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Notes on Guanacos.

By

EINAR LÖNNBERG.

With four figures in the text.

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The Guanaco has a very wide distribution in South America from the Andes of Ecuador and Peru to the plains of Patagonia and even to Tierra del Fuego. The general opinion among zoologists has been that all this vast area was inhabited by a single wild species named *Lama huanachus* MOLINA. Last summer I had, however, the opportunity of seeing some material of Guanaco, brought home, from Peru in the year 1911 by Dr. IVAR SEFVE, which appeared to prove that there may exist more than one wild race of this animal. Dr. SEFVE's specimens which considerably differ from Guanacos from Patagonia and Tierra del Fuego, as will be set forth below, are from a locality about which he has communicated as follows: »The Guanacos are shot at Ccacsile, Nuñoa (near S:ta Rosa railroad station), Peru. The plateau itself is situated at an altitude of about 4,000 m. above the sea, but as these animals live near the snow region of the mountains it may be considered that the real altitude of their habitat is about 4,500 to 4,600 m. above the sea.»

With regard to their colour these Guanacos do not differ from southern specimens, but their skulls are very much smaller than skulls from Patagonia and Tierra del Fuego, as is shown by the appended table of measurements. But in addition to

	Guanacos				*L. vicugna* ♂	
	Peru ♂	Patagonia ♂ rather old	♂	Tierra del Fuego ♂ ad.	Peru	
Total length	261	316	307	309	234	236
Condylo-basal length	244	295	290	290	220	221
Greatest width	128	152,5	146	144	117	122,
Least interorbital width . . .	81	107	106,5	99	78	80,
» postorbital » . . .	56	64	64	69	59	58
Length of the three upper molars (crowns).	51	64,5	63	66,5	44	45
Distance from front of *c* to back of m^3	115	132	131	145	96	100
Width across middle of m^2 . .	64	75	75,5	74	55	59
Greatest transverse width of anterior lobe of m^2	13	19	19	18	13	14
Diastema between *c* and p^3 . .	40	—	—	52	38	—
Least width of palate between premolars and *c*	8,6	13,3	14,7	14,6	11	10
Width of palate between anterior lobes of m^3	39,6	45	45	48	34	34
Greatest length of nasals laterally	52,5	78	—	77,5	42	—
Distance from lateral tip of nasal to tip of premaxillary	80	91	—	87	77	—

this general difference in size there are also differences in proportions between different parts of the skulls. In the Patagonian Guanaco the distance from the back of the condyle to the anterior brim of the orbit (149 mm. in an adult male) is smaller than the distance from the orbit to the tip of the premaxillaries (172 mm.), but in the small Peruvian Guanaco the former distance (131 in an adult male) is greater than the latter (129 mm.). In the Patagonian Guanaco the distance from the anterior brim of the orbit to the lateral tip of the nasal (95 mm.) is contained only about $2\,^2/_3$ times in the distance from the tip of the nasal to the back of the occipital crest (240 mm.), while in the small Peruvian Guanaco the former distance (63 mm.) is contained more than 3 times in the latter distance (193 mm.). This proves that the præorbital region of the skull is, even comparatively, longer in the Patagonian Guanaco. On the lower surface of the skull several important differences are to be seen. In the small Peruvian Guanaco the palate is extremely narrowed in the region between the premolars and the canines (conf. fig. 1). The incisure in the posterior margin of the palate is broadly rounded,

and the vertical parts of *ossa palatina* forming together with the pterygoids the walls of the choanæ are parallel with each other, so that the posterior palatal opening has the shape of a greatly extended U (conf. fig. 1). In the Patagonian Guanaco the incisure in the posterior palate is narrower in front than behind, even if it is rounded, but sometimes it is pointed, and

