THE MYLODON CAVE

(Patagonia Occidental)

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In 1895 the accidental discovery of a hide of an unknown origin in a cave of the Ultima Esperanza (Occidental Patagonia) area opened a series of researches and controversies that as of today haven't found their definite solutions. The hide incrusted with bones on the inside was recognized as having belonged to a big enentate that was thought to be extinct, a Mylodon. As it was covered with hair and in excellent condition many believed that the last specimens of this Mylodon were still living in unexplored forests at the foot of the Andes. Researches and digging in this area didn't produce any living Mylodon, but the cave was found to contain layers of excrement extraordinarily fresh and some human remains. Authors concluded that not only had the Mylodon, at a recent period, been contemporary to humans in this area, but that humans had succeeded in domesticating it and that the cave was used as a stable.

Many statements were published to that effect around the 1900's in scientific reviews around the world. In Europe, they consisted mainly of trans/lations of studies already published in Spanish, or of brief notes by authors who, lacking direct information, did not themselves take any position. The interest in this discovery didn't last. After the hasty diggings of the end of the 19th century, no new scientific expedition was made in Ultima Esperanza. Most authors adhere to the contemporary thesis and not the domestication of the Mylodon.

In 1953 we were at Punta Arenas, in the Magellan Strait, about 350 km south of the Ultima Esperanza area. The season was beautiful. It was a unique opportunity to try to bring light on the subject. Digging was started in the cave which lasted three weeks. The results allow us to reconstruct with a reasonable certainty the history of the Mylodon cave and of its inhabitants. We didn't find a trace of the domestication of these creatures by humans, not even their contemporaniety. It is probably not bad luck: the first discoverors' error is explained easily by some particularities of the filling of the cave. It is a huge one, turned over by preceding diggings and blocked by rocks fallen from the

ceiling. To explore it properly would have taken machinery more effective than the one at our disposal. Interesting discoveries, especially from the paleontologists' point of view, still have to be made. The 1953 results haven't solved all the questions yet.

Although the conclusions of our diggings are clear to us, it is impossible to reveal them without systematically negligenting [branding as careless] our predecessors' work, under the excuse that they are now more advanced. The Mylodon cave literature is now scattered in various reviews and often of difficult accessability. Sometimes also the information is contradictory. No thesis has ever been written about it. It seems necessary before we expose our findings to review rapidly the arguments and papers from which the legend of the Mylodon begun. Starting with the basic findings and the filling of the cave is not enough. It is necessary to eliminate any uncertainty and not to have any temptation to référer [context? = refer] ourselves once more to what has become a real archaeological myth. Some suppositions (or hypotheses) made even more seductive by their unexpected aspect, i.e., the domestication of the Mylodon, are a waste of time to the researchers who are always obliged to refer to them as long as they don't have any tangible proof and it is always necessary not only to demonstrate one's point of view but also to destroy all that could persist of an obsolete point of view.

I. History of the discoveries and researches carried out primarily in the Mylodon Cave

From the first the discovery itself was the subject of many versions. According to some (Lonnberg) "peones d'estancia" [farm workers] were the discoverers of the hide, while according to others (Moreno) they were Argentine officers, or (Hauthal) Capt. Eberhart and his companions. These divergencies are not in themselves very important, but are typical of the climate of imprecision which existed from the beginning of the discoveries made in the cave. Nevertheless, in 1895, a piece of hide of large size incrusted with small bones and covered with long, light red hair was discovered at the entrance of a cave in the region of Ultima Esperanza where a German colonist had settled himself (Capt. Eberhart). Nobody at the farm had ever seen such a hide. It was believed that it belonged to

a seal of an unknown species or maybe the work of an Indian. The hide was hung in a shed and no one gave it more thought.

A year later the Swedish explorer Otto Nordenskiold arrived at the new farm of Eberhardt, Puerto Consuelo (1). He was shown the hide. He realized that it belonged to an unknown animal and took away a piece. Other visitors, some Navy officers, took, as mementos, some fragments of the hide still hinging in its shed. These various fragments were shown to experts, given to museums and as of 1898, the scientific world in South America as well as in Europe, began to be informed that a Mylodon hide had been found in a cave in Patagonia and in sutch a [state of] freshness that made it possible to think that the last species might still be living in that almost unexplored area.

AMEGHINO. -- It was Ameghino, well known for his works in paleontology and South American geology, who announced the discovery to the scientific world by his "First notice on the Neomylodon Listai, a living representative of the old [ancient] gravigrade [= plantigrade, here and below] edentates of Argentina." Having in his possession a few small dermic bones that he attributed to a living Mylodon, he related this finding to the stores of a mysterious beast which lived in the austral [southern?] forests. "Many times, he wrote, I head of a mysterious quadruped who in the inner territores of Santa Cruz lives in dens dug in the gound and goes out only at night. According to some Indians, it is a fierce animal, with long claws, of a terrifying aspect, impossible to kill because his body is impenetrable, even to bullets.

"A few years ago the now deceased Ramon Lista, the well known traveler and geologist told my brother Charles and I as well as many other persons, and I think he also wrote it in one of his works, that he had seen the -ysterious quadruped. He had met it during one of his travels in the inner territoyr of Santa Cruz, but in spite of all his efforts, was unable to capture it. Many shots didn't stop the animal from running away and it disappeared in the bushes; all efforts to find it were futile.

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(1) The name of the cave in which the hide was found varies with the writers. It is called by turns Caverne Eberhardt, Grotto of Ultima Esperanza or Puerto Consuelo Mylodon's grotto. It is this last term that we have adopted, as the only one known in Chilean Patagonia.

"Lista kept a perfect memory of the impressionof that meeting. It was to his thinking a pangolin (Manis) [scaly anteater] almost equal to the one in India by its size as well as its general aspect except that instead of scales, its body was covered with red-grey hair. He was certain that if it wasn't a pangolin, it was at least an edentate very similar to it.

"In spite of Lista's affirmations, who besides being a very learned traveler was a keen observer, I always thought that he made a mistake, a victim of an illusion. In spite of having, many times, tried to identify the beast that he thought was a pangolin, I never succeeded.

"It wasn't an illusion. Although excessively rare and on the verge of extinction, the mysterious animal exists, with the only difference that instead of being a pangolin, it is the last specimen of a group thought completely extinct, a gravigrade edentate, related to the Mylodons and Pseudolestodons."

