex.)

ANGORA GOAT RANCH OF H. T. FUCHS, TIGER MILLS, TEX.

(Photograph furnished by Mr. Fuchs.)

and a part of the Western division of the Census groupings[1], or twenty States and Territories, which together contain nearly 285,000,000 acres in farms, of which over 122,000,000 are improved and over 162,000,000, or 57 per cent, unimproved. The average size of farms and the average amounts of unimproved land are greater in this area than elsewhere, and the climatic conditions are more uniform.

It is safe to say that it will be many years before the matter of available land for goat culture becomes a problem. It is sufficient at this time to know that there is an abundance of suitable land everywhere in the country.

Mr. W. Hammond Tooke, in the Agricultural Journal of Cape of Good Hope for May, 1899, says:

> He [Schreiner] admits that it is generally agreed that very large portions of the States are well adapted to Angora goats, an opinion formed from actual experience over a number of years. This being so, it is difficult to understand how it is that the industry has progressed so slowly, seeing that the hair is valuable, the skins in great demand, the flesh prized as good, and the tallow as good as any that reaches the Chicago market. It is not more easy to understand when it is considered that large portions of the country are suitable for goats and not suitable for sheep.
>
> There seems no reason, therefore, to the outsider why the industry should not make almost as rapid progress in the States as it has in South Africa.

THE CARE OF ANGORA GOATS.

The preceding pages have no doubt given the impression that Angora goats are very hardy, and, indeed, it is true, especially if their foundation is upon crosses with the common goat; but this should not be taken by the careless or shiftless man as a license to subject his goats to all manner of discomfort with the expectation that the results will be fully as satisfactory as if rational attention were given them. That these animals can withstand extreme cold, such as that of the islands of Alaska, or extreme heat, such as that of Guadalupe Island, is strong evidence of their fortitude and of their adaptability to a wide range of temperature under proper care. The same fortitude is exhibited by horses, cattle, sheep, and hogs, but no one thinks of turning these domesticated animals out upon their own resources, as wild animals are forced to exist. That they can subsist upon vegetation which is utterly useless for any other purpose is evidence simply of their economical keeping; it does not permit one to conclude that they never need any other kind of feed at times. In a word, it is intended here to impress the fact that, if satisfactory results are to be obtained in goat raising, the animals must receive the same rational treatment that is received by other live stock when best results are sought. The goat is a hardy animal in the fullest sense of the word, but this characteristic only enables him to respond the more quickly and satisfactorily to careful treatment.

[1] South Atlantic division: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida; South Central division: Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas; Western division: Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, California.

HERDING AND FENCING.

Goats require a great amount of exercise, much more than sheep. The one is by nature a browser and the other a grazer, and the browsing habit naturally requires more activity on the part of the goats. They are sensitive to restraint and do better if not herded, but of course this is often a necessity, and therefore should be done under as favorable circumstances as possible. So far as possible they should not be allowed to feel their restraint. If constant attendance is necessary, the herder should be of quiet disposition. The next best thing to the freedom of a range is a large pasture, where the goats may have oversight, but not constant attendance. Such pastures are considered the cheapest method of keeping these goats. They can easily be trained to come home by feeding a little and salting regularly at home.

The fencing for pastures is a matter which early concerns one who contemplates going into the business, for it is the current belief that goats will climb onto any shed of ordinary height or jump any fence that will stop other animals. While they will climb anything that is built in such a manner that it may be climbed easily, they will not jump any ordinary fence. They will, however, creep through if there is an opening large enough. The old-fashioned "worm" fence, especially if it leans outward, will not stop goats. The angles in such a fence are an incentive and a delight to them. Indeed, there are many hogs that will go over a fence of this kind.

In building a goat fence there are other matters to be taken into account than simply that the goats shall be kept in: the animals themselves (especially the young ones) must be protected from dogs and wolves from the outside. In the Southwest it is much more important to fence to keep varmints out than it is to fence to keep the goats in. So the double object must be kept in view in building a goat fence. Such a fence must be dogproof, hogproof, and wolfproof. A hog at liberty which has once had the taste of chicken, or lamb, or kid is a greater nuisance than any wolf or dog, and should be dispatched as being an enemy to other young live stock as well as kids.

One correspondent of the Bureau constructs a fence of ten-barbed hog wires, with posts set 20 feet apart, having three stays between the posts. The lowest wire is only 1 inch from the ground; the next four wires 3¼ inches apart, and one-half inch added to every space above. It is necessary that all the wires should be kept very tight. This correspondent adds the interesting note that many wolves are killed by screw worms in wounds received while attempting to crawl through such a fence. A good fence may be made of woven wire 3 feet high, drawn on the inside of the posts, and a closely barbed strand of wire 3 or 4 inches above fastened to the outside of the posts to prevent animals from jumping in. A straight rail fence, if the rails are laid close enough, as well as an ordinary board fence, will turn goats.

Mr. Jobson says that a five-board panel fence 4 feet high is sufficient for goats. He also says that zigzag, or worm, fences are an incentive for the goats to climb, and that they will walk along the top of such fences as easily as on the ground.

If they are permitted to climb onto the roofs of buildings it will not be long before they will have them completely ruined.

SHELTER AND PENS.

A shelter is necessary during wet spells, and more especially if the rain is cold or in case of a sleet storm. Dry cold alone has little or no injurious effect after the kids are three or four weeks old, and they will even frolic in the snow when the mercury is at zero, and sleep with apparent comfort in an open shed. With their dense covering there is no reason why this should not be true; but this same dense covering, when soaked with cold water or driven full of sleet, is a deadly menace. Goats will not get wet if they have an opportunity to avoid it. They appreciate a shelter and will always seek it at night, and during the day in the event of storms. They are said to be excellent barometers, being able to foretell stormy weather, and always contrive to place themselves under shelter before the advance of a storm, if possible. Mr. Diehl says they will run miles to avoid an undesirable rain.

Goats should not be left on the range or in pasture over night. The latter is practiced to a considerable extent, but experience has shown that they are safer in closer confinement during the nighttime.

The pens in which the goats are kept at night should, above all things, be in such a location that they can be kept dry by drainage. Other live stock should be excluded, as they would only help to trample the ground into mud. They should have a dry place to stand and sleep, for they are apt to contract rheumatism in the knees. There would be little use in raising Angoras for their fleeces if they are compelled to wade through mud and filth, or be confined under these conditions. The fleece would soon become so soiled and matted as to be a "burden unto death."

The sheds provided for their shelter must be of a size to give an abundance of room. The goats should not, under any circumstances, be huddled together. If they are thus crowded in cold weather they will pile up, with the result that some of the younger ones will die from suffocation. One writer states that he has known as high as 30 being killed in this manner in one night. Mr. Oscar Tom, of Angora, Oreg., describes a shelter that proves satisfactory in the following language:

> The sheds should have eave troughs, and be boarded down to within 3 or 4 feet of the ground. There should be a ditch around the shed to prevent any water from running into it, and it should be open all around, so that the goats would not have to wait for others ahead of them to go in; a few cross ones could not block the way and

keep other goats in or out, and the rain would not blow in, but the goats would have plenty of fresh air. There should be a good fence around the shed at a distance of at least 50 yards, to keep cattle and horses from trampling up the ground and working it into mud. Have the fence high enough for the goats to go under, but never allow hogs to run into the goat shed, for goats are easily frightened after dark.

In some parts of the country the strong winds will blow rain under a shed such as Mr. Tom describes. In such cases, the side from which these storms usually come might be boarded to the ground. A better plan, in the opinion of some, is to have a few solid movable panels of fence to place around the openings of the shed on such occasions. This plan is convenient, too, as the panels may be taken away in fair weather, thus permitting a free circulation of air from all sides.

Shelter from the sun's rays should be provided for summer time. Although goats are able to withstand intense heat, they do not thrive well when subjected to it. For this purpose sheds more open than that described above are preferred, for the reason that the air will have freer circulation. Better yet than a shed against the sun's rays are large trees. In this case there is no obstruction whatever to the air.

FEEDING.

The principal reason why goats will be raised instead of sheep in some places is because they are practically inexpensive so far as feeding is concerned. This phase of the subject is quite fully discussed under the head of "Browsing and pasturage" (p. 26). They eat the leaves in summer and the soft twigs in winter, and if there is an abundance of either they will not require anything else to sustain life; but this condition exists only in certain localities, and other means must be adopted elsewhere. They are fond of straw and fodder of any kind. Plate XI shows where a herd in Iowa has access to a straw stack.

Notwithstanding the ability of goats to subsist upon coarse fodder in the winter season, the impression must not be held that they will thrive well upon it in the absence of browse. They will extract from these fodders all the nourishment obtainable, which is not very great, but must receive some supplementary feed. Any kind of grain will answer this purpose. Probably the best feed is oats, and if it is sheaf oats better still. In Texas some of the large goat raisers feed cotton seed by scattering it upon the snow so that goats will have to exercise somewhat in picking it up; besides, the time consumed in picking up the seed thus scattered insures better mastication.

In feeding grain care must be taken not to make the supply too liberal, unless the object is to fatten for slaughter. Goats easily become lazy on a plentiful supply of grain and will decline to go out to feed upon the brush. This is an important point, as their hardiness to a large extent is attributed to their feeding upon browse and to the resulting exercise.