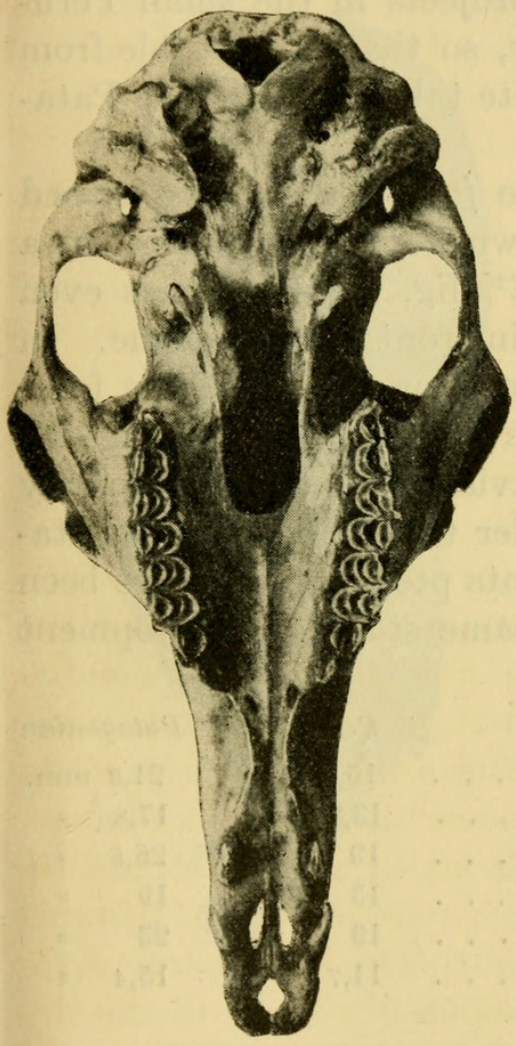

Fig. 1. Palatal aspect of a skull of the small Peruvian Guanaco.

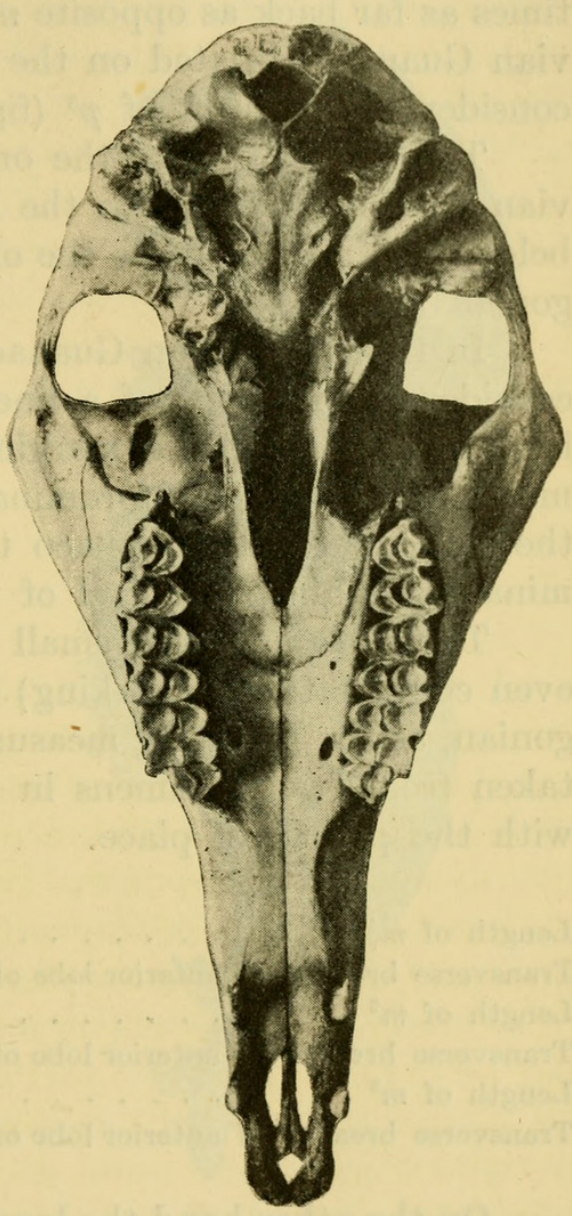

Fig. 2. Palatal aspect of the skull of the Patagonian Guanaco.

the vertical walls of the choanæ are diverging backwards so that the general shape of the posterior palatal opening is that of a V (conf. fig. 2), even if the anterior end is somewhat rounded off, as is already mentioned. In this respect the small Peruvian Guanaco with its parallel palatal walls resembles *L. vicugna*.

The bullæ appear to be comparatively more inflated in

the small Peruvian Guanaco (fig. 1) than in the Patagonian (fig. 2), but the distance between the bullæ and the posterior edge of *laminæ pterygoideæ* is greater in the former (conf. fig. 3), than in the latter (conf. fig. 4).

The two rather large foramina on the palate, which in the Patagonian Guanaco are situated opposite p^3 or p^4, and sometimes as far back as opposite m^1 (fig. 2), are in the small Peruvian Guanaco situated on the narrowed portion of the palate considerably in front of p^3 (fig. 1).

The upper brim of the orbit projects in the small Peruvian Guanaco more than the lower, so that it is visible from below (conf. fig. 1), while the opposite takes place in the Patagonian (fig. 2).

In the Patagonian Guanaco the *foramina incisiva* extend considerably in front of a line drawn across the palate on a level with the anterior margin of i^3 (fig. 2), sometimes even more than half of the foramina lie in front of such a line. In the small Peruvian Guanaco the anterior ends of these foramina lie behind the level of the front margin of i^3 (fig. 1).

The molars of the small Peruvian Guanaco are (partly even comparatively speaking) smaller than those of the Patagonian, as the following measurements prove, which have been taken from two specimens in the same stage of development with the p^3 still in place.

	Peruvian	*Patagonian*
Length of m^1	16,5 mm.	21,5 mm.
Transverse breadth of anterior lobe of m^1	13,3 »	17,8 »
Length of m^2	19 »	25,5 »
Transverse breadth of anterior lobe of m^2	13 »	19 »
Length of m^3	19 »	23 »
Transverse breadth of anterior lobe of m^3	11,7 »	15,4 »

On the other hand the lower incisors of the small Peruvian Guanaco are very strongly developed so that, in spite of the smaller size of the animal itself, the combined width of the median pair of incisors is 16,5 mm., or exactly the same as in two specimens of the much larger Patagonian Guanaco. In a specimen from Tierra del Fuego these teeth are, however, still broader (about 20 mm.). The molars of the lower jaw are as those of the upper much smaller in the Peruvian Guanaco than in the Patagonian. If two specimens in which the molars are worn to a corresponding degree are compared, the

length of the three lower molars is in the Peruvian Guanaco 57, and in the Patagonian 72 mm. The transverse thickness of the foremost lobe of m^3 is in the former 8,3 in the latter 11 mm. The third (hindmost) lobe of m^3 is also very much more strongly developed in the Patagonian than in the Peruvian Guanaco. On the whole the lower jaw of the latter is heavily

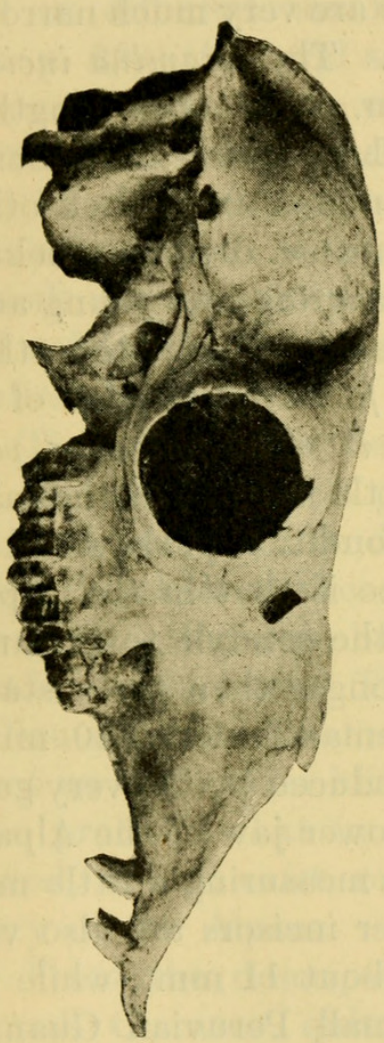

Fig. 3. Lateral aspect of the skull of the small Peruvian Guanaco.