Some species of these gravigrade edentates present a peculiar character. Their bodies are protected by a countless number of small, irregular bones which unquestionably grow in the thickness of the skin and must have been covered by a horny or scaly epidermis. Among these types one can cite the Mylodon, the Pseudolestodon, the Glossotherium. Other types (Megatherium, Lestodon, etc.) didn't possess them. These characteristics are not primitive, but were acquired at a relatively modern period because they are not found neither in the Santa Cruz where the gravigrade edentates are many, neither in the preceding formations. These small bones vary in size and shape depending upon the species. They are flat and big in the Glossotherium, more irregular and smaller in the Mylodon. After this brief statement on the gravigrade edentates, Ameghino continues: "Lately someone brought me, in provenance of southern Patagonia, a few small bones asking me which animal they could belong to. What a surprise seeing in my hands fresh small bones, and in spite of their freshness, absolutely identical to the fossilized small bones of they type Mylodon. The only difference was they they were a little smaller, varying from 9 to 13 or 14 mm. I studied carefully those small bones on every side, without finding any essential difference with the fossilized ones.

"These small bones were unfortunately taken from an incomplete hide, without traces of extremities, hide that was found on the gound and gives the impression of having been exposed many months to the weather which had partly discolored it. This hide of about 2cm thick is so resistant that to cut it one would have to use a hatchet or a saw. The deepest part of it is full of these small bones tightly pressed near each other, showing on the inside surface a pattern similar to a paved stone street. The exterior shows a smooth epidermis, nonscaly, covered with coarse hair, straight and hard, of 4 to 5 cm long, and of a reddish-grey color.

"It was the pangolin that Lista had seen alive. This unfortunate traveler who, as Crevaux, found his death in his attempted exploration of the Pilcomayo, is to date the only civilized man to have seen the mysterious edentate of southern Patagonia. To better give his name to a discovery, I call this modern specimen of the family of the Mylodonts: Neomylodon Listai".

"Now that we have certain proof of its existence, let's hope that it won't be long before it is found and that we will be able to present the scientific world with the detailed description of the past specimen of a group which a long time ago played an important role in the terrestrial fauna in South America."

It was too hasty a conclusion on the site of a handful of dermatic small bones and a vague story of which tere is no trace in the works of Ramon Lista and no one, not even Ameghino, had talked about before the discovery of Ultima Esperanza. In spite of it, the following year, Ameghino follows his thesis and completes it (1). He tied it to the legends of Tehuelches [an Indian tribe] of the Iemish or water tiger legends collected by his brother, Carlos Ameghino. The iemish is not a mythical animal. It exists. It has a short head, long teeth, short and flat feet with three fingers and four toes. These fingers and toes have claws and are joined together by natatory membranes. The tail is long, flat, prehensile. It is larger than a puma, with a bigger body but shorter legs. It can live on land as well as in water. It is nocturnal. Carlos Ameghino saw a piece of hide of an iemish belonging to a native and sent

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(1) "Un sobreviviente actual de los Megaterios de la antigua Pampa," La Plata, 1899.

the dermatic bones to his brother. They are exactly like the ones found in a fossilized state on the Mylodon skeletons.

Ameghino's hypotheses were immediately criticized. He was reproached for having created a new type (Neomylodon Listai) on the sight of a few dermatic bones (2). Besides Ameghino can't explain very well the origin of the hide seen by his brother and it seems that it is none other than the one discovered in the cave of Ultima Esperanza. Finally, the description of the iemish by the Tehuleches didn't have much connection with what was know n of the Mylodons. As Lehmann-Nitsche demonstrated a few years later (3) citing precise papers, it is likely that the ienish is none other than an otter. Some characteristics attributed to it describe it accurately, others describe it as a big cat (Felis onça) which until the 18th century lived in a more southern location than now. The Indians have kept its memory and in their traditional stories the characters are confused with the otter until they constitute a fabulous animal. In spite of these refutations, and the fact that it seemed impossible that such an animal would have remained unknown to the outside world, the hypothesis of a giant edentate still living in the Patagonia forests seduced the public and the press.

In 1900 a small expedition was sent from London by the Daily Express to explore the mountainous regions of Patagonia to try to find the Mylodons and bring back a specimen for the London zoo. The expedition came back with a very interesting description of the Patagonian fauna, observations on the Tehuelches and their civilization, but without a Mylodon (1). After this date, no one supported the thesis of the surviving Mylodons until our epoch. The mystery of the discovery of the Ultima Esperanza cave was still unsolved.

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(2) S. Roth, "Descripcion de los restos encontrados en la cavern de Ultima Esperanza". Rev. Museo de la Plata, 1899: 422 ff.
(3) R. Lehmann-Nitsche, "La pretendida existencia actual de Grypotherium. Supersticiones araucanas referentes a la lutra y al tigre." Ibid, 1902: 268-281.

(1) H. Prichard. Through the heart of Patagonia, Londres, 1902.

The first excavations.-- The first excavations made in the cave were done by Moreno, the director of La Plata's Museum. Moreno was in charge of the "Commission des limites" which had for its purpose to determine the border between Chile and Argentina, in those areas practically unknown of the Cordillere. The Commission arrived at Puerto Consuelo in November 1897. Naturally it was shown the hide, as it was shown the preceeding year to Otto Nordenskiold. Ingriqued, Moreno went to the cave rapidly, dug a few holes in wich he found nothing and was obliged to leave right away..;[he arranged] for excavations to be continued after his departure. He questioned the inhabitants of Puerto Consuelo, learned that the hide had been found half buried in dust, that no bones had been noticed around it and that remains of a human skeleton were discovered at the cave entrance, but that they were broken or lost. He as Nordenskiold and the officers of the Chilian Navy, took a piece of the hide, or maybe took the whole of it that remained; he is not very clear on this subject. A year later, Dr. Moreno was in London and was showing the famous hide to members of the Zoological Society. He had entrusted his sample to the naturalist Smith-Woodward who had studied it in detail. The piece measured 48 cm by 55. Its thickness varied from 1cm to 1.5cm. It showed signs of dried serum [lymph, animal secretion]. The inside was lined with small bones, and the outside bore long hairs, very strong, dirty yellow or light brown in color, all revolving the same way. The hair length varied from 5 to 6.5 cm. At an extremity, which may have been a cheek, they were much shorter. All these hairs were coarse, straight, very lightly wavy and very tight, round. The general aspect of the piece of hide made one think that it must have been from a neck, a shoulder or a fragment of a left cheek.