As to the coarse feed for winter use, straw is eaten with relish; corn fodder is better and more nourishing; clover and alfalfa hay are excellent. Indeed, very little grain will be required where either clover or alfalfa hay is provided. Mr. Hoerle says:

> The quantity of food necessary to keep them in good condition varies according to the climate, but one-fourth pound of corn or its equivalent in other grain and 1¼ pounds of hay at a ration is about a fair average. With abundant winter pasture this ration once a day (in the evening) is sufficient; if the pasture is scant, they ought to have it both morning and evening, and on wet, cold days, when they are kept in the sheds all day, feed them three times or make their rations correspondingly larger. They should be taught early to eat their hay chopped, moistened, and sprinkled with bran, oil meal, or corn meal, which, if it digests easier if given in that way, will save about 20 per cent of the feed. They should also be taught to eat ensilage where practicable.

Sugar-beet pulp has been fed with success. The goats must be taught to eat it, but after once learning they seem not to be able to get enough.

In feeding either hay or grain absolute cleanliness must rule, as goats will not eat soiled food. There is no animal more particular about his food than the goat. He has no inclination for mud or filth in which to stand or walk, much less having to pick his food out of it. Bryan Hook, author of Milch Goats and Their Management,[1] says:

> The goat is of all animals the most fastidious in the matter of the cleanliness of its food, refusing, even though ever so hungry, to eat food that has been soiled or trodden under foot. For this reason a rack should be provided for the hay, and only as much given at each meal as the animal will consume, for that which has been trampled under foot will ever after be rejected, even though carefully collected and replaced in the rack.

When the production of mohair is reduced to a fine art, the question of feed will receive the most careful consideration, because of its influence upon the fiber.

The replies received by the Bureau to the question "Do you feed in winter? If so, what is the character of feed?" are interesting in many particulars. It will be observed that in the Southwest the treatment of goats in winter is not very different from that received by them in the summer. Below are given quotations from some of the letters received, credit being given to States only:

> Winters being mild, do not feed.—*Arizona.*

> I have to feed here. They like alfalfa best. In southern New Mexico they never need any feed, and are good mutton the year round.—*New Mexico.*

> We do not feed, there being plenty of evergreen brush.—*New Mexico.*

> Feed only during severe storms, perhaps an average of three days in the winter, and then any kind of good hay will suffice.—*Texas.*

> Feed some poor old goats on cotton seed and hay.—*Texas.*

> Winters are mild, and the goats live on evergreen brush (four kinds).—*Texas.*

[1] Vinton & Co., Limited. London, 1896.

Feed only when the ground is covered with snow and sleet. I like shelled corn best. Feed in troughs or scattered on the snow.—*Texas.*

Yes; in stormy winters we feed hay so placed that they can run to it in the shed, for they must have shelter.—*Oregon.*

Native hay.—*Oregon.*

Very little; a few oats, and straw.—*Oregon.*

We manage to cut grubs in winter, but give them some straw; will eat most any kind of straw or hay.—*Oregon.*

I feed out in the prairie, along with the sheep; feed wild hay and lucern (alfalfa).—*Idaho.*

Hay, oat hay, and corn from shock, unhusked; some roots, and more or less bran.—*Iowa.*

Sheaf oats, fodder, straw, and hay in spring.—*Iowa.*

They run on the range all winter.—*Texas.*

Have never had occasion to feed, except during a snowstorm, when we cut down branches of live oak.—*Texas.*

Do not feed, except the bucks at breeding time; give them wheat hay and barley.—*Texas.*

In Nevada we feed our kids some alfalfa hay, at night, for two or three months.—*Nevada.*

I find shelled oats best for weakly ones; usually cut brush for the main herd during winter months.—*Oregon.*

We find clover hay and wheat and oats cut in the dough. We prefer that to anything else.—*Oregon.*

Stock fodder and clover hay. They will do well on the same feed as sheep.—*Missouri.*

Not much grain, a little corn fodder, and wheat straw.—*Kansas.*

Shredded corn fodder, wheat straw, and a little corn in bad weather.—*Kansas.*

SALTING.

Goats require more salt than sheep, owing to the more astringent character of their food. If loose salt is used, the general custom is to give it once a week on regular days. If rock salt is used, it should be placed where the animals can get to it at any time. Rock salt is preferable, as it can be placed in boxes or troughs raised from the ground, and thus be kept out of the dirt and be of easy access to the goats at any time; and, too, there is no waste and no danger that the animal will eat too much of it.

MARKING.

The question of marking is always proper. Several devices are in use, but the metal tag in the ear is probably best known. A practice which appears to give satisfaction is to tattoo the numbers into the ear, using indelible ink. It is found that the metal is sometimes pulled out by brush.

KIDDING AND THE KIDS.

The kidding time is the most important in the life of the goats. For two or three days after the kids are dropped they are exceedingly delicate, and there will be no future success unless good care is given at the time. They can not "rough it" at this period, but will die from very little exposure or neglect. They are more delicate for a few weeks than lambs. When the kids are large enough to follow the flock they have constitutions stronger than lambs of like age and are able to care for themselves very well.

The proper time for kids to arrive is in the spring, about the time when leaves start on the trees and bushes. At that time there is milk-producing food for the doe, and the weather is also warm enough to favor the kids. The exact time may be governed, of course, by the service of the bucks and will be earlier in localities where the seasons are earlier. If kidding comes in cold weather, there will be greater difficulty in saving the kids. Warm stabling must also be provided, and the does will require extra feeding in order that they may supply milk for the kids.

A few days before a kid is due the doe should be separated from the flock. Some breeders would put her in a pen alone, while others would put as many as 20 in one pen. If the facilities are at hand, a small pen for each doe is better, for the reasons that the doe will sooner "own" the kid and there will be less danger of injury than if among a number. A doe knows her kid by the sense of smell, especially when it is young. This characteristic is so strong that some breeders assert that if two kids of different mothers are rubbed together, the does will often refuse to own them. Whoever cares for the doe at kidding time will find it an important part of his work to see that the does own their kids. This difficulty in any case will disappear in a few days, and it will then only be necessary to arrange for the does to get to the kids whenever they desire.

If kids are dropped on the range or in the pasture, they must be carried home and special care given to see that the does are made to own them, for many times they will refuse. A lamb will follow its mother very soon after it is dropped, but a doe will hide her kid as best she can in bushes, or behind a stone or log, and leave it there while she goes away to feed; and on her return she expects to find it where she left it.

The Mexican method of handling the kid is largely practiced in Texas and New Mexico and consists in "staking," or "toggling," the kid. When the kid is dropped, take it to a protected place (shed or barn), seeing to it that the doe follows, and "stake it out" or "toggle" it with a string about 14 inches long. Tie this string to one leg, changing occasionally to other legs to avoid lameness. This string should have a swivel in it to prevent twisting, and the kids should be

carefully watched so long as they are so tied, which will be from seven to ten days.

The does should remain with the kids until they leave them of their own accord to go out for feed. The kids may then be allowed to run loose in a pen together until they are large enough to go out with the flock, which is when they are from four to six weeks' old, or when they are able to jump a board from 12 to 20 inches high placed across the gate. The height of this board restrains the kids that are too small to follow the flock and at the same time enables the does to go and come as they please. W. G. Hughes & Co., of Hastings, Tex., have a device for separating the does from the kids which is better than the board. It is a bridge, either end of which drops to the desired height. This device enables the does to go out and in without injuring the udder, which is apt to occur where they have to jump a board. A picture of this bridge in use is shown in fig. 2 of Plate XII.

The following is from "California Angoras," published by C. P. Bailey & Sons Company:

There are in use two methods of handling kids at kidding time, namely, the corral method and the staking method. Each of these has points which render it most valuable under certain conditions and in certain localities.

The corral method.

This method may be used with any number of goats. With various modifications and adaptations which best suit the size of the flock, the climatic conditions, the facilities for feeding, etc., it may be used by the beginner with success. We have practiced this method in Nevada for more than twenty-five years. If the herd is a large one, say 1,000 head, three men are required to handle the goats at kidding time. The service of the bucks is so managed that the kids will be dropped gradually through several weeks. At the height of the season we expect from 75 to 100 kids a day. The season lasts about thirty or forty days. Fortunately, most of the kids are dropped in the daytime.

We have four or five small corrals, fenced with 36-inch woven wire and large enough to hold 50 does and their kids. The doe should be allowed plenty of room, because if too close to her neighbor she may adopt the other doe's kid. Besides these small corrals, two large ones are needed, each large enough to hold 1,000 does. Along the fence of one of these corrals are a dozen small pens just large enough to hold a doe and kid. At the gate of this large corral a jump board is placed. This jump board is intended to keep back those kids which are not large and strong enough to jump over it. A 2-inch board about 18 inches high will answer the purpose. Another device sometimes used is a platform open at the end, so that the kids may run under it and thus avoid being trampled upon when the goats are going out over the platform.

The small corrals may be made of panel fence and located in a meadow where some feed is afforded. The does should always have some kind of feed at kidding time.

In the morning the flock is carefully examined, and all does which show signs of kidding during the day should be separated and placed in one of the small corrals. The large flock is now turned out, and one of the men is sent with them with instructions to take the herd at once as far as he intends to go for feed that day, and then

FLOCK OF ANGORA GOATS AT STRAW STACK.

(Photograph furnished by Capt. J. Murray Hoag, Maquoketa, Iowa.)

FIG. 1.—ANGORA KIDS.