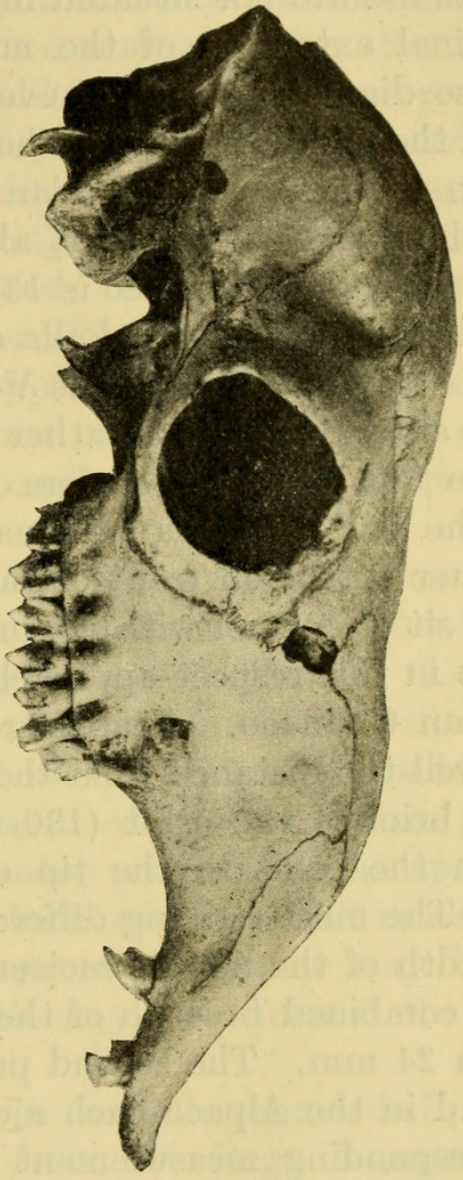

Fig. 4. Lateral aspect of the skull of the Patagonian Guanaco.

built so that its breadth and height in its anterior parts are almost equal to those of its larger relative. But the difference in length is the greater, the distance from the angular process to anterior end of the symphysis being 250 mm. in the Patagonian, and 205 in the Peruvian Guanaco.

The sagittal and occipital crests are strongly developed in the male of the small Peruvian Guanaco.

The shape of the choanæ in this latter Guanaco has some resemblance to the same of the Vicugna from approximately the same locality, but the agreement is restricted to this and to the inflated state of the bullæ. The skull of a male Vicugna of similar age is much smaller (conf. table of measurements), the anterior palate is not so strongly constricted, the palatal foramina are not situated in front of the premolars, the longitudinal extension of the molars is shorter, but their transverse diameter equal, or even greater, the nasals are shorter, and the middle incisors of the lower jaw are very much narrower than in the small Peruvian Guanaco. The *foramina incisiva* of the Vicugna are short, about 9 mm., while their length in the Peruvian Guanaco is 13,7 mm. There is thus no difficulty in distinguishing the skulls of these animals from each other.

The Alpaca skull has V-shaped choanæ, diverging behind. The anterior palate is rather broad measuring in a young adul-male 13,5 mm. The molars of the Alpaca are larger than those of the small Peruvian Guanaco. The *foramina incisiva* of the former extend in front of the level of i^3. The *foramina palatina* sit on a level with m^3, or even a little in front of the same, thus in this respect approaching the condition of the small Peruvian Guanaco. Another resemblance is that in the Alpaca as well the distance from the back of the condyle to the anterior brim of the orbit (130 mm.) is longer than the distance from the orbit to the tip of the premaxillaries (120 mm.).

The most striking difference is produced by the very great breadth of the middle incisors of the lower jaw of the Alpaca, the combined breadth of the pair of i_1 measuring a little more than 24 mm. The second pair of lower incisors are also very broad in the Alpaca each measuring about 11 mm., while the corresponding measurement of the small Peruvian Guanaco is only 8,2 mm. In the much larger Patagonian Guanaco i_2 is often broader than in its small Peruvian relative, but the greatest breadth observed in any of my specimens is, however, only 10 mm., thus less than in the Alpaca. In consequence of the very great breadth of i_1 and i_2 in the latter animal these teeth must to great extent overlap in such a way that about half the breadth of i_2 is pressed close the inner side of i_1. The incisors of the Alpaca thus form a much more powerful and broader chisel-shaped tool than in the Guanacos, not to speak of the Vicugna, in which these teeth are placed so that i_1 does

not at all or but slightly overlap i_2. Evidently this enlarging of the lower incisors of the Alpaca must be regarded as an adaptation to its feeding on very coarse and resistent food, probably the paramograss (*Calamagrostis*), which needs a powerful cutting implement, and for the grinding of the same large molars must be very useful as well. The incisors of the Guanacos are not so strongly developed, and those of the Vicugna still less. This stands probably in connection with the wanderings of these animals which enable them to find less coarse food at different seasons of the year. TSCHUDI[1] describes (l. c. p. 230) this, and says that these animals during the dry season go down in the valleys, »wo Quellen oder Sümpfe sind», round which they find sufficient food. Further below (l. c. p. 233) he also speaks about the »feuchten Weiden, die die Vicuña's besuchen» — — —. It appears thus that the latter animals are especially fond of moist pastures where they may find soft herbage; and this may explain why they have the smallest teeth.

The differences between the small Peruvian Guanaco and the Alpaca are so pronounced that the former cannot be regarded as a possible direct progenitor of the latter. On the whole the skull of the Alpaca is more similar to a skull of a Patagonian Guanaco, but reduced in size, and with broadened mandibular incisors. The fact that it exists in a certain part of Peru a distinct local race of Guanaco proves that this species is not so uniform as hitherto has been assumed, and it makes more probable that in other places as well races may have existed, or still exist, one of which may have formed the ancestry of the Alpaca.

From the description above it may be concluded that a small Guanaco, quite distinct from the large Patagonian form, inhabits certain localities in Peru. As there has not been made any subdivision of geographic subspecies of *Lama huanachus* MOLINA before this, the first question to solve is which of these two forms ought to be regarded as the type of MOLINA's name. In his work »Saggio Sulla Storia Naturale Del Chili» the author quoted gives the name »*Camelus Huanachus*» on page 317. On the following page he writes: »Il nome di Guanaco, con cui viene comunemente chiamato, deriva dalla lingua Peruviana: i Chilesi nel loro idioma lo chia-

[1] Unters. über die Fauna Peruana.

mano Luan.» It might follow from this that MOLINA in the first rank had a Peruvian animal in his mind, when he gave the name, but it is also clear that he regarded the Guanacos from Peru and Chili as identical. As the Peruvian name has been used it would perhaps have been near at hand to seek the type for the name in Peru, if nothing directly contradicted such a proceeding, but that appears to be the case, at least so far that the name cannot be applied to the small Peruvian race described above. When describing the Guanaco MOLINA says: — — — —»la sua altezza misurata al sito delle gambe dinanzi di quattro piedi, e tre pollici» (l. s. p. 318). If it is assumed as most probable that this means spanish feet and inches the height of MOLINA's Guanaco would be about 111 cm. A Guanaco from Tierra del Fuego which has been mounted in this museum in accordance with the measurements of the skeleton belonging to the same specimen stands 113 cm. at the withers which thus is in rather close correspondence with MOLINA's measurements. This proves that the author quoted has had as a type not a dwarfed form such as Dr. SEFVE's specimens represent. J. J. VON TSCHUDI has also in his work »Untersuchungen über die Fauna Peruana» (St. Gallen 1844—1846) (l. c. p. 225) recorded dimensions of a male Guanaco which are larger than the corresponding ones of the domesticated Lama. According to him the male Guanaco of Peru has a height at the withers of 39 inches. If this means French inches TSCHUDI's Guanaco must have been a large animal standing about 126 cm.; if Suisse inches about 117 cm., but in neither case it could have been smaller than the Patagonian animal. It is thus clear that Peru must be inhabited by a large Guanaco as well, and it appears therefore probable that the small Guanaco collected by Dr. SEFVE must constitute a local race confined to a certain district only. It must then receive a new name, and I take the liberty of calling it **Lama huanachus cacsilensis** from the place where it has been found.

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