D. VII—19; A. 13; V. I, 4; P. 17. Lat. l. complete.

Color olivaceous above, little punctulated; lower two-fifths of sides and whole under side of head and body uniform whitish; above, head and body with irregular spots and blotches of black; these in finer pattern on head, and not forming bands on back; dorsals, caudal, and pectorals with black spots arranged in more or less distinct series; anal, ventrals, and lower rays of pectorals translucent, unmarked.

A single specimen (No. 29663) $4\frac{1}{2}$ inches in length, was taken in Lake Michigan, off Racine Wis., by Dr. P. R. Hoy, and presented to the National Museum.

OBSERVATIONS ON FOUR MULES IN MILK.*

By Professor ALFRED DUGÈS.

[Translation of a note contained in "El Repertorio" of Guanajuato, Mex., No. XVII, 1876.]

Although observations relative to the milk given by animals which have not passed through the state of gestation are few, still a number have been recorded, including some regarding the human species. Frèmy has given an analysis of the milk of a sheep and Schlossberger of that of a goat. Facts of this nature being so uncommon, I believe that the note which, conjointly with my learned friend Prof. Vicente Fernandez, I now publish, will prove of considerable interest.

On the 11th of May, 1876, having learned that there was a mule in milk at the Hacienda d'Argent de San Pedro de Rocha, on the Marfil road, a quarter league from Guanajuato, I went to the place, accompanied by my friend Fernandez. Through the kindness of the employés of Mr. Bernardo Lopez, proprietor of the farm, we were permitted to examine the phenomenal animal, which was then working in an ore mill.

The mule is of a chestnut color, with the nose, lower parts of the limbs, belly, tail, and mane white. Its height is about $1\frac{1}{2}$ meters; its proportions are perfect, without fullness of the abdomen; the breast is also larger than those of hybrids of the same kind ordinarily; the back is quite concave. Except in these particulars, however, there is not the least doubt but that we had before our eyes an ordinary mule. We were told that it had been bought five years before, and, according to the workmen, it was at least seven years old. On examination, however, I discovered that the teeth resembled those of a horse four and a half or five years old. It is possible that there is an anomaly here co-ordinate with the peculiar appearance presented by the mammæ. The latter are shaped like the alligator pear (*Persea grattissima*), black, and without nipples. Their length is 12 centimeters, exclusive of the base, which is

*Translated by Frederick W. True, from Professor Dugès' French version of his original Spanish.

buried, as it were, in the skin of the abdomen; as a whole the organs somewhat resemble testicles. According to the information given us, the animal had never given birth to offspring, nor had ever been served by an ass or horse. It appeared that two years before a workman in the establishment, seeing that the mammæ were a little large, attempted to milk the animal, and that the repetition of this act had brought about the condition in which we found the animal. In a moment, and before us, more than four hundred grams of milk were drawn, which issued with much force and fell foaming into the vessel prepared to receive it. When it had remained undisturbed for a little time it appeared of a dead white color, resembling that of milk of almonds. Its odor was slight, not at all resembling that of the mule. Its taste seemed to me oily and a little sweet, but as I tasted of it with repugnance I cannot describe the flavor accurately. Regarding its other peculiarities I refer to the note of my friend, Professor Fernandez. The microscopic characters were those of ordinary milk.

Such are the more important facts which I learned regarding the hybrid in question. The matter is known to a large number of the citizens of Guanajuato.

The following note on the nature of the mule's milk is extracted from the report of Prof. Vincente Fernandez, which appeared in the same number of the "Repertorio" in which my own observations were first printed:

"The liquid obtained from the mule has the appearance of whey, is without sensible odor, and has a sweet taste. Its reaction is slightly alkaline. Density, 1.0270. Heat alone does not coagulate it. Acetic and hydrochloric acids coagulate it, however, and leave oil globules upon the filter. Sulphuric acid coagulates the milk also, and gives a white precipitate by forming an insoluble compound with the casein. It contains, therefore, two of the principal constituents of cow's milk—fats and casein.

"By pouring into a test-tube 80 drops of pure sulphuric acid, 5 centigrams of ox-besoar,* and a drop of milk, and heating to 60° or 80° F., I obtained a reddish purple color similar to that of a solution of permanganate of potash. This demonstrates the presence of glucose, which is formed by the sulphuric acid at the expense of the lactose—another principle of cow's milk.

"In order to prove the existence of butter and of casein, I mixed 20 centiliters of milk with an equal volume of a saturated solution of sulphate of soda and one gram of carbonate of soda.

"Filtration gave a clear liquid, and butter remained on the filter. The liquid, neutralized by acetic acid, gave a precipitate of casein, which the carbonate held in solution.

*This reagent, very delicate for use in recognizing the presence of glucose, is a discovery of Vicente Fernandez, and has always been of great service to me in testing diabetic urine.—A. D.

"A quantitative analysis gave the following figures, the process being carried on with the greatest care:

	Liter.	Hundredths.
Water	908.50	90.850
Casein	19.45	1.945
Butter	17.00	1.700
Sugar of milk	51.30	5.130
Fixed salts	3.75	0.375
	1,000.00	100,000

"The result proves that the liquid in question is a true milk, and that this milk does not differ from that of horses in general, except by the presence of a little more fat, which diminishes its density. Possibly the predominance of fat is due to the fact that the milk remained a long time in the mammæ, and that the casein underwent a regressive change. Otherwise it is a liquid almost entirely composed of olein."

Subsequent to the time of this observation my friend, Mr. Epifanio Jimenez, brought to Guanajuato a mule five years old, which gave about a liter of milk daily for four months. The animal was taken away again, however, so that I was unable to examine it.

I have been made aware of an additional fact. I received milk from two mules of the Hacienda de Luna, near Guanajuato, in February, 1880. It is salt, very fat, and whiter than that of which an analysis has been given. The facts which I obtained are as follows: One mule is fifteen years old, the other eighteen. The first furnishes milk at all times of the year, and has done so from the time it was purchased. The second mule has been under observation only a month. Neither has given birth to young. The quantity of liquid given by the first animal is 250 grams per day; by the second, a liter or a liter and a quarter.

GUANAJUATO, *November* 24, 1880.

ON LAGOPUS MUTUS, LEACH, AND ITS ALLIES.

By LUCIEN M. TURNER.

The following paper is based upon an examination of the specimens contained in the National Museum collection, to which I have been kindly allowed access by Professor Baird. A sufficiency of material alone can demonstrate to a certainty the relationship of birds subject to almost daily mutations of plumage as are exhibited in the various species of the genus *Lagopus*.

It is well known that individual birds of this genus differ greatly, though they inhabit a restricted locality, such as a single mountain. The birds from the lowlands are larger and have a looser plumage,