(Illustration furnished by W. G. Hughes & Co., Hastings, Tex.)

FIG. 2.—GOING TO PASTURE. (SEPARATION OF DOES FROM KIDS BY MEANS OF BRIDGE.)

(Illustration furnished by W. G. Hughes & Co., Hastings, Tex.)

to let them feed over a limited area and gradually work their way home. A few does will drop their kids on the range, and the herder should carefully note the number and their location. He should see that the herd does not feed around one of these does, as she is apt to leave her kid and join the band, thus necessitating much extra work in finding the kid and in giving it to its mother. Early in the afternoon the band is placed in one of the large corrals. Now the herder and another man go out with a wagon or on foot and carry the kids home, gently driving the mothers. The kids should not be handled or rubbed against one another more than is necessary, as the doe knows her kid by the scent. These does and kids are placed in the small corral which contains the does held back in the morning with the expectation that they would kid during the day. We now have one day's kidding in one of the small corrals. The does and kids should be watched to see that they are properly arranged. Do not bother them more than is absolutely necessary. Do not be in a hurry to make a doe own a kid. Do not drive the goats around one of the small pens.

The does should remain with their kids in the corral for a day or two at least, or until the kids are properly mothered. Any does which have not kidded should be taken out. The next morning any kids which may have been born during the night are put in another small corral with their mothers, as well as the does which are expected to kid during the day. The procedure of the previous day is repeated. In about three days, if one has limited quarters, the first day's mothers and kids may be put in the second large corral; that is, the one with the jump board at the gate. Now this "wet" band is placed in charge of one of the men and sent out to feed. The gate is opened, the mothers passing out over the jump board, and the kids remain in the corral. The herder must not range his goats near the does that are kidding upon the range, and he should be cautioned to come in later than the "dry" band, so as to avoid any possibility of their mixing. When his band arrives at the corral the gate is opened, and each mother hunts for her kid. Some of the kids may not find their mothers, and if after a day or two there are a few unnourished kids and some does with overdistended udders they should be placed together in the small pens along the side of the corral. The doe will own the kid in a day or two, whether she is its mother or not. The kids should not be allowed to become too weak before this is done. If one does not have enough small pens, a doe may be held while two or three kids suckle her, and thus tide them over until some of the small pens are vacant.

The next day the second day's kidding is added to the wet band. The wet band thus gradually grows, while the dry band decreases. During the day two men will be employed at herding the dry and wet bands, respectively, and the third man will be kept busy inspecting the kids, feeding the does in confinement, etc. If the weather is stormy some of the kids will have to be sheltered. The advisability of having the kids dropped gradually through a period of thirty or forty days will readily be seen. If help is inexperienced they may be gradually trained, or if the weather is stormy there will be time to get all things arranged properly.

The kids should not be allowed to go with their mothers until they are about 6 or 8 weeks old. If they go before this, they will probably become tired very soon and go to sleep. When they awake the band will have gone, and they are liable to be lost. During the day, while the mothers are feeding, the kids would eat a little grass if they could be herded near the corral.

As stated before, there may be many modifications of this method which will suggest themselves, but the above is a general outline of a method commonly in use.

The staking method.

This method is largely employed, even with large flocks, in New Mexico, but is possibly best suited to small flocks. It is without doubt the best method for certain surroundings. About the same amount of help will be required as with the corral

method. There should be a good supply of stakes similar to tent stakes. There should also be a supply of swivel blocks which are about 4 inches long and having a hole bored near each end. A piece of rope about 6 inches long is fastened to the stake, and the other end is passed through one of the holes in the swivel block and a knot tied in the end. Another piece of rope of equal length is likewise knotted and passed through the other hole of the swivel block, the loose end being tied to the kid's leg. Any swivel will take the place of this primitive method. The herder or owner can busy himself during the winter months by making stakes and swivels and by cutting and attaching the ropes.

When a kid is born it is taken to a convenient place to stake and the mother is gently coaxed to follow. The stake is securely driven into the ground, and the kid fastened to it by the hind leg. The mother is left with the kid, in order that she may know where to find it upon returning from feeding. The kid should be staked where he can get plenty of sunshine, shade, and shelter. A small bush, a post, or a box will answer the purpose admirably. If there are twins, they must be so staked that they can suckle at the same time. The rope should be changed from one hind leg to the other occasionally, to prevent unequal development. Sometimes a vigorous kid gets thoroughly tangled and requires help.

The kid may thus be left staked until he is old enough to go with the flock, which is after six or eight weeks, or he may be put in a corral after a few days, as is done in the corral method.

There are many successful breeders who use this method entirely. One may expect to get good results if he follows either the corral or staking method carefully.

There is very small loss among kids cared for as set forth above. Many of the breeders on a large scale report the percentage of increase as 100. This does not mean that every kid lives, but that so few die that the loss is offset by the number of twins that are dropped.

The most practicable fencing to be used at kidding time is made of portable panels. By the use of these panels a pen may be made large or small and be moved from one place to another without difficulty and with very little work.

Weaning.—Kids should not be weaned until they are 4½ months old unless they are very strong; but they should not remain with their mothers after they are 5 months old. This especially applies to the buck kids, as they will often breed at 6 months of age or even younger.

Castration.—The buck kids not reserved for breeding purposes should be castrated when about two weeks old. The earlier it is done, the better will be the meat and the mohair. It is pointed out in previous pages that the mohair from wethers ranks with that from the does, and the flesh is superior to that of the does and inferior only in small degree to that of the kids. A cool day should always be selected for the operation of castration and careful attention given for a few days.

Opinions of correspondents.—The quotations given below are a symposium of the opinions of most of the leading breeders of Angora goats in the United States on the matter of kidding:

There are several methods of handling goats during kidding. The one employed here is the Mexican plan. When the kid is dropped take it by the hind legs, so that the doe will follow, to where you want to stake him. Stake with rope about 12

inches long, with wooden swivel in center. Leave them staked until after they are marked and castrated and well owned by the mother. Sometimes kids are herded with their mothers and sometimes by themselves until they learn to be herded. If not handled properly and the kids are allowed to mix together, the doe loses the scent of her kid, and young does will often disown them.—*F. O. Landrum, Laguna, Tex.*

This is the most critical period in the handling of goats. The kids are generally collected daily, as soon as dropped and able to stand and suckle the mother, and are confined in a corral for several weeks, much of the time tied to a stake driven into the ground. It is not safe to let them run with the flock until they are a month to six weeks of age, as they are liable to drop out of the flock and be lost.—*Col. W. L. Black, Fort McKavett, Tex.*

The kidding season is the time when the work and care comes. The kids are more delicate than lambs, and require a great deal of care.—*Harris & Baylor, Montell, Tex.*

The easiest way to get through kidding time is to put all the does that are soon to bring kids in a separate small pasture where they can be looked up easily. In case of bad weather they should be brought into their shed every evening before sundown; but if the weather is dry and not too cold they can be left out, and all the does will likely own their kids. Of course, the kids will not follow their mother as lambs do, but will lie down in a thicket or under a bush, a weed, a log, or a rock, and remain there till the mother comes back to it, even if it should have to wait till it starved to death; but after a kid is a few days old it is able to follow its mother, although it is best to keep the kids at home. Kids need not suck oftener than twice a day.—*H. T. Fuchs, Tiger Mills, Tex.*

I stake the kid in a barn for two weeks. The mother goes out in the daytime to feed and is put with the kid at night. After two weeks the kid is turned loose and kept in a pen until 2 months old, when it is allowed to go out with the flock.—*Henry Fink, Leon Springs, Tex.*

We keep the nannie and kid to themselves so far as possible for a day or so, and do not allow more than 20 nannies and kids in the same pen until the kids are over a week old, nor more than 50 nannies and kids in the same pen until 2 weeks old. Kids are kept in the pen day and night until a month old, and are then allowed to run outside the pen during the day to eat a little; the feed may be furnished them in the form of cut branches if there are no bushes near the pen. They should also have access to water after 4 weeks old. When 6 weeks old they can go out with the flock for a few hours in the afternoon, the flock being brought in at midday for this purpose. After eight weeks they can go regularly all day with the flock. We use a bridge for the purpose of "cutting back" such kids as should not go out with the flock.—*W. G. Hughes & Co., Hastings, Tex.*

Protection from rain; confinement in a corral or small pasture until the kids are 6 weeks old. We allow the does to jump over a 21-inch board to get food and return as they please. We separate all does every morning that will drop kids within two or three days and keep them in a pasture by themselves.—*Conklin Brothers, Newville, Cal.*

I put nannies that are soon to kid in an open pasture (not bushy). As the kids come, gather them into a corral with a shed or barn in it, taking the mothers with them. Keep the kids in the corral until they can jump over a 16-inch board, turning their mothers in and out evening and morning. At about 2 weeks of age they are usually fit to run with their mothers.—*George A. Houck, Eugene, Oreg.*

I aim to have a field of fall grain or reserved pasture to turn does in a few days before kidding commences, and turn the does in another pasture as fast as they drop their kids. Keep the kids up about two weeks, then let them go with their mothers.—*Oscar Tom, Angora, Oreg.*

Put the goats in a small pasture near a shed. If stormy, take the kid and doe to the shed at once. Every night put all the kids and does in the shed. Put bars up 20 inches high, and when the kid can jump over, let it go. Without a shed in this State you could not raise two out of ten kids; there is too much cold rain in kidding time—March and April.—*U. S. Grant, Dallas, Oreg.*

