lowing estimates, which ought to be included in the Aide-Mémoire des Practiciens:

A man, putting forth an average effort of 7 kilogrammes on a winch of 0.35 meter radius, works during 8 hours with the speed of 30 revolutions per minute. The price of the working day being 3.50 francs, the horse power hour will cost 4.20 francs.

A horse weighing 500 kilogrammes, attached to a gin of 4 meters radius, exerts an equivalent of 55 kilogrammes at the rate of 55 meters per minute during 8 hours. The day of the horse being valued at 4 francs the horse power hour will cost 0.97 franc.

An ox, working under the same conditions, exerts the force of 65 kilogrammes, at the rate of 40 meters per minute. The price of the day being counted at 3.50 francs, the cost of the horse power hour will come to 1.13 francs.

A steam engine (locomotive of 3 to 8 steam horse power, of high pressure, without condensation), the price of which varies from 1,000 francs per horse power for light force to 750 francs for medium force, consumes about 3 kilogrammes of coal per horse power hour. The net cost of one horse power hour furnished by a locomotive of 6 steam horse power, working 10 hours a day for 150 days, comes to 0.22 franc.

A petroleum motor consumes about 0.500 liter to 0.800 liter of petroleum or of gasoline per horse power hour, and costs from 600 to 800 francs per horse power. (The locomobile motors are of a little higher cost.) The net cost of one horse power hour may be estimated at 0.34 franc with heavy petroleum and at 0.38 franc with gasoline.

A windmill, developing a force of $\frac{1}{4}$ to 3 steam horse power, and costing from 1,000 to 3,000 francs, makes the net cost of the horse power hour 0.11 francs.

A water wheel, whose price, including masonry and putting up, varies from 400 to 800 francs per steam horse power, makes the cost of the horse power hour come to 0.03 franc to 0.04 franc.

A turbine, varying in price, in the same conditions, from 100 to 500 francs per steam horse power, yields nearly the same result.*—Translated from L'Industrie Automobile.

THE FOOTHILLS OF COLORADO.

By H. A. CRAFTS.

WHILE the higher peaks of Colorado have been generously dealt with by the descriptive writer and scenic artist, I am inclined to believe that the foothills have been neglected. The lofty grandeur of the former has given them a world-wide prominence, and their transcendent beauties have been celebrated in song and story, and presented in glowing colors on many a canvas. In the railway literature of the day especially, they are constantly held up before the public eye.

But what the foothills lack in grandeur, they make up in extent, variety and picturesqueness. In fact, these are the qualities that stagger the writer who essays to describe them. For it must be understood that the great peaks of the Rocky Mountains do not spring suddenly from the level plains, and shoot thence above the clouds; but rather crown a mighty mountain ridge, more than two hundred miles broad, from base to base, looking down, both east and west, upon two immense slopes studded with these same foothills.

So the mountain climber, who starts from the plains with the purpose of attaining the highest pinnacles of the range, must needs make a journey of a day or two before reaching even their bases, unless, however, he be traveling by rail. And this preliminary journey pursues a constantly ascending grade, winding meantime through a perfect labyrinth of hills, of greater or less magnitude, and of an infinite variety of form and substance.

Starting from the plains, the climber first encounters the long and low ridges that skirt the base of the range in parallel lines. The outer ridge is composed principally of limestone, and slopes quite gently toward the plains, but is more rugged and precipitous on the opposite side. At intervals of every few miles, up and down the range, the ridge is intersected by clefts, or canyons as they are called in Colorado, some of which afford outlets for the numerous streams that come pouring down out of the mountain gorges, fed by the melting snows of the higher altitudes.

The canyons are quite narrow, their walls as a general thing quite perpendicular, and showing in fine array the various strata, forming the substance of the ridge. They are strewn with a profusion of huge fragments of broken rock, that dispute an entrance, save on foot or horseback. These, with the steep, rugged walls, would lead the observer to believe that the canyons had been blown out by some sudden and violent convulsion of nature; but even where they are not the outlets for natural living streams, springs are usually found above them, and even in the driest season small rivulets trickle over their rocky beds; and again, when sudden and heavy rain storms prevail in the mountains above, accumulated floods pour through them, with almost irresistible force, sometimes carrying upon their breasts the great boulders that lie in their pathway; so upon second thought it occurs that these openings were really formed by escaping waters.