This hide was different from the ones of all the mammals known on earth except for the edentates. Even among the edentates it shows some special characteristics by the strictly internal disposition of the dermatic bones. Besides, the piece of hide was too small to allow conclusions to be reached and it is possible that it wasn't the same all over the body of the animal and no one could say if it came from a real Mylodon as Moreno thought(1), or from a new kind, the Neomylodon of Ameghino.

(1) Plus tard, dans sa "Note on the discovery of Miolania..." Moreno admit l'hypothese de Roth qu'il s'agissait d'un Glossotherium.

For the first time Smith-Woodward tried to find out how old the hide was. It just happened that Smith-Woodward had to look over the remains of mammoth and rhinoceros preserved in the ices of Siberia, and a neck and leg of Moa which were found mummified in a cave in New Zealand. Compared with these specimens allcurled up and dired, the Patagonian hide looked remarkably fresh and recent. This freshness and the presence of serum which, Smith-Woodward said, can also be found in Egyptian mummies brought him to the conclusion that the hide was recent, but still without solving the problem.

In the same work Dr. Moreno gave for the first time the opposite supposition that the hide couldn't be recent nut was well preserved due to special circumstances. He recalled the human or animal specimen uncovered in Buenos Aires province in an extraordinary state of preservation and the mummified human body found in 1877 near the Lake Argentino, wrapped in a nandou skin and holding in his arms a big condor feather. Other ancient discoveries happened in similar circumstances. And, concluded the author: "These proofs of favorable conditions of the climate and land near the Cordillere which are revealed to us by the preservation of objects of ancient periods, reinforce my opinion that this hide of a huge animal extinct for a long time was found by us in excellent condition" (2). Moreno's hypothesis is the one to which we come more than half a century after him, but curiously at the moment it didn't hold anyone's attention and no one tried to verify the reality and the nature of "these favorable conditions of the land" of the Mylodon cave.

ERLAND NORDENSKIOLD.-- In 1897, the same year when Moreno was at the cave, Otto Nordenskiold back from Europe, gave to Dr. Lonnberg the piece of hide brought to him by Capt. Eberhart. Lonnberg's description and study of the hide appeared in the scientific report of the Swedish expedition. In it Lonnberg who had knowledge of Ameghino's paper, gave it the name of Neomylodon Listai, and after a detailed description of the fragment in his possession, supposed that it had belonged to an extinct animal, but that it had lived later than similar animals and had been a contemporary of humans until a recent period. In effect, this note wasn't bringing any new development to the mystery.

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(2) Moreno and Woodward. "On a portion of mammalian skin..."

However, on the advice of his uncle, Erland Nordenskiold left for Ultima Esperanza with the prupose to explore the cave more completely. He arrived in the beginning of 1899 and started a very methodical study, the only one taking in consideration the layers of sediments of various ages. Many memoranda on the results of his research were published as of 1899 in Swedish and German reviews. The complete publication of the excavations was done in 1900, and includes many sketches. Unfortunately it is in Swedish and of difficult access. In France, a memorandum of the Geological Society Bulletin, in 1900, published the main lines, given by the author himself. As the excavations of Nordenskiold were carried out with a concern to find the stratigraphy of the filling, it seems necessary to give at this point some important extracts:

"During my trip, writes Nordenskiold, I made considerable excavations in the cave, or rather caves, at the Eberhardt farm near Ultima Esperanza. In executing them, I took into consideration the location and the various ages of the layers where the bones were found. These excavations brought a numerous collection. After my return I examined thoroughly these samples (they were compared to the collections of other museums and especially to the ones in Copenhagen). My opinion is not in accord with Mr. Hauthal's which is characterized by the name Glossotherium domesticum (1)....

"In the sediments [deposits] of the Cueva Eberhardt, one can see the following layers: A. A top layer that contains bones of various kinds, of animals still living in the area (the most important fossil is Auchenia lama) with man-made objects and other proofs of humans staying in the cave. B. An intermediate layer of which the main fossils are Auchenia lama and Onohippidium saldiasi Santiago Roth (2). C. A lower layer right on the rocky ground of the cave, containing mainly various bones of extinct animals. The most important fossil is Glossotherium darwinii Owen. In this layer C I found very few man-made objects or other indications of human presence in the cave.

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(1) Hauthal avait fouille la grotte peu apres Nordenskiold et avait conclu que la peau avait appartenu a un Glossotherium domestique par l'homme. (Voir plus loin.)

(2) Sur l'Onohippidium Saldiasi, voir Roth, Rev. Museo de La Plata: 477.

"After having taken off a layer of the thickness of a few centimeters of rocks and gravel, I saw in the upper layer A ashes, hay, employed probably as bedding for humans, man-made objects, Mytilus shells, burned pieces of wood and bones that had been cracked to get to the marrow, these bones exclusively coming from still existing animals. The B layer was found in about the middle of the cave under a top bed of gravel. It was composed of ashes containing Auchenia lama bones, burned and cracked to get to the marrow and bones from Onohippidium Saldiasi in great quantities. I can't tell with certainty if the Onohippidium bones have been touched by humans or not. Some fire, probably set by humans has penetrated into the A and B layers and partly destroyed the lower layer of excrement. This latter C layer in certain places is deeper than one meter of thickness and covers a vast area of the far end of the cave. In many points it is more or less rotten, in some it is in perfect state of preservation and contains big pieces of dung. Dr. Anthal's hypothesis that the layer of excrement is found only in a restricted area, fenced, in another time, for domesticated animals deesn't appear to me to be founded. If the cave had been a fenced area for domesticated animals, there would have been found man-made objects in great quantities."

There follows afterward a description of the manure of the Glossotherium (Layer C) and of the bones it contained: many of the Glossotherium, but also of a big cat, Felis onça, of the Macrauchenia, and of the Onohippidium Saldiasi." Only one certain human bone did I find with the bones of the Glossotherium and it was of a pars petrosa of a very young child; the only man-made object was a piece of pleated [braided] leather [strap]. Probably the two came originally from the two top layers (A or B). They can't be used as certain proof the humans were contemporary to the Glossotherium.