Put the nannies by themselves and then look after them once or twice a day to see that the kids are able to get up and suckle. Don't bother them, if they are all right and are in a sheltered place, until three or four days, and then change them to suit your convenience.—*W. W. Smith, Eola, Oreg.*

Take all the nannies out from the other goats as soon as they kid, and put them by themselves. I have about 100 small pens in which I put the nannies. Put the young nannies and old ones in different pens. Here they remain for four or five days and they are then turned into a larger pen, but not more than 50 should be put together.—*G. M. Scott, Malta, Idaho.*

Comfortable shelter and close watch to see that the kids get milk promptly. Put the doe and kid away from flock for a few days.—*J. Murray Hoag, Maquoketa, Iowa.*

We have a man on the spot all the time to help the goats in kidding, if necessary, and also to see that the kids begin to suck.—*Richardson Brothers, Dubuque, Iowa.*

Have good warm shelter, and under no circumstances allow cold rain to fall on the kids till after they are 2 weeks old. The shed should be open to the south, so that the sun can shine in on the kids. Turn the does out of the shed once a day, and leave the kids in the shed for the first two weeks. By that time the kids will be old enough to follow the doe.—*W. T. McIntire, Kansas City, Mo.*

I always keep the kids in a corral until they are old enough to follow the doe, which is when they are about thirty days old. In taking the kids to the corral care should be taken to get nothing on them that will change the scent, for does are very sensitive. If two kids from different does are rubbed together, the does will often refuse to own either of them. All kids should be castrated before two weeks old, as there is less danger and they do not get so sore.—*H. I. Kimball, Maxwell City, N. Mex.*

I cut out the heavy ewes from the rest of the herd, and hold them in a close herd, and catch the kids and bring them with their mothers to the corral, where each kid is staked separately with a toggle, or swivel, being careful to see that the mother knows where the kid is. After this I let the new mother goats come and go at will, only noticing them enough to see that they come to their kids regularly. The kids should be watched closely in order that they may not get tangled up and hurt. When they are about 2 weeks old they are turned loose in a corral and a board is put at the gate over which the mothers jump in going to and from their kids. When the kids are 3 months old they may be allowed to go with the herd.—*Josephus R. Barnette, Globe, Ariz.*

THE BUILDING UP AND MANAGEMENT OF A FLOCK OF ANGORA GOATS.

THE BEST FLOCK.

It is assumed that whoever goes into the business of raising Angora goats does so for the production of mohair, rather than meat or skins, and so it is to his interest to have a flock that will yield a profit from the beginning. The best flock for this purpose is one composed of thoroughbreds.[1] Such a flock will yield good mohair from the first.

[1]The term *purebreds* is not used here, as there is strong objection to it by many of the best breeders, on the ground that there are no purebreds, as explained elsewhere. As the term *thoroughbreds* will exactly suit the purposes of this chapter it is preferred, leaving the question of *purebreds* to be discussed by others.

Those who enter upon the business of goat raising, however, must make their operations conform to their capital, the same as in any other business. They will find that desirable does will cost from $5 to $12 each, and bucks all the way from $50 to $100 each; so that a large herd of this kind, although preferable, will cost a small fortune, and is beyond consideration by most people who will engage in the industry.

BUILDING UP A FLOCK FROM SMALL BEGINNING.

Another plan that may be pursued by one who has limited capital, but time and the patience to wait, is to begin with a few first-class animals and build up a flock from these. The result will be satisfactory, and the only drawback is the length of time required. After all, this may be the wisest plan for most beginners to pursue, as experience, so necessary always to success, will be gained as the flock increases.

BUILDING UP A FLOCK BY CROSSING UPON THE COMMON GOAT.

It is noted in the historical part of this paper that the Turks many years ago began the practice of crossing Angora bucks upon Kurd does. They probably had in mind the twofold purpose of producing thereby a hardier goat than the pure Angoras and of increasing the number of goats in order to supply the increased demand of Europe for mohair. Crossing the Angora bucks upon the common goats of the United States has been practiced since their introduction, and the results have been very satisfactory in many respects. Many of the large flocks of Texas and New Mexico have had Mexican does for their foundation. Building up a good mohair-producing flock upon this plan requires five or six years. The advantages are that the does with which the beginning is made are cheap, costing from $1.50 to $2.50 per head. During the first and second crosses there are many twin kids, thus increasing the herd in that proportion—a condition not existing, except to a small extent, among either the purebred or thoroughbred Angoras; the size and hardihood of the progeny are increased and the liability to disease decreased.

Care should be exercised in starting a flock by this method to select only such common does as are entirely white; any other color, however slight, is objectionable. If otherwise, the results might be satisfactory, but the probabilities would be the contrary. In handling the crosses the breeder often finds that atavism becomes apparent when it is most objectionable. For instance, the progeny for two generations of a doe having black spots might appear all that is desirable, while the third generation would produce the latent color.

In starting with a bunch of common goats that you want to use for raising a graded flock of shearing goats you should use only as pure white goats as you can get, and you should allow no colored goats in the flock. You should also dispose of all those that have long, coarse hair on the thigh and on the fore legs, below the shoulder.

In fact, the common goats that you want to start your flock with should be nice and smooth built, with small head and short, smooth hair and small horns. From muleys you can raise heavy shearers, but their mohair is not quite so fine.—*H. T. Fuchs, Tiger Mills, Tex.*

If bred for the purpose of quick propagation, and with very fine, robust goats of both sexes to begin with, in six years five or six crosses can easily be obtained if nutrimental advantages are favorable; and if really first-class bucks, having all the most valuable points this side of perfection, can be procured, and inbreeding carefully avoided, even our common short-haired and smooth-coated goat will, after the fourth cross—say, beginning with the thirty-second—show improvement, which in a large flock on general inspection would defy detection by anyone but an expert judge of Angora goats.—*G. A. Hoerle, Ridgewood, N. J.*

It is always quite necessary that the common does should be of the short-haired variety. Long-haired ones will give trouble in persisting to throw out long hairs among the mohair.

The buck used upon these does should be the best one can afford. The better the buck, the better the result. There will be many twins among the kids from this first cross, and if proper care is exercised at kidding time it will not be difficult to increase the flock as much as 100 per cent. The higher the cross, the fewer twins will be dropped. As the fleece upon the first cross is not worth more than the effort to clip it, the males among them should be castrated when about 2 weeks old and disposed of for meat as soon as old enough. The females among them, being half-blood Angoras, are kept for service with another thoroughbred buck. The result of this second cross is three-quarter blood Angoras. The mohair from them has a marketable value, but is very limited in quantity and usually mostly kemp. It is best to deal with this cross in the same manner as with the first cross. If this method of procedure is followed up to the fifth or sixth cross a flock will result that will produce most excellent mohair.

It has no doubt occurred to the reader that we now have four or five different grades of does, beginning with the common breed. Therefore after a thoroughbred flock has once been produced in this manner, each year brings forth another one from the same sources, and this condition continues as long as the breeding life of the does continues.

PROPER AGE FOR BREEDING.

Goats of both sexes will sometimes breed when they are 5 months old, and often at 6 months, but from the fact that they are at this age but a month or two from weaning time and are not nearly full grown, it is obvious that they should not be permitted to breed. They reach maturity when about 16 or 18 months old, and they ought not to breed before this time. If bred earlier the kids will not be so strong or so well developed. They are in their prime when from 2 to 6 years old, but with proper feeding in winter they have been known to breed regularly until 15 years old. The average life of goats, however, is about 12 years. There should be no tendency to keep does until they

are very old unless they bring kids of exceptional merit, for it must be remembered that their mohair gets coarser, and consequently less valuable, as they grow older.

The accompanying illustration (Fig. 1) shows how the age of goats may be determined until they are four years old. After that, in the absence of definite information, the age is a mere matter of guess, based upon the general appearance of the animal. The new teeth are longer and larger.