Doubtless, in the beginning, this ridge was a continuous whole, and for a time held lakes of pent-up waters. Then small leakages were formed, which grew by degrees, until the ridge was completely cut through, and the waters rushing through, spread themselves upon the plains; for the plains, contiguous to the canyons, are strewn with boulders, myriads of pebbles and cobble stones, and the soils are largely mixed with sand and gravel, plain testimony to powerful floods in time past.

The slopes of this outer ridge of foothills give but small encouragement to vegetation. A thin coating of clayey soil, scattered over a bed of rocks, which have a propensity to stick their noses above ground, coupled with a naturally arid climate, is hardly propitious to plant growth. A few scrub pines, clumps of sage brush,

some cactus plants, and bunches of soap weed, constitute the large specimens of plant life. During the season of showers and sunshine there is a growth of buffalo grass, that gives the hills a pale green tint, which turns to a light brown, as the grass becomes sere from long summer drought. And the grassy slopes, too, are spangled, in season, by a profusion of low-stemmed wild flowers, remarkable for their rich tints. In spots, larkspur grows quite luxuriantly, but it is quite a terror to stockmen, as cattle in the early spring, while the plant is young and succulent, frequently die from over-feeding upon it. So fatal are its effects that the plant is known as "poison-weed" among the ranchmen.

The inner slope of the ridge is here unbroken from base to summit, and there surmounted by a perpendicular crest of solid rock, resembling somewhat the rampart of a fortification. The cattlemen find these latter very convenient substitutes for fences in inclosing their ranges.

Crossing a narrow grassy glade we now come to the second line of foothills, almost identical in shape with the first. Its principal substance, however, is a stratified gray sandstone, which can be quarried in almost any required thickness, and is taken out in large quantities to be used for flagging, paving, curbing and building stone. This ridge, like the outer one, is intersected by canyons, which in some cases stand opposite to those in the first ridge and sometimes not, making a journey from the plains into the hills frequently devious, but nevertheless interesting. The inner flank of this second ridge is more precipitous than that of the first, and for long distances reveals the various strata of stone, each having a color or tint of its own. There are delicate grays, drabs, browns and pinks, which lying in long undulating bands, present a very pleasing aspect of variety and richness.

The third ridge is composed of red sandstone, not stratified like the gray, but lying in immense masses, with here and there a seam dividing one ledge from another. This stone is found to be well adapted for building purposes, and is quarried in large quantities for structural work. Here again are found the intersecting canyons, and the sharp interior declivities of the second ridge, and the pictured walls are even more marked, the lines of color running both vertically and horizontally. The shades run from a light buff to a chocolate brown. For miles these alternate parallel ridges and glades extend up and down the base of the great range in gently curving lines; also in coloring and contour there is general softness. The reddish tint predominates, even when the grass is at its greenest, a fact attributable to the general presence of iron ores, which exist to a large degree in the shape of hematites. These color the rocks, the sands and the clays. But when the grass turns brown the ruddy tint is deepened, especially when seen in the mellow light of an autumn day.

Winding all through these glades and canyons are numerous wagon roads and bridle paths where the lover of nature may wander at will, feast his eyes upon a thousand beautiful vistas and have his attention attracted by a multitude of interesting objects. Some parts of the glades are as smooth and grassy as a well-kept lawn, and from their midst gush springs, embowered in groves of cottonwood trees, willow or quaking asps, and bordered by tall grasses and luxuriant growths of wild flowers, that bloom brilliantly during the spring and summer seasons.

Odd and bizarre bits of scenery spring up on every hand. On the crest of some ridge curiously shaped rock formations are outlined against the clear sky—a human profile, a line of chimneys, a column, a pyramid—against the blue background. From the midst of a smooth, grassy slope springs a single huge rock, and farther on a lone and starveling willow, gnarled and twisted out of shape by buffeting winds and parching droughts, languishes in a sterile soil. Half-mournful, half-weird, almost purely exotic, but exquisitely beautiful, are some of these views; worthy to be limned by a Beardsley.

Of animal life these precincts are by no mean destitute. Largely in these modern times the hills are utilized as pasture lands and their slopes are dotted with grazing kine. But it is of wild life that we have to deal, and if we look up and down the glades and in the cracks and crannies of the rocky ridges we shall find it in abundance. In the clumps of wild plum trees and chokeberry bushes the air is made vocal by the chatter of magpies and blackbirds. Then the ear is occasionally greeted by the cry of the bluejay, which by the way is rather a late comer to Colorado. Of smaller birds there are bluebirds, wild canaries, cardinals, etc., flitting among the branches. Then there are ground owls and hoot owls, the former being on quite familiar terms with the prairie dogs while the latter occupy grottoes high up in the rocky cliffs. Of furred animals there are the well-known prairie dogs, ground hogs, mountain rats, squirrels, wolves, coyotes, etc., who cultivate a more or less intimate acquaintance with the wayfarer and add life and animation to the scene.

But above and beyond these outer rims of the Rockies begins the true wonderland of the region. There is a vast succession of hills and valleys, crags and canyons, meadows and streams, until the great timber belts of the higher altitudes are reached. The hills are more broken, more varied in form, more rocky and more massive. Some are rounded in form and quite bare, save of rocks and a few scattering pines. Short grasses grow thinly upon their slopes, which are grazed summer and winter by innumerable kine. Others are abrupt, steep and craggy, and tower grimly against the sky. The grand canyons are deep, and in some places very narrow, while the tributary canyons lead up into all manner of secluded and picturesque regions—narrow rocky gorges, verdant meadows or forest arbors of pine and spruce. It is a region that is exceedingly well watered, the natural flow from multitudinous springs and from an occasional rainfall being augmented by the melting snows of the alpine heights. These streams are quite plentifully peopled by mountain and brook trout, whose ranks are being added to year by year by the State fish hatcheries; so that the tourist, who has piscatorial

leanings, may have his fill of sport while on his summer outing.

Despite the rough and rugged nature of the country, these are essentially regions of light and cheerfulness. This is largely due to the dryness of the climate and the superabundance of sunshine. Barrenness is also a predominating feature, permitting nearly every nook and corner to be entered by the sun's rays, and to be breathed upon by the light and capricious breezes that blow almost constantly over the hill-tops and through the network of narrow valleys that cover this portion of the range. There is almost an utter absence of gloomy gorges, miasmatic swamps or barren mountain wastes. On the contrary, there are green and sunlit slopes, that stretch far up to pine-clad summits, the sun's rays filtering with fine effect through the canopies of green boughs; level and park-like glades, growing luxuriant grasses and wild flowers, and studded with pines and aspen groves; and flanked perchance by high cliffs of ragged gray rocks, which reflect warmly the brilliance of the sunlight and over against which the liquid heat-waves may be discerned, trembling against the rocky background in delicate undulations; clear and crystal streams that tumble noisily down stormy declivities, or wind silently through narrow meadow lands, embowered in alder trees and silver spruces, whose branches look as if they had been freshly powdered by fairy hands; a hill-side with grassy plots and rocky ridges, looking for all the world like a New England upland farm transplanted among crags and peaks, for as the hill rises there is a transition to bald ledges, and finally to granite precipices with clumps of pines finding scant foothold between the crags; or far-reaching vistas, stretching mistily into the distance, with rocky headlands jutting into view, that require but a mild stretch of the imagination to picture as castles.

Yet how difficult it were to classify the varying features of this great region! Take a single sequestered valley, and a volume might be written, and yet there would be undiscovered wonders! Then how herculean were the task of unfolding the wonders of an entire mountain tract!

A brief description of a single highland lake and then the present essay must end. Chamber's Lake lies at the headwaters of the Cache la Poudre River, in northern Colorado, at an elevation of ten thousand feet above sea level, and fifty miles from the outer foothills at the eastern base of the range. It is set deep in the embrace of a group of steep mountains. It has been sounded to a depth of more than three hundred feet, yet there are depths that have never yet been touched by the plummet. Its waters are as clear as crystal and so translucent that the bottom of the lake is visible many feet beneath the surface. Wild and romantic regions are on all sides. From its northern borders steep, pine-clad mountains rise to an imposing height; yet above these towers the snowy summit of Clark's Peak, which reaches an altitude of more than 13,000 feet above tide water. Down the slope of one of the lower heights pours an impetuous stream, known as Fall River, whose muffled brawl is echoed far across the blue waters of the lake.

The atmosphere round about is highly rarefied and of the utmost purity, and under clear skies the surrounding peaks stand forth in vivid outline. Over all reigns the hushed breath of high altitudes, and no sound breaks the silence save the murmur of the winds through the pine forests and the louder voice of Fall River as it thunders down the opposite steep. Southward, as far as the eye can reach, the snow-capped peaks of the main range stand in seemingly endless procession against the melting skies. Eastward the grand canyon of the Cache la Poudre plunges down into a mass of rugged hills that stretch far toward the great plains. Taken all in all, it is a scene of surpassing grandeur, and one calculated to rouse the awe and admiration of the most serene.—Popular Science News.

THE CANALS OF MARS.

By Miss M. A. ORR, in Knowledge.

THE physical condition of Mars is a problem over which discussion still rages with unabated vigor. While Mr. Lowell sees in the Martian "canals" a vast system of artificial irrigation, and M. du Lignonès geological fissures, through which rise to the frozen surface vivifying vapors from a still heated interior, M. Antoniadis ascribes their doubling to a defect in focusing, and others disbelieve in even their single existence. But the enigmatical lines have appeared to so many, and in the main with such consistent similarity, that the ranks of these unbelievers grow thin. Between rejecting the canals altogether, however, and accepting them as actual physical entities, there are other possible alternatives. Mr. Walter Maunder, in an article in Knowledge for November, 1894, and more recently Signor Cerulli, in recounting his observations of Mars in the opposition of 1896-97, at his private observatory of Collurania (Teramo), showed how the mathematical lines and spots we find in the faint markings of Mars might be merely the easiest form in which, with our present optical means, we could be cognizant of its real features. This latter treatise elicited replies from Schiaparelli and Flammarion, but their arguments in favor of the physical existence of the markings as such, and of actual changes taking place in them, are not altogether conclusive. Signor Cerulli's observations during the last opposition have confirmed him in the belief that the markings are optical, and his new report* is substantially a full exposition of his theory. These observations extended from August, 1898, to March, 1899, and were made with a 15½-inch Cooke equatorial, with powers of 400 and 500, always without stops or colored screens, the object being not to get sharp definition of any special feature, but as complete a picture as might be of all the phenomena. The author shows what is the explanation, on his theory, of the features seen and their apparent variations, and brings forward ingenious and novel arguments to prove his case.

It must be remembered that in a bird's-eye view of a world some forty millions of miles away all we can take note of are contrasts in tone and color, while the

* Nuove osservazioni di Marte: Saggio di una interpretazione ottica delle sensazioni areoscopiche. By V. Cerulli. Collurania, 1900.

* The steam horse power in French calculations, which is 736 watts, is less than the horse power in English and American estimation, which is 746 watts, or the equivalent of 1.014 steam horse power.—Note by Translator.

real contour of objects is masked or invisible. Small or faintly-shaded objects, invisible singly, will produce an effect, if close together, of one large mass, and from our inability to see the irregularity of their grouping, will appear as round spots or long streaks. But conditions of seeing vary enormously on Mars, according to its distance and position, and the changing illumination of its disk; not to speak of variations in ourselves, our atmosphere and our instruments; the contrasts, therefore, will vary, more detail will sometimes be seen in the patches and streaks, fainter markings at their edges will appear and disappear, altering their outline and extent. The hazy aspect of Schiaparelli's canals may thus be a nearer approximation to reality than the sharply defined, and the doubling may be due to disappearance of faint shadings between more easily grasped boundaries. That the canals were discovered after the opposition of 1877, being only suspected during the most favorable period, that they are sharpest with colored screens and comparatively small apertures, while in the great Lick and Washington telescopes they have been seen either as few diffused markings, or not at all, suggest that the fine lines are simply a mode under which faint markings may present themselves to imperfect vision. There is undoubtedly truth in the apparent paradox that greater distinctness comes with poorer vision, for in the best moments the eye dimly perceives, even where it cannot grasp, divisions in simple masses, curves and blurring in narrow lines, indeterminate shadows in clear spaces.

Whether the optical theory accounts for all the variations, including those of the polar caps, the future must decide. Most interesting is Cerulli's appeal to the past history of areography, referring to Flammarion's valuable collection of drawings, all carefully copied from originals, in his "Planète Mars." Here we may see how in the first rude telescopes impressions of Martian markings were summed up in one large round spot, or one wide band, which latter was by Cassini and some others seen double. By degrees the easiest features of the southern hemisphere were distinguished, but appeared so variable that an atmospheric origin was ascribed to them. It is particularly instructive to compare Knott's drawing of November 3, 1862, with Lord Rosse's of three days later. Knott's telescope was of 7.1-3 inch aperture, and the features which in the 6-foot Rosse reflector appeared as large dark patches on a fainter background, he portrays as narrow lines on white—canals on a large scale. Again, in two excellent drawings by Kaiser, a broad band where we now recognize Praxinos, seen at the opposition of 1862, becomes, six weeks later, when seeing was more difficult, two narrow bands with faint shadings between. Other examples of gemination in lines and in spots, contractions and enlargements, etc., may be traced and through all the series there is a remarkable, but in no wise astonishing, variety of representation. One has but to consider the fugitive faintness of the objects, the imperfections of the instruments, and the personality of the observers, which affects not only their vision but their mode of portrayal. On this last point, which comes out very clearly on an examination of the illustrations in "La Planète Mars," Signor Cerulli has not perhaps laid enough stress, nor on the influence of unconscious imitation.

Mr. Green, the artist-astronomer, used to insist on the importance of the trained hand as well as the trained eye in order to obtain true pictures of planetary detail.

Is the history of discovery with regard to the large markings in Mars' southern hemisphere repeating itself now with the more delicate shadings in the northern? and with better optical means would they also lose their misleading appearance of mathematical regularity, and their instability?

The artificial origin of the Martian "canals" can hardly be maintained now that they have been seen to traverse the polar caps, and to appear in Venus, Mercury, and two of the Jovian satellites. On the optical hypothesis, on the other hand, this is precisely what we might expect. It is perhaps going too far to suggest that the bands of Jupiter and their varying appearances are strictly analogous to canals, since their atmospheric origin is rendered probable by other considerations, notably by the planet's low density; yet there is certainly a startling resemblance between some early drawings of Mars and recent diagrams of Jupiter. Schröter's Mars, for instance, on page 77, Fig. 48, of "La Planète Mars" (1892 edition), tempts one to quote Dante:

"Such would Jove become, if he and Mars
Were birds, and changed their plumage."*

We are indebted to M. Flammarion for another line of evidence. He had the happy idea of collecting naked eye views of the moon by different observers, and in response to his appeal an interesting series appeared in the "Bulletin de la Société Astronomique de France," from January to June of last year. The disk of the moon to the unaided eye is about the same size as that of Mars in an average telescope, but the conditions are not quite the same, as naked eye vision does not admit of straining and mis-focusing to the same extent as telescopic. Nevertheless, the study of these drawings is, as M. Flammarion remarks, a lesson on the value to be attached to observations at the limit of visibility, and no one would have believed that the same thing could have been represented in so many different ways. The reader may judge for himself by personal examination whether these drawings support Cerulli's theory of the canals. He will not fail to observe a tendency to draw the Seas of Serenity, Tranquillity, Plenty, and Nectar, as two lines more or less parallel, while the Ocean of Tempests is sometimes a narrow curved line, its eastern border only being seen, in contrast with the brilliant limb. Tycho in one instance appears a very large bright square.

Whether the optical theory be correct or no, probably no one will deny the wisdom of Signor Cerulli's advice to regard all Martian maps as temporary guides, sure to be modified by further investigation. We may add, however that to refrain altogether from speculative hypotheses would be as unscientific as uninteresting.

ing; the sensational theories about Mars have been a stimulus to much excellent work; but the scientist remembers that they are only theories, and is prepared to see them dispelled by fuller light.

INFORMATION CONCERNING THE ANGORA GOAT.*

THE goat has accompanied civilization into all parts of our country—not numerous, 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.

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 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

the intelligence that the breeders will bring to bear, the Angora goat industry will soon be placed on the highest plane.

The history of the Angora goat in the United States has been marred by the carelessness or indifference of occasional writers for the press who have been often inaccurate as to dates or facts, and also by others whose interests have doubtless led them into exaggerations.

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.

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.

The 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

MADAME LADYSMITH, THREE YEARS OLD.

Fleece, 8 pounds. (Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)

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. 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 Penant to refer to a pillow made of the Angora fleece.

The city of 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.

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.

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 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.

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 pendulous ears. In this country care must always be exercised to cull the off-colored 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

* Quid viveret Giove, e' egli e Marte
Fossero angelli, e cambiassero penna."—Par. xxvii. 14, 15.

* By George Fayette Thompson, Editorial Clerk, Bureau of Animal Industry. Abstract of Bulletin 27 of the Division of Animal Industry, Department of Agriculture.