"The bones of layer C are accidently broken, probably trampled on by heavy animals' hooves. They are often polished and scratched by the movements of the sand. In the top layers (A and B) can be found almost all the inferior jaws of the guanaco (Auchenia lama) cracked, although the processes, even protruding ones, are not broken. To the contrary, one can always find in layer C the middle part of the inferior jaw of the Glossotherium intact, although the protruding parts are broken. In layer

C there are no burned bones, except where excrement was burned by accident. No shells or pieces of wood were found burned neither in the Onohippidium layer B, nor in the one of the Glossotherium, C. I carefully searched the layer in which in 1895 the Glossotherium (Neomylodon) hide was found. It seems to me to belong to a more recent period than layer C, because it contains some tree branches and leaves that grow presently around Eberhardt ['s farm] instead of which the untouched layer of C as well as the dung that I previously mentioned, contain only fragments of grass. We have here the proof that at the epoch of the Glossotherium the cave wasn't, as it is today, surrounded by woods, but probably by pampas or rather marshes covered by grass. Probably the hide of which Dr. Nordenskiold had a big piece didn't originally belong to layer C; it must have been carried later into the surpior layers or on the surface by the inhabitants of the cave.

"Layers A and B apparently belong to a fairly recent epoch, contemporary of humans, instead of which layer C containing the Glossotherium, etc., is much older. It still doesn't seem to go back as far as the Quaternary. The dung, the hide and parts of the bones' state of preservation doesn't seem to me to be in accord with the supposition that these fossils were preserved such a long time.

"As to the question of knowing whether the Glossotherium was the contemporary of humans, I do not dare answer it positively."

What are the new components brought to the cave problem, now raised in the whole world, by Erland Nordenskiold's excavations?

1. Nordenskiold clearly states that from the coexistence in the cave of human and extinct animals remains; one can come to the conclusion of the contemporaneity of these remains. It is an elementary principle, but it was neglected by his predecessors and will be by his successors.

2. He sees three layers, i.e., three epochs in the filling. The first one is characterized by a present fauna and human remains; the second is composed of ashes including guanaco (present Auchenia lama) and extinct Onohippidium; the third one contains only vestiges of a disappeared fauna. These results are in accord in their many lines with our own excavations. However, we really didn't discover any vestiges in the intermediate layer of ashes. As this layer was in certain part mixed with

the top layer containing human remains and that it didn't penetrate deeply in th e bottom one containing Mylodon dung, it doesn't seem impossible to us that the guanaco that Nordenskiold attributes to it comes from the top layer instead of which the Onohippidium would belong to the bottom level. This is only a hypothesis, but it would concur with the fact, stressed by Nordenskiold himself, that the guanaco bones are broken by humans instead of which no one can say anything certain on the Onohippidium remains, a fact which seems very strange if the two species represented human food. There is no question here to deny the contemporaneity in the extreme south of [South] America of man with an extinct fauna, this contemporaneity having been demonstrated in other parts, but only to stress that it wasn't strictly demonstrated in the Mylodon cave.

3. The observation of Nordenskiold relative to the hide's age appears to us less interesting. The presence of present tree branches and leaves in the layer which contained the hide, and the absence of Mylodon dung do not necessarily signify that the hide is more recent than the dung. The top layer, remarked all observators, contains many remains of present vegetation. In 1899 the site of the discovery, particularly pulverulent, was dug many times and especially by Moreno, and it is certain that it is already a mixture of the two top layers with ashes and gravel and some very dry dung of this area.

THE GRYPOTHERIUM DOMESTICUM.-- Erland Nordenskiold hadn't concluded his excavations in the cave than new researches were started by Hauthal. Hauthal who was the head of the Geology Department of the La Plata Museum, had taken part of the "Commission des Limites" of which Dr. Mo-eno was in charge. With this commission he had already visited the cave in November 1897 and knew of the hide's existence. In April 1899, coming back from a geological exploration in the Cordillere west of Lake Argentino, he found Erland Nordenskiold at Puerto Consuelo. Nordenskiold showed him the various remains that he had found during his excavations: jaws, teeth, claws, bones and also some shells, a stiletto and some fragments of carved rocks. Whad did Hauthal remember of Nordenskiold's explanations? No one knows, but from his first publication, Hauthal in a recapitulation of Nordenskiold's excavations affirms as a very important fact the proving of the contemporaneity of man and the great edentate <u>that the human remains were in the same layer with the dung</u>. The Mylodon's legend was born.

These findings enticed the German scholar to prolong his stay by a few days to dig in the cave. He dug from Monday p.m. April 24 to Saturday the 29th. Honestly, before revealing the results Hauthal said that his excavations were limited to a few rapid probings ("ligeras excavaciones") because of the lack of time, tools and workers. It is nevertheless on these 4 or 5 days of hasty work, during which other caves in the area also were explored, that rest the belief of a giant edentate contemporary of man in the area of Ultima Esperanza, and perhaps domesticated by him.

Hauthal's excavations (1) were done in the middle of the cave at the foot of a heap of blocks 15 meters high, fallen from the ceiling. In it he found, under a thick layer of rubbish coming from the decomposition of the ceiling and containing pieces of shells and broken bones of guanaco and deer, a layer of dried dung 1.20 m thick. In no other part of the cave did he find some of this dung (even though there is some in other parts) and concluded that it was an ancient corral or a kind of stable in which for centuries animals were kept. The dung was trampled on, in some places pulverized and dried (these places must correspond with Nordenskiold's B layer made of ashes); the digging raised thick clouds of a very fine dust, strongly odoriferous, which slowed down the workers.

Under a block was found at a depth of 1 meter, a new piece of leather measuring 1 meter by 93 centimeters. The leather seemed to Hauthal to have been cut and folded with skill. Underneath, the dung continued for a depth of 1 meter and didn't contain any bones, which proved that the leather was already taken from the animal when the rubbish which was covering it fell from the ceiling. In this same layer of dried dung were many bones, according to the author, without doubt broken by man. In the same layer Hauthal found again two stilettos made of bones, and some small cut pieces of leather belonging to various animals. The deepest part of the dung layer was burned and showed ashes of various colors, but the whole seemed to belong to one layer in which the fire would have penetrated irregularly and in zigzag. In these ashes were found some bones and a stiletto.

Adding these findings to the ones of Nordenskiold left Hauthal no doubt of the contemporaneity of man and the remains of animals found in the dung. The conclusion was simple: men who lived in the cave centuries ago

(1) Hauthal, Rev. Museo de La Plata, 1899.

shut off a part of it as a corral for the animals, and occupied another part. It is impossible to determine the tribe of these cave dwellers, or the age in which they lived. The only skeleton found in the cave was discovered in 1895 in an amfractuosity of the wall; it was in bad condition and was completely destroyed. It is possible to suppose, nevertheless, that this man was the same as the ones in the burial grounds of Cerro Guido.