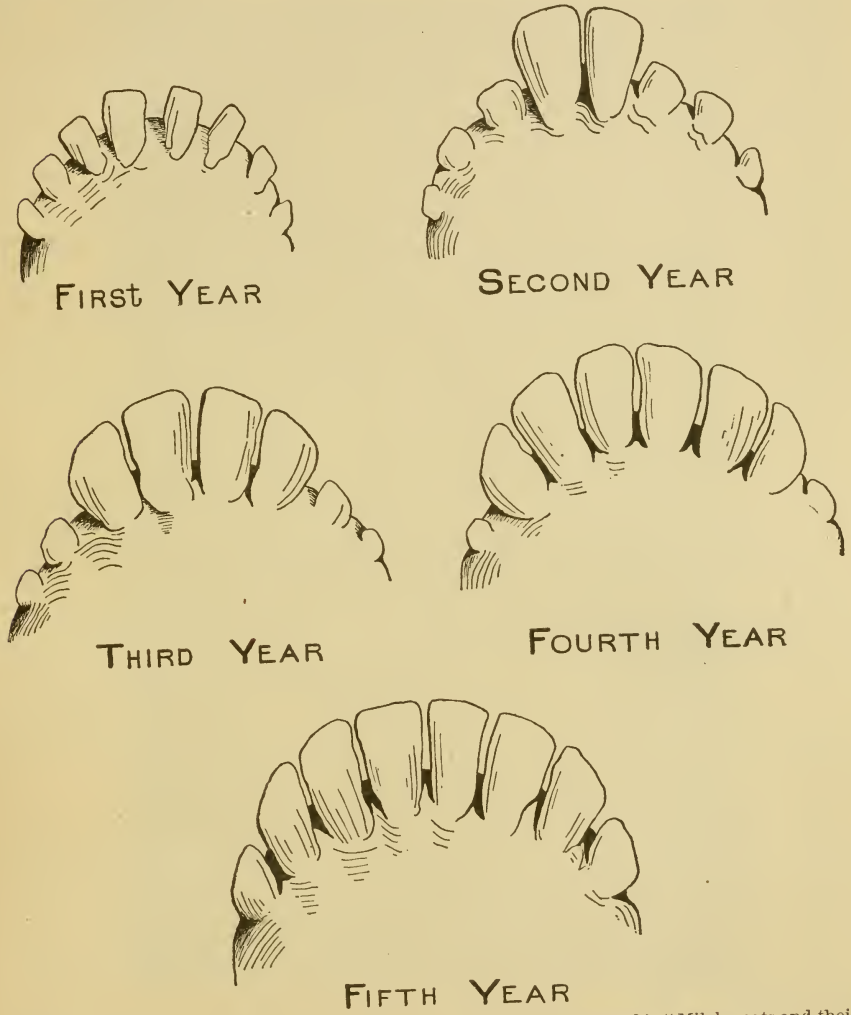


Fig. 1.—The age of goats shown by the teeth. [Copied from Bryan Hook's "Milch goats and their management."]

IN-AND-IN BREEDING.

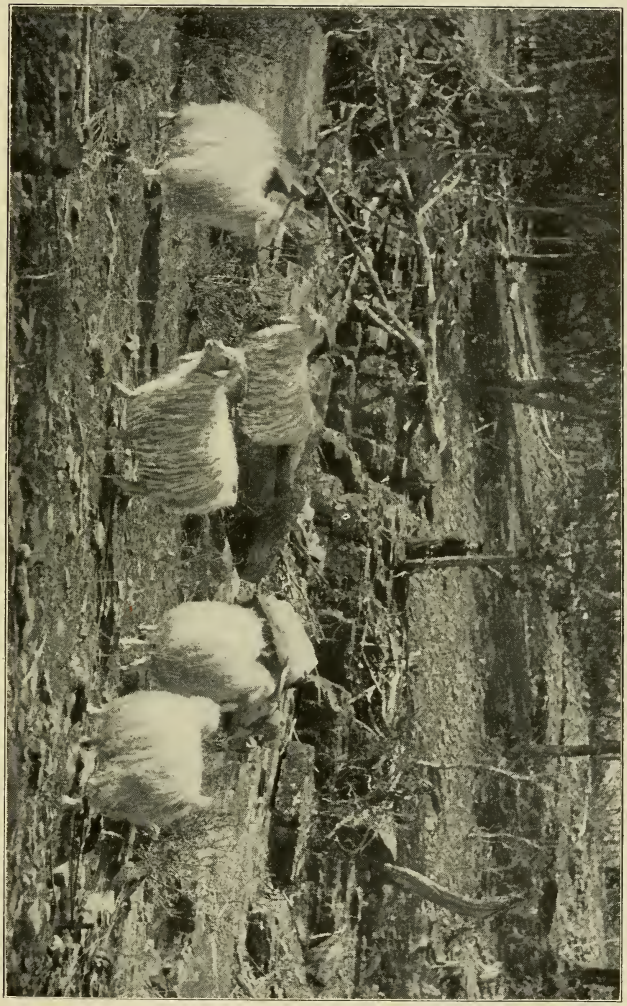
In-and-in breeding means the breeding of related individuals. The term is indefinite, and with some refers to a close relationship and with others any degree of relationship. The correspondence of the Bureau

with goat raisers shows that the term with them means generally the breeding of individuals of close relationship.

It is safe to say that there is an overwhelming sentiment against the practice. This will be apparent after one has read the replies which are published herewith to the question, "What is your opinion of in-and-in breeding?" It is quite generally agreed, however, that this practice will give a fleece of finest fiber, having a beautiful luster and little oil, but the weight will not be so great. Those who favor the practice contend that the quality more than offsets the quantity. The animals resulting from this practice are not so large and strong as those which are not related. The fact must not be overlooked, however, that Mr. John S. Harris, of Oakley, Idaho, has followed in-and-in breeding continuously and with evident success, and, too, they are kept in a climate where the temperature in winter is sometimes far below zero. But Mr. Harris is a gentleman who understands the art of breeding; if all goat raisers knew so well the principles of breeding as he does there might not be so many to condemn the practice. However, they have learned much by experience, and it can not be contended that they are wrong in advising generally against the practice. Col. Richard Peters, the most successful breeder of his day, said that half-blood does can with best results be bred to their own sires, provided the sires have proved themselves to be good breeders.

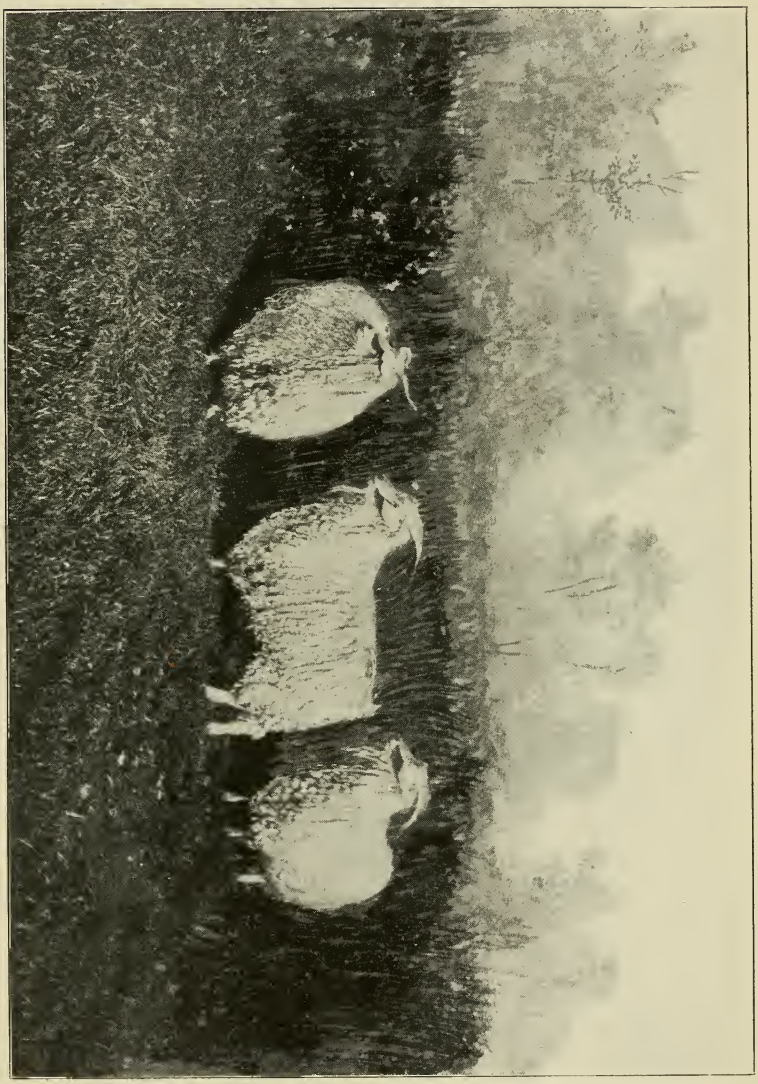
If inbreeding of closely related animals is meant, it should not be resorted to with live stock of any kind except when individuals which show very desirable points are at the same time of very strong constitution and of good size. But, then, I would never hesitate to breed even parents to children. Strict observance of this rule I consider doubly necessary with Angoras, which are naturally tender and delicate, and it should be risked only when chances are very strong that the gain of fleece or shape will fully compensate for the inevitable loss of size and constitution. I believe that in a very few years that the value of the annual product of meat (from her offspring) of a doe will surpass that of her mohair. Besides, the more constitution is gained, the more apt are we to return to the original prolificness of the goat tribe, which has been entirely lost with Angoras in consequence of inbreeding. With the third free generation usually, but always with the fourth, bad effects of mating relations would not be felt any more.—*G. A. Hoerle, Ridgewood, N. J.*

The opinion of our leading authorities, such as Professor Sanford and others, is that in-and-in breeding is the most successful way, and many cases are cited where this has been carried on for over thirty years. We have some breeders here who have been inbreeding for the past eight years, and the result, when the greatest of care is exercised, is that we have produced some very fine stock, as fine, I believe, as any that has been raised in this country. This in-and-in breeding is a very particular piece of work and should not be attempted by anyone unless he intends to give it his undivided attention. I believe it is the most successful way to breed for a fine fiber. The greatest trouble seems to be in the size of the animal, but if careful attention is paid to the work there is no excuse for losing size. We have demonstrated beyond all doubt that in-and-in breeding produces a finer wool, a longer wool, and a better wool; so if one desires to breed for fine wool he will have to follow in-and-in breeding.—*E. H. Jobson, Lake Valley, N. Mex.*



Angora Goats in Rocky Pasture.

(Photograph furnished by H. T. Fuchs, Tiger Mills, Tex.)



Angora Goats in Pasture.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)

I think that to get a perfect goat one should inbreed to the finest buck or ewe obtainable; but don't keep it up too long, as the goat will be small and weakly.—*Josephus R. Barnette, Globe, Ariz.*

We think it should be avoided so far as possible, as it reduces the size and general stamina of the goat.—*W. G. Hughes & Co., Hastings, Tex.*

It will ruin a flock of goats the same as any other animal.—*R. C. Johnston, Lawrence, Kans.*

If done properly, closely watching defects, it is all right.—*J. R. Standley, Platteville, Iowa.*

Would not practice it if I could help it. We want goats with long, fine mohair, but at the same time we must look to the build of the goat.—*Q. M. Beck, Beargrove, Iowa.*

Am opposed to it on general principles. Would prefer it, however, to a moderate extent, to using inferior sires.—*J. Murray Hoag, Maquoketa, Iowa.*

I don't like inbreeding, as it weakens the goat. They don't have the ambition that fresh blood imparts to them.—*G. M. Scott, Malta, Idaho.*

They will be small and not strong, and harder to raise; will not shear so much, and more difficult to keep in flesh.—*W. W. Smith, Eola, Oreg.*

My stock are all inbred (600 does), but they are very small and tender. Would not advise it.—*V. Cladek, Larwood, Oreg.*

Once will do, provided you have an extra buck. After that you weaken the constitution of your goat.—*U. S. Grant, Dallas, Oreg.*

It can be practiced to advantage in producing a fine fleece, but if indulged too much will weaken the constitution and the goat will be small.—*Abe Blackburn, North Yamhill, Oreg.*

I believe, by careful selection of bucks, they can be improved, but I prefer crossing with new blood when it is just as good.—*Oscar Tom, Angora, Oreg.*

It shatters the constitution without a relative gain in weight of fleece. Fine mohair and light fleeces are all right, but I don't practice inbreeding. It produces such a goat as the practical man does not want.—*George A. Houck, Eugene, Oreg.*

We do not approve of it on general principles, but have not experimented much along this line.—*C. P. Bailey, San Jose, Cal.*

Under certain circumstances inbreeding for points in thoroughbreds is necessary, but it will degenerate a grade herd very quickly.—*Conklin Brothers, Newville, Cal.*

I do not like it and have never practiced it. I have seen it practiced, and the goats lack constitution.—*Henry Fink, Leon Springs, Tex.*

It brings the mohair to the greatest fineness if properly managed, but it should not be kept up too long.—*H. T. Fuchs, Tiger Mills, Tex.*

It is beneficial in the matter of improving the fleece, but a decided injury to the constitution and size of the animal.—*Col. W. L. Black, Fort McKavett, Tex.*

I used one billy five years. He was the best goat that I ever saw, shearing 10½ pounds of clean mohair annually.—*G. B. Miller, Gervais, Oreg.*

Inbreeding makes the fleece thinner and shorter and the constitution of the goat weaker.—*F. O. Landrum, Laguna, Tex.*

MANAGEMENT OF THE BUCK.

Bucks usually come in heat about the middle of July and continue so about six months; does, however, do not usually come in heat until the latter part of August or the 1st of September. As the period of gestation in goats is from 147 to 155 days (or about five months), care must be taken in mating the animals in order to have the kids dropped in proper season, which will vary somewhat with the locality. The kids should not come before the warm days of spring, or when vegetation begins to put out vigorously. Therefore the buck should be put to service from November 1 to December 1, so that the kids will come about the 1st of April or May. The only objection to earlier kidding is the extra care required to preserve the life of the kids, for they are exceedingly delicate for a few days, as has been stated before, and even a little cold at this season will probably prove fatal.

A buck, like any other domestic animal, should be in the best possible condition when put to service. He should be well fed with grain for a few weeks before this time, and the feeding should be kept up until a few weeks after his service is ended.

As to the number of does which a buck may serve, there is a great diversity of opinion. The greater number of goat raisers, however, think forty or fifty is all that may be served with good results. Col. Richard Peters wrote that he had obtained the best results with two hundred breeding does by turning in with them ten selected bucks. His object was to have the kids come as nearly at one time as possible, thus shortening the period of careful watching. Referring to Colonel Peters's practice, Dr. J. R. Standley says he regards it a great success, and will adopt it in the future. He says, further: "I have tried the one-service system, also turning in bucks at night, removing them during the day, and other plans, but decidedly prefer Colonel Peters's plan."

Where there are very large flocks it is not always desirable that the kids should all come at one time. If they are dropped at intervals for a month one attendant may thus be enabled to look after a large number, whereas if all come about the same time one attendant could not do the work, and assistants who may be strangers to the flock would be necessary. (It is not well to have many strangers with these goats at any time, and certainly not at kidding time.) Upon this point Mr. G. A. Hoerle has written out a plan, given below, which is quite generally followed where there are large flocks:

A great difference of opinion exists as to how many ewes an Angora buck should be allowed to serve. This depends both upon the bucks and the condition they are in, as well as upon the length of the period during which you want the kids to drop. In a small herd, and where ample conveniences for kidding are furnished, so that good care can be taken of all the kids at once if necessary, one buck should serve from thirty to fifty (as above said, according to the animal); but should the flock be large, and owing to the uncertainty of the climate or the insufficient help or shelter

it should be desirable to have the kids drop gradually, say during a period of two months, especially when winter kidding is made a practice, from 75 to 150 ewes for each buck is not too much—again, according to animal and time. They should not run with the entire flock at once, but begin with say one-third to one-fourth of it, according to circumstances. The next similar fraction should be put in the breeding flock from two to five days later, and so on until gradually the entire flock is with the bucks. In this way a full crop of kids would be insured and at the same time the bucks prevented from doing excessive service.

The handling of "riginals" (ridgels) should have a word here. If the one testicle which descends is removed, the riginal will not get kids, but he will bother the does. If the descended testicle is not removed, he will breed without difficulty. He should be killed as soon as practicable.

NUMBER OF KIDS.

Thoroughbred Angora goats do not often drop more than one kid at a time, while the common goats nearly always drop two. There are many twins with the first cross, but the number diminishes as the crosses become higher. It is stated that the purebred Angoras never dropped but one at a time, and that the presence of twins in a flock is evidence of a base origin of the goats. The latter statement is disputed by some, who believe that the purebred Angora (having no trace whatever of base blood) will drop twins as regularly as the common goat.

SIZE OF FLOCKS.

All goat raisers agree that Angoras can not stand crowding together; and the higher the grade of the goats the more susceptible are they to injury from crowding. But to state just how many should be kept in a flock is difficult, as the number depends upon the character of their restraint. Where they have the range at day and large yards at night, the flocks may be very large, but where they have pastures and small pens at night the flock must not be large.

Writers upon the Angora industry have placed so much stress upon the point of overcrowding that the Bureau sought for information upon the question "What should be the size of Angora flocks?" Each correspondent replied with his own experience, and the conclusion is reached from the replies that they may be handled in flocks about as sheep are handled, the number depending wholly upon the capacity of the range or pasture, as the numbers reported for flocks are from 100 to 2,500. However, the danger from crowding is not disputed by any of the correspondents, and many of them mention it specifically. This phase of the matter must be carefully considered in connection with the question of housing and shelter. These must be ample to afford abundance of room and fresh air.

It is stated by some that goats running in small flocks shear more than the same number running in large flocks.

DEHORNING.

Dehorning the goats has received very little consideration, and it is probable that Mr. Q. M. Beck, of Beargrove, Iowa, is the only goat raiser who is now practicing it. Many other breeders report that they do not dehorn but believe it practicable, while a very few express opposition to the practice. Mr. Beck writes as follows: "I dehorned forty-five head last fall (1889) and found it a success, as it stops a great deal of bunting, which is liable to cause abortion, saves shed room, saves broken legs, and will save many kids." These same reasons have brought the dehorning of cattle in quite general favor among feeders, and it is probable that as the Angora goat industry grows into a large industry the practice of relieving the goats of their uncivilized weapons of warfare will be generally adopted.

Mr. Beck dehorns in the fall after all flies are gone.

A different view of the question of dehorning is taken by C. P. Bailey & Sons Co., who dehorned 250 head which were in a band by themselves. They bunted as much or more than before the horns were removed. "Goats always butt each other, but we have never seen any ill effects resulting, except occasionally a leg being broken from being caught between the horns. It deprives them of their only means of defense, and we consider it unnecessary and objectionable."

SHEARING AND SHEDDING.

SHEARING ONCE OR TWICE A YEAR.

In Texas, New Mexico, Arizona, and sometimes in California shearing is done twice a year—in the months of March or April and in September or October. The reasons are that, owing to the warm climate, the fleece will often shed in the fall if not clipped. Mr. H. T. Fuchs, of Tiger Mills, Tex., says: "I find it quite necessary to shear twice a year, as they suffer too much from heat in the summer and autumn and even during the warm days in winter if they are not sheared about the middle of September, and in the springtime as soon as they begin to shed their long silky hair." There are instances in these localities where goats carry their fleece through the year, but all breeders, except in some parts of California, report the practice of shearing twice a year. In the other parts of the country shearing is done but once a year, and that in the months of March or April. The rule for shearing time does not depend so much upon the calendar as upon the condition of the fleece. It should not be delayed until the fiber begins to shed, as then the oil will begin to go back into the body of the animal, the mohair thus losing its life and luster.

As to the relative values of the semiannual and annual fleeces, there does not seem to be much difference of opinion. The semiannual fiber is shorter and therefore less desirable for fabricating, and the price is not so high as for that of the annual fleece. It is generally agreed

that the two shearings combined weigh a little more than the annual shearing, but probably the increase does not average more than a quarter of a pound. However, some who have practiced it report that the gain is not equal to the cost of the second shearing, and that shearing twice is done from necessity rather than from the standpoint of profit.

USE OF CLIPPING MACHINES.

The use of clipping machines, although largely employed among large sheep raisers, has not yet come into general use among goat raisers. Those who have used them indorse them, and they will no doubt soon come into general use. They are more rapid than hand work, and the results are more satisfactory. The cutting of the skin is easily avoided in reasonably careful hands, while it requires extreme care with hand shears to prevent cutting. Mr. H. I. Kimball, of New Mexico, says of the use of the machines: "I sheared them [the goats] myself faster than the best hand shearer I ever saw, and I got a better price for my mohair." Another gentleman says: "I will say that the clipping machine for sheep will work well on goats in every respect. I have sheared ten goats in one hour and done up the fleeces."

Of course, the goat raiser will consider the relative cost of shearing with machines and by hand before he will purchase a machine. The decision will probably depend upon the number. The cost of hand shearing is about 4 cents a head. In the Southwest there are Mexicans who follow the profession of shearing sheep and goats; these usually receive 2 cents a head with their board. Many of them will shear 85 or 90 a day, the average of all being about 60. Any man who can shear sheep can shear goats. If shearing is done by hand, a short-bladed shear should be used in order to avoid cutting the hair twice.

Another objection to hand shearing is that there is often double cutting of the hair. The result is a shortening of the fiber and an increased amount of noilage.

If the animals are well cared for during the year, their fleece will not require washing before clipping. One writer of experience says that "the natural habits of the Angora goats are clean enough to enable spinning before washing, at least for some purposes." Any dirt that may adhere to the fleece should carefully be picked off after shearing.

CARE OF THE FLEECE AFTER SHEARING.

The operation of shearing should be done in a building free from straw and dirt, which might adhere to the fleece after it drops from the goat. It should then be rolled up, inside out, and packed in the sack without being tied in any way. This is the manner in which the mills desire to receive it. The practice of tying the fleece with almost any kind of twine that may be at hand obtains very largely among goat raisers, but the wishes of the mill operators are already receiving

proper attention. The reasons why the mill operators do not desire fleeces tied are very forcibly stated by one of them (George B. Goodall), as follows:

I want to mention another evil which should be corrected, and that is the use of twine or string around the fleeces. Vegetable fibers will not take dyes used for animal fibers, and in cutting these strings by the sorters more or less of the vegetable fibers get into the mohair and have to be carefully burled out from the face of the finished goods, which adds to the cost of each piece. A mohair fleece should be simply rolled up without twine of any description. You never see it on Turkey or Cape mohair.

If mohair producers insist on the use of twine, the quality should be hard and smooth, so that no particle of it will adhere to the mohair when it is cut away.

As to assorting the fleeces with reference to the quality of the mohair, no common practice is followed by producers. Some assort them at shearing time and pack in separate sacks, while others pack all sorts together. If the producer is a good judge of mohair, the former method will prove more satisfactory. When all are packed together indiscriminately, the poorer grades of fiber tend to reduce the average price of the whole lot. However, many prefer to pack thus indiscriminately, leaving the work and judgment of assorting to the commission merchant. Most of the mills purchase from the commission merchant because of his skill in assorting.

There are appended some opinions on this subject of Mr. Hoerle which are worthy of consideration:

Before folding up the fleeces they should be carefully assorted, if this is possible, in the following way:

A. Combing hair, or all hair over 4½ inches in length:
   1. The very finest, as fine as fine kid hair.
   2. Next finest, or average run of good doe fleeces.
   3. General run of fair doe and good wether fleeces.
   4. Coarse fleeces.

B. Carding hair, or less than 4½ inches long:
   1. Fineness of class 1 above.
   2. Fineness of classes 2 and 3.
   3. Coarse fleeces.

At shearing time fleeces of similar quality and length should be packed together, and special care should be taken not to allow tag ends and burrs to remain in the fleeces. The latter should be carefully picked out before the shearing begins and the former pulled off before packing and placed in a special bag, and marked separately. It is much more profitable to have small lots of low-priced short ends and tags and to pull out with the burrs a few strands of the mohair than to have an entire clip depreciated by careless shearing and packing.

SHEDDING.

The question of shedding is provoking much discussion among goat raisers at this time. Some maintain that the goats shed regularly, while others assert that the purebreds and best thoroughbreds do not

shed at all. The correspondence of the Bureau shows that practically all of the goats in this country shed their fleece, either annually in the colder localities or semiannually in the warmer climates. The question submitted by the Bureau was, "Do thoroughbreds shed if not sheared?" There were many positive affirmative replies received and several modified answers. Among the latter are reasons why some goats do not shed. It will be of interest, and probably of some profit, to consider some of these replies in any effort toward reaching a conclusion regarding this question, and they are given herewith:

They will all shed in the spring, when warm weather begins, but the higher they are bred up the longer they will go without shedding.—*H. T. Fuchs, Tiger Mills, Tex.*

Some will shed. I regard the nonshedding Angora as a distinct type, and all the various crosses will retain their fleece.—*William L. Black, Fort McKavett, Tex.*

I have goats that never shed, but they are fed for show purposes during winter. If ordinary care is given, they shed.—*Abe Blackburn, North Yamhill, Oreg.*

I have had goats that did not shed at 1 year old, but did at 2. I think feeding conditions are responsible for such cases.—*George A. Houck, Eugene, Oreg.*

Goats of second cross sometimes do not shed. Depends on condition of goat.—*U. S. Grant, Dallas, Oreg.*

Many thoroughbreds will shed, and we have grades that do not. Much depends upon the physical condition of the goat. If it is in poor flesh and fattens rapidly in spring, it is very apt to commence shedding, just as many sheep do under similar conditions.—*W. G. Hughes & Co., Hastings, Tex.*

Though most breeders in this country disagree with me in my nonshedding views, I am supported by the Cape breeders. One of them, Mr. R. C. Holmes, is very decided in his expressions. He says: "With regard to well-bred goats shedding their hair, I quite agree with you that they should not do so. In fact, among my goats it is an exceptional thing to see a goat shed, and even the ewes at kidding time do not shed. At this period some few may do so, but very few indeed, and a ram should never shed." This does not lack in clearness. Angoras will sometimes lose their hair from disease, a change of climate, or a change of weather even, or a sudden change from a continued dry food to green food, etc. This may appear at any time of the year, regardless of the season, and has absolutely nothing to do with the yearly shedding of low-bred goats. No yearly shedder should be classed as a thoroughbred."—*G. A. Hoerle, Ridgewood, N. J.*

Under certain conditions they will shed, but not if the goats are in good health.—*E. A. Hinkle, Roseburg, Oreg.*

I have about fifty head of nannies that do not shed, but most goats shed if not sheared.—*G. M. Scott, Malta, Idaho.*

DISEASES AND OTHER ENEMIES.

Goats are less subject to disease than sheep; but these species are so closely allied that treatment in cases of disease is the same for both. Several accounts have been published in the agricultural press of goats in the Southwest being affected with stomach worms and with grub in the head, the same as sheep are affected in the same localities. There are occasionally outbreaks of disease in certain localities, but these are due to local causes, and generally have not been difficult to overcome.

The treatment recommended for the screw worm is as follows: Add to any one of the carbolic sheep dips 10 per cent of chloroform. Apply this mixture, after thoroughly cleaning the wound, with a wad of cotton. The chloroform immediately destroys the larvæ and the carbolic dip prevents the further blowing of the wound.

The stomach worm (*Strongylus contortus*) is the same form as found in sheep, cattle, and deer. The treatment in all cases is the same as for sheep.

Goats have at least three kinds of scab parasites peculiar to their species, but apparently only two kinds of scab develop. Psoroptic scab of sheep does not develop disease upon them, though it can undoubtedly sustain life for a while.

Tapeworms of the genus Moniezia are found in goats. In the intestines are also found five round worms, namely, *Strongylus filicollis*, *Œsophagostoma venulosum*, *Sclerostoma hypostomum*, *Uncinaria cernua*, and *Trichocephalus affinis*.

Verminous pneumonia of sheep also occurs in goats.

Tuberculosis is so rare in goats that every case is recorded, the number of such cases being less than a dozen. It may be said, therefore, that they are practically immune from this widespread and insidious disease.

Goats are apt to have foot rot, but a cure is easily effected by the use of sulphate of copper (blue vitriol). It is usually applied by driving the goats through a trough containing a solution of strong blue vitriol. The solution should be about an inch in depth. Oscar Tom, a breeder of much experience, says:

> Butter of antimony applied with a stiff feather will cure it, or mix 1 ounce of sulphuric acid with 2 ounces of vinegar and apply as above. Go over the whole band. Generally one application cures if well done. Change the range at the same time if you can.

Angoras are frequently affected with lice, which cause a loss of mohair from the rubbing and scratching of the goat. The lice may be exterminated by dipping. The common sheep dips are generally used for the purpose. It is a common practice to dip the goats once a year, and some advise dipping twice a year—in spring just after shearing and again in the fall.

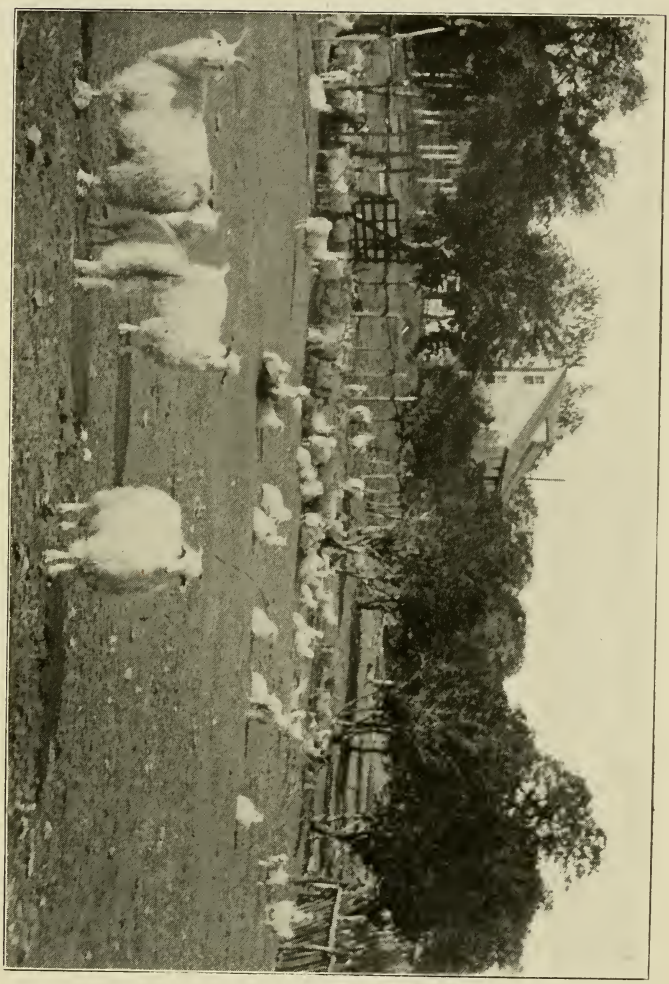
One of the principal enemies of the Angoras is the wolf. The best guard against wolves is a good wire fence. Sometimes the wolves dig under the fence, and then it becomes necessary to trap them. This is practiced by Mr. H. T. Fuchs, who says:

> Three steel traps are fastened to each other, but to nothing else, and catch the wolves. If the trap is made fast the wolf will break loose, but the weight of three traps fastened together simply tires the wolf out, and it rarely drags them more than 200 or 300 yards.

In many localities the wildcats are especially troublesome. Their prey is the kids.

Angora Goats in Pasture.

(Photograph furnished by H. T. Fuchs, Tiger Mills, Tex.)



Angora Goats in Yard.

(Photograph furnished by H. T. Fuchs, Tiger Mills, Tex.)

Fig. 1.—A Yearling Angora Goat.

Photograph furnished by W. G. Hughes & Co.)

Fig. 2.—Shearing Angora Goats.

(Photograph furnished by W. G Hughes & Co.)

The fact that many plants which are poisonous to sheep and cattle may be eaten with impunity by goats is frequently referred to by writers for the press. It is true, however, that goats sometimes die from eating poisonous plants, especially in the mountainous districts of the Carolinas, as the Bureau is informed through correspondence. The so-called "ground ivy" is specially referred to. It is believed that goats will not eat poisonous plants to an injurious extent unless driven by hunger to do so.

NUMBER OF ANGORA GOATS.

IN THE UNITED STATES.

The census reports previous to the year 1900 have not given the number of goats in the United States; the Twelfth Census, however, will show the number of Angoras, as well as the number of common goats.

Col. William M. Black, of Fort McKavett, Tex., in 1898 estimated the total number (including all grades) to be 247,775, located in States and Territories as follows:

Texas	75,000	Tennessee	250
California	59,000	South Carolina	200
New Mexico	52,000	North Carolina	200
Oregon[1]	15,000	Colorado	200
Nevada	11,500	Mississippi	150
Idaho	8,000	Louisiana	150
Wyoming	7,000	Connecticut	150
Arizona	5,700	Alabama	75
Missouri	5,200	Arkansas	75
Utah	2,000	Florida	75
Montana	1,500	Iowa	75
Kansas	1,200	Virginia	75
Indian Territory	900	Nebraska	50
Georgia	750	Washington	50
Kentucky	500	West Virginia	50
Pennsylvania	400		
Illinois	300	Total	247,775

About a year later Mr. William R. Payne, of New York, estimated the total number at 300,000. If these estimates are anywhere nearly correct, the present number must be very much greater, probably as many as 400,000.

IN CAPE OF GOOD HOPE.

Mr. W. Hammond Tooke, in the Agricultural Journal of the Cape of Good Hope for May 25, 1899, gives the number of Angora goats for 1893–1898 as follows:

1892–93	2,811,206	1895–96	2,546,981
1893–94	2,619,708	1896–97	2,685,080
1894–95	2,611,082	1897–98	2,982,811

[1] A home authority estimates the Angoras in the State at 65,000.

IN ANGORA VILAYET.

Schreiner estimated that the number of Angoras in the vilayet of Angora in 1894, was 1,230,000. He also directs attention to the fact that the mohair area of Turkey in Asia extends beyond that province.

PRODUCTION OF MOHAIR.

The quantity of mohair of all grades produced in the United States has been a matter of guess, and the estimates have been wide apart. Assuming that practically the entire domestic product goes to the mills for fabrication, the Bureau addressed to the mills that consume mohair a request to be furnished a statement of the amount of domestic and imported mohair used annually. It is believed, therefore, that these statistics which are given herewith represent the total product of the United States for the year 1899:

Consumption of mohair in the United States in 1899.

Mills.	Domestic.	Imported.
	Pounds.	*Pounds.*
Sanford Mills and the Goodall Worsted Co., Sanford, Me	840,000	460,000
Tingue Manufacturing Co., Seymour, Conn		15,000
Atlantic Mills, Providence, R. I		[1]296,465
Gold Medal Braid Co., Attleboro Falls, Mass		1,000
Massachusetts Mohair Plush Co., Lowell, Mass	200,000	300,000
Westfield Braid Co., Westfield, Mass		[1]8,000
Cranston Worsted Mills, Bristol, R. I	32,000	39,000
Queensbury Mills, Worcester, Mass	5,000	
Total	1,077,000	1,119,465

[1] Not certain it was imported mohair, but assumed to be.

The customs figures of the Cape of Good Hope, as quoted by W. Hammond Tooke, show that mohair was produced there for various years previous to 1898 in the following amounts:

1877	1,433,774	1894	10,003,173
1882	3,766,657	1895	11,090,449
1887	7,153,730	1896	10,001,028
1892	10,516,837	1897	12,583,601
1893	9,457,278		

According to Commercial Relations for 1899 the entire product of the Cape of Good Hope for 1897 was exported, as well as that for 1898, which is given as 10,876,014 pounds.

It has not been possible to obtain figures showing the production of Turkey for any specific year or for a series of years, but the average annual production is frequently given as 7,650,000 pounds.

TARIFF.

The act approved July 24, 1897, places a duty of 12 cents per pound upon mohair. Mohair cloth for buttons is taxed 10 per cent ad

valorem. The duty on dressed and finished goatskins is 20 per cent ad valorem; on skins for morocco, tanned but unfinished, 10 per cent ad valorem. These rates are subject to increase under certain conditions of shipments.

REGISTRATION ASSOCIATIONS.

The Bailey Angora Goat Registration Association, of San Jose, Cal., has kept a private register for many years, and became a general record association in 1898.

There are two registration associations in the United States which were organized during the year 1900—the American Angora Goat Breeders' Association, with headquarters at Kansas City, Mo., and the National Angora Record Association, with headquarters at Salem, Oreg.

LITERATURE CONSULTED.

The principal works consulted in the preparation of this paper are as follows:

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HAYES, JOHN L.:
The Angora Goat: Its Origin, Culture, and Products. American Agriculturist, New York. 1882.

HOOK, BRYAN:
Milch Goats and their Management. Vinton & Co., Limited, London. 1896. Pp. 115, figs. 17.

HOERLE, GUSTAV A.:
The Angora Goat: Its Habits and Culture. Fink & Co., Leon Springs, Tex. 1886. Pp. 32.

JOBSON, E. H.:
Angora Goat Raising. E. H. Jobson, Lake Valley, N. Mex. 1900. Pp. 29, fig. 1.

ALLEN, GEORGE EDWARD:
Angora Goats: The Wealth of the Wilderness. Horace A. Field & Co., Wellsboro, Pa. 1900. Pp. 32, fig. 1.

C. P. BAILEY & SONS CO.:
California Angoras. San Jose, Cal. 1900.

Besides these access has been had to hundreds of articles in the agricultural press. Special mention should be made of the Oregon Agriculturist, Portland, Oreg., the Pacific Rural Press, San Francisco, Cal., and the American Sheep Breeder, Chicago, Ill. The two latter devote a page regularly to the goat industry.

The library force of the Bureau of Animal Industry have prepared a bibliography of goat literature, but the titles are so numerous that it has been deemed advisable to hold them for separate publication rather than to append them here.

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