Hauthal also indicates that there were smaller caves nearby the big one. In one of them he discovered the different layers that he hadn't seen in the Mylodon cave: a layer of actual rubbish composed of ground, leaves and branches, and mixed with broken bones and parts of shells; a layer of ashes of 20 cm depth, without dung, but containing remains of guanaco, ostriches and equides [horses?], minus the bones of the great edentate. Time was lacking to dig the other small caves. Hauthal doesn't make any hypothesis on the age of the remains. The only thing he could say was that it took many centruies to accumulate such a thick layer of dung, and maybe as long to form the upper layer of sand and gravel. Considering simply the thickness of these layers, he is certain that man began to inhabit the cave in prehistoric times.

Hauthal gave the remains that he brought back to Santiago Roth in charge of the paleontology section of the Museum de la Plata and to R. Lehmann-Nitsche in charge of the anthropological section of the same Museum. The two experts reached the same conclusions.

Roth attributes the remains of the mysterious animal to a Grypotherium of the family of Megatherides and [calls] it Grypotherium domesticum, which would be of about the same size as a rhinoceros (1). He stresses the fresh look of the bones and the fact that on many of them can be found ligaments and traces of flesh. With the exception of two tibias all were broken and bore traces of blows. The pieces of leather are not raw, but seemed to have been tanned or softened. Most of the remains found in the cave were attributed to the Grypotherium domesticum (cranium fragments, superior jaw fragments with or without teeth, loose teeth, inferior jaw fragments, vertebrae, phalanx, claws, long bone fragments, two tibias, pieces of leather with or without hair, loose hair, intact dung and dung more or less pulverized). Besides, Hauthal had excavaged a few remains of a big cat, which was much bigger than the ones that live presently in

(1) Roth, Rev. Museo de La Plata, 1899: 425-431; tells of the various discoveries of Mylodon Darwinii robustus, of Glossotherium and of Grypotherium since 1840.

South America, bones of dogs, of Mephitis suffocans, of a big rodent and a small one, probably the Ctenomys magellanicus, some teeth and bones from an equid, baptized by Roth : Onohippidium Saldiasi, and naturally remains of Auchenia lama (guanaco).

In conclusion, Roth recalled that in 1882 he had found near San Nicolas de los Arroyos the remains of Megatherium in some dirt covered with vegetation and that in 1890, in Uruguay, was discovered the remains of a great gravigrade, probably a Grypotherium, whose bones seemed very fresh. These discoveries show that the gravigrades lived to a very recent period. However, they do not live now in Patagonia where they would be found. The conservation of the muscular filaments and of the tendons is simply due to some favorable conditions which shouldn't surprise us, since in Europe some organic prehistoric remains were found in peat bogs.

Finally, Lehmann-Nitsche studied the same objects, as Roth did, and looked for man-made work on them. His study brings very little that is new. He also believes that the Grypotherium was killed, cut and eaten by men. His main argument rests on the innumerable injuries and traces of blows that can be seen on almost all of the bones. As these traces are old and of the same color as the bones, they have been made, things the author, during meal preparations, although it is impossible to tell with what. The piece of leather, of which the use is unknown because it is too small to be used as a blanket and too heavy (17.5 kg) to use as clothing also was cut by man "with a firm hand". The bones of cats, of canids and rodents show the same traces of blows and are cracked. The examination of the other remains doesn't bring any interesting result, because the shells discovered near the entrance may have no connection with the dung and may be of a more recent period; as for the two blades of stone, they don't seem to have been utilized. Then rapidly resuming his analysis, Lehmann-Nitsche declares that man killed the great edentate, took its leather; cut it in small pieces and ate it, most of the time raw, because very little traces of fire are found. For this work, man didn't seem to use sharp instruments, but big stones and blades of stones (laminas de piedra). The depth of the dung layer proves that the animal lived a long time in the cave. Hauthal's opinion that it is a domesticated animal is probably right, but it would be more accurate to say that it was a wild animal held in captivity.

The following year, in 1900, Hauthal returned to the cave and brought back the new remains described by Roth and by Lehmann-Nitsche. This time no information is given on where they came from, but the presence of fire and some burned fragments mixed with the dung inforce the thesis of the domestication. The same type of animals are represented, but besides them, Hauthal has found two human metacarpus and one metatarsus, two tools made of bones, one made of a "rudimentary metacarpus belonging to an equid" and the other of a parrot cubitus, a stone knife and three cut leather fragments. One is a small piece not belonging to the Glypotherium, the other a piece with jagged edges "intentionally" made to deco/rate it. The third piece was studied, added to the collection by Lehmann-Nitsche who had bought it at Punta Arenas in an antique shop as coming from the Mylodon cave. It is a piece of a young guanaco stitched with cartilage [in the fashion] the pampa's shepherds still use today, and it is obviously audacious to attribute it to the dung layer. Actually, no new fact was added to the first excavations.

No serious digging was done in the cave after 1900. From that date one can get the artifacts from the cave in two shops in Punta Arenas, of which one still exists and continues to sell arrowheads and remains of animals of a whimsical source. The business must have been lucrative, for a band of prospectors barged into the cave, picking at ramdom all the remains and digging also in the smaller caves around the big one. When in 1908 the botanist Skottsberg visited the cave, only a few places were intact which could give an idea of the primitive stratification. A picture by him published shows the interior of the cave exactly in the state that we found it in 1953, which seems to prove that the hunters of the Mylodon have abandoned their activities a long time ago.

THE PROBLEMS.-- These five years of excavations and discoveries gave approximately the following results:

The hide's age.-- Everybody agrees that the hide which was the basis of the researches belonged to an extinct animal. The authors are equally in accord to think its disappearance is "relatively recent" i.e., in the order of a few centuries of millenaries [or 1,000 years?].

Recently a sample of the Mylodon dung taken from the Ultima Esperanza cave and picked up by the American archaeologist Junius Bird was C-14 dated.

The sample appeared to be 10,832 years old with a possible error of four centuries more or less. The sample came probably from the upper part of the dung layer. It seems evident that the first piece of hide discovered also came from the dung layer since no trace of Mylodon was found in the layers above it and that it came from the top of it to be seen by a passer-by. Henceforth, it is possible to date the skin to approximately 10 to 12,000 years. That organic remains could be kept intact for so long is not in question. The dung itself is composed of substances more fragile than leather and the range of its age is certain. The reason for this extraordinary preservation is yet to be explained. The analysis of the sediments found in the cave give a satisfying response.

The contemporaneity of man and the Mylodon.-- Nordenskiold is in doubt about it, being unable to affirm with certainty the level where the human remains came from that he found in the cave. To the contrary, Hauthal, Roth and Lehmann-Nitsche are in accord to consider it certain and give as proof the following arguments: (1) the traces of blows on the bones and the fact that they were intentiaonally cracked; (2) the presence in the cave of ashes, partly burned bones down to the Mylodon dung layer; (3) the discovery of human remains in [with] the Mylodon dung.

The first argument seems to eliminate itself since the authors have not found traces of sharp tools on the bones examined. If it were really bones stripped by humans, there would have been found around them, as in such circumstances, tools made of carved stones and the traces on the bones would have been neat. However, Hauthal discovered only a few fragments of carved stones and he supposes that the bones were broken with blows from rough stones. It is simpler to suppose as does Nordenskiold, that the many traces of blows were made by the trampling of heavy animals. In favor of this thesis, one can add also that according to Hauthal's excavations, the large cat bones bore the same traces as those of the Mylodon and that they also were made under the same conditions. It is improbably that the ancient inhabitants of the cave were hunting the big cat to eat its flesh.

The presence of hearth, ashes and bones partly burned in the Mylodon dung would be convincing only to the extent that it would really be human hearths. Nordenskiold expresses the hypothesis that fires were started on the surface and reached the deep layers of dung. Both opinions are easily verified by the meticulous examination of ashes in the dung, which if coming from man-made fires must have left traces: hearth stones, charcoal frag-

ments, burned bones. The old excavations are not conclusive and must be taken up again.

The most incontestable proofs of the contemporaneity of man and the Mylodon are evidently given by the discvoery of the remains of man's industry inside the Mylodon dung [layer]. Nordenskiold confesses not to be certain to have found any. To the contrary, Hauthal thinks he has found some from time to time: stones that he supposed to have been broken by man, hide fragments softened and cut by man, finally two bone stilettos. Stones, which today are not to be found, and skin fragments of which no pictures or descriptions are given, are not a very convincing proof and it is very difficult to arrive at a definite conviction. There remains the bone stilettos. Two are made of a dog tibia, another of a metacarpus of an equid, a fourth in the shape of a bevel was made from the cutitus of a parrot. However, according to the works of Lehmann-Nitsche, in charge of the examination of the human industry of Hauthal's excavations, only the two stilettos made of dog bones are for certain taken from the dried dung [layer]. These two pieces are a very weak proof for excavations hastily made and without much concern with stratigraphy, especially when one knows how difficult it is to locate a finding in the middle of dust and rocks fallen from the cave roof. The sides of the excavation fall in continually mixing the upper layers with the bottom ones. Neither Nordenskiold's excavations nor Hauthal's can be considered as giving a final solution to the problem.

The contemporaneity of man and the Onohippidum.-- It is neatly asserted by Nordenskiold and implicitly continued by Hauthal's discovery of a stiletto made of a metacarpus of equid (1). It is strengthened by the discovery of Bird, in the volcanic regions of the Chile-Argentinian border of horse mixed with human remains and by our own discoveries in the bed of Ponsonby on the edges of the Sea of Skyring. It is today absolutely demonstrated that man has known and hunted in the extreme south of the world, 10,000 years ago, the small indiginous horse that became extinct at

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(1) The stilettos found by hauthal in the ashes present an interesting problem. If the location of these stilettos is exact and as it is possible the Onohippidium found by Nordenskiold belongs to that layer, we find ourselves perhaps in the presence of the ancient arrow and bone stiletto industry found by Bird in southern Patagonia.

this period. During our excavations in 1953 in the Mylodon cave, we didn't have the luck to find any equid remains. Hence we can't bring any new elements to the question, which we are obliged to leave as it is.

The Mylodon's domestication.-- It is sustained by Hauthal, Roth and Lehmann-Nitsche who base themselves on two arguments, the location of the dried dung in a point of the cave easy to fence and the presence of a pile of dried grass which would have been utilized to feed the animals. Neither argument stands a serious examination. The dung is not localized where Hauthal did his digging; it is found in almost every part of the cave, be it dry and whole or humid and decomposed. As for the hay, Nordenskiold speaks of it also, but as belonging to the upper layer with human remains and thinks it is only a kind of human bedding. For his part, Hauthal indicates that he had discovered it on the top of the dung layer, just under the top layer. The two localities are in accord and it is probable that the Mylodon's "fodder" dates after the extinction of the animal. The domestication hypothesis, even though fascinating, is in reality unwarrantable.

II. The 1953 Excavations

HERR VON HEINZ. -- In January 1953 we found ourselves at Punta Arenas, having finished a series of excavations on the edge of the Sea of Skyring. Our object was especially to place the time of man's arrival in the world's extreme south. The Mylodon cave was situated much more northward than the area of our excavations which were made essentially in the region of Skyring and on the coasts of the Magellan Strait. However, it seemed nonsensical not to take advantage of a few weeks of freedom and of the possiblity to go to this region to try to throw light on the problems created by the famous cave. Were were in full southern summer. The wind was blowing at Punta Aernas and it was cold. But the region of Ultima Esperanza has a milder climate. It was the good season. We were told that a road accessible to cars went to the vicinity of the cave. We didn't hesitate. Supplied with this unique information of a capital importance we were on our way. It was well that we did so, because not only were we able to work three long and fruitful weeks at the cave, but also we met at the Puerto Consuelo farm the last surviving person of the ones that had discovered the famous hide.[4] The road that goes from Punta Arenas towards rhe region of Ultima Esperanza crosses a flat region formed almost

entirely of glacial deposits of Quaternary age. The ground itself is formed uniquely of accumulations of glacial pebbles of every size, not broken. Sometimes the bank bordering the raod was freshly cleaned. A series of varves a few centimeters thick can be seen with a surprising clarity. It is because we are traveling in the bottom of a glacial age lake, today dry. We cross tremendous deserts. Plains disposed in vales, intercepted by lagoons are boundless. The season is already advanced, the level of the lagoons is low, the grass yellow. In some places the vegetation has been torn by the wind and the dryness. Then the moraine shows its bare flank of pebbles and stones. It is difficult to imagine a more desolate countryside. As one goes on, numerous forests cut the steppe. They are the remains of the old, impenetrable virgin forests. They announce the Cordillere and the coming of the fjord Ultima Esperanza.

A few kilometers before Natales we leave the main road to take a track that serves the last farms and the last posts of shepherds before the unexplored forests and summits of the Cordillere Balmaceda. The track stops at the Puerto Consuelo farm. For those who want to go further along the fjord, it is necessary to use a horse; to the right a path leads away from the coast and pushes across the plain, then the forest and towards the small mountain in which the cave is found. The path is 8 km long. Sliding, skidding, falling in the holes, holding on to the rocks, the old Ford is half-way up after an hour. The path stops abruptly. We are there.

The Mylodon cave opens half-way up a mountain of conglomerate a few hundred meters tall [;it appears as] an immense and regular mouth in the shape of a gaping hole, which can be seen from afar. It is on a rocky platform, almost horizontal, strewn with trees partly burned and colossal rock fragments fallen from the cave ceiling. Everywhere the vegetation cover is very thin, and the rock shows in many places; some large areas, smoothed and rounded by the ancient passage of the glacier, emerge. The terrace ends fairly suddenly and the descent toward the plain is fast. Above lies a few kilometers of marshy region interspersed by groves; the view opens out on the long blue thread of the ramified [ramparted] fjord of Ultima Esperanza and on the forests and wild summits of the Cordillere Balmaceda. No human sign is visible on this immense landscape.

The nearest farm is Puerto Consuelo. We had the luck to find there one of the discoverers of the famous hide, Herr Von Heinz, and Capt. Eberhardt's grandsone, Hermann Eberhardt. Both of them were very helpful in giving us the information and services which could be of use to us.

Herr von Heinz is a man of 87 years of age. He keeps from the old times refined ways, a goatee, the habit of well -cut suits and a beautiful pearl as a tie pin. The big event of his life was the discovery of the Mylodon which brought him so many visitors and so many questions. He loses his memory from time to time, but he tries to remember and persists. He wants to go off with us to the cave to explain on the spot the discoveries and their sites. And here is what the venerable Herr von Heinz told us, scratching with the top of his cane the dusty ground of the Mylodon cave.

The region of Ultima Esperanza was colonized for the first time in 1895 by a small group of Germans having at its head Capt. Eberhardt. It was then completely unknown and could be reached only by the sea after a detour around the archipelagos which made it a distance of 500 miles from Punta Arenas. On the ground any communication with the Argentinian or Chilien pampas was yet impossible. Sometime after their arrival, Capt. Eberhardt and von Heinz, escorted by an Englishman and a peon, entered the cave during a walk in their new farm. An unusual object was sticking out of the dusty ground, that they thought to be first a bale of hay. They pushed it with their feet. The object didn't move. It was deeply imbedded in the ground. When it was dug out they realized that it was a big piece of hide, the likes of which they had never seen. It was covered with long hair and encrusted with small bones irregularly laid out. The hide formed a kind of package, accordion-pleated, and it was very difficult to open it, being very hardened. It was a very big and thick fragment. The four men who were not naturalists thought it must have been a seal's skin of an unknown type which could have been brought there by Indians (they frequented the region at that time, but only rarely); they brought the hide to the farm as an object of curiosity.

Von Heinz doesn't tell us anything new of the years that followed and the diggings executed in the cave. He shows us where the hide was discovered and where the Mylodon fragments were found (he calls it

Grypotherium) and also the remains of the large cat and other animals. He also explains to us what happened during the years following the excavation. The rumor got around in the region that a sensational discovery was made in a cave near Puerto Consuelo. Adventurers, prospectors arrived. They sacked the cave and the smaller ones nearby. It was the era of the gold fever in Patagonia and in simple minds the search for treasure, gold and the Mylodons were mixed. However, bones were discovered which were sold to travelers and naturalists and sent to various museums. Of these haphazard diggings Von Heinz knows very little. They were always more or less made in secret and the new colonists had other preoccupations than the gold prospectors.

We are a little disappointed. One question remains: What of human bones? He specifies that it was a human skull and a few bones, but that they were discovered in an anfractuosity between fallen boulders. They were burned. They are lost forever and in any case must not have had any connection with the discovery of the Mylodon, contrary to the belief in Puenta Arenas that a human skeleton was discovered with the Mylodon. Finally, von Heinz has given us only the confirmation of the historic unfolding of the facts. It is now our turn to try to find the history of the cave by methodical excavations.

The cave and its filling.-- The Mylodon cave is a single, gigantic cavity. The inside is reached by a steep path of about 10 meters which climbs a mound of rocks fallen from the ceiling and superior declivities. These fallen rocks form a kind of regular pad neatly separating the inside of the cave from the platform upon which it opens. From this pad one can see on one side an immense horizon of forests, fjords and mountains and on the other an immense room, which measures 170 meters wide and 270 meters long. The height is about 40 meters. But the forms are so regular that the impression is not one that can be expected. Any scale of size is lacking from the inside and the big trees growing in front of the cave, measuring 15 or 20 meters in height, seem to be mere bushes; [on the other hand] when working in the back of the cave and seeing men on horses arriving at a gallop, one has a sharp consciousness of the size of the cave in which men and horses seem to be like dwarfs.

This room is divided into two parts by blocks fallen from the ceiling [see Fig. 20]. For about two-thirds of its depth they make an accumulation aligned against a wall of about two to four meters high. This wall

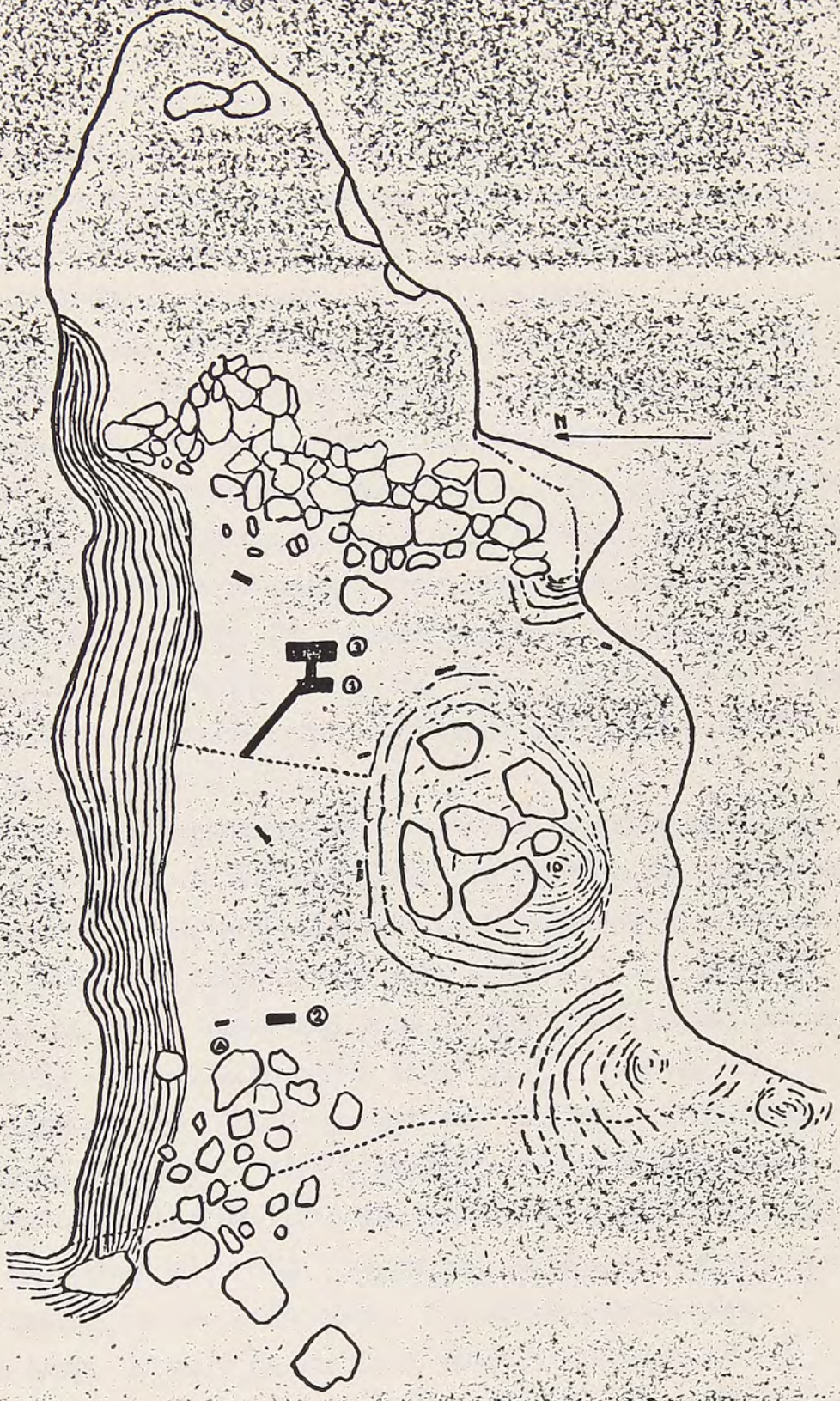

FIG. 20. — Plan de la grotte du Mylodon. La salle du fond, triangulaire, est séparée de la salle principale par une muraille d'éboulis. Les surfaces en noir marquent l'emplacement des fouilles de 1953, les surfaces hachurées, les parois d'anciennes fouilles rafraîchies par nous. La ligne pointillée qui va des grands éboulis à la paroi Nord indique la position du seuil rocheux. Le triangle marque l'endroit où fut découverte la peau.

delimits towards the end a much smaller room, darker, whose floor is slightly higher than the front part of the cave. We have called these two rooms, "back room" and "main room". The "back room" has been little devastated by the old excavations. Even we, on account of the darkness and the temperature, have made only a few fast probings, which revealed nothing. If some excavations were to be made in this cave systematically, it would be easy to make in it two perpendicular trenches.

The "main room" is all of a piece, but at the right, near the entrance, an accumulation of blocks form a mound 10 to 15 meters high which occupies a large area. On this right side the wall is vertical; to the left of the entry, on the contrary, and along all its length, it constitutes a slope at the same time swift and easily climbed, incrusted with a kind of white crust left there by waters that seep from about everywhere. The ceiling is of one single part. It is only marred by the softened prints of the blocks fallen from it. Here and there some brownish stumps have remained. They are the vestiges of impressive stalactites that gunmen made a game to shoot down.

The ground is covered everywhere with a very fine dust and pink-grey in color. At the moment of the discovery its surface was fairly even, as probed by old pictures. The central mound of blocks was also covered with the same dust. Today the blocks have been freed and all that is left is some vestiges of dust, ashes and dung in the interstices; as to the floor itself, it is covered with holes from old excavations. Some of these holes are partly filled by what was dug from other holes. The first difficulty was trying to find a spot that wasn't disturbed.

The main works consisted beside a few probings in the back room, of the clearing of the edges of old holes and of making three probes and digging a long trench in the main room. The three probes were respectively 2.60 m long, 80 cm wide and 2.40 deep, 2 m long, 1.50 m wide and 2.75 m deep, 4.35 m long, 1.40 m wide and 1.55 deep. The rocky bottom was reached in all the areas of the excavations. A trench measuring 15 meters long and approximately 60 cm wide was made with an ax the length of the cave to try to obtain the profile of the various layers and of the rocky bottom.

The detailed stratigraphy of each of these probes will be given in a work in preparation on Patagonia's prehistory. We are only giving

here a general view of the results. Everywhere where the ground wasn't disturbed, the cave surface is covered with a layer of fine light grey sediments, containing pebbles whole or more often broken. The whole of the layer is formed by the accumulation of rubbish fallen from the ceiling. This ceiling is actually formed of a Tertiary conglomerate of pebbles coated by a rough cement and interspersed with sandstone. These pebbles are the ones that are found in the upper layer, coming from the decomposition of the cement. These same pebbles and decomposed cement are found also in the lower layers mixed in very small proportions to other sediments.

Evidently this layer corresponds to layer A of Nordenskiold and to the upper layer of Hauthal. It contains vegetal remains, well-preserved, brought by the wind, a few guanaco bones evidently broken by man, a few rare stone tools. No extinct animal vestiges have been found.

On this ground evidently Indians have trod. They have built fires and cooked meals. However, they never seem to have been regular inhabitants of the cave, for the simple reason that it is uninhabitable, at least in the present condition. In winter at 150 meters altitude, a thick layer of snow normally covers the area and in summer which is the great windy season in Patagonia, the ground is constantly swept by violent whirlwinds which make impossible any sojourn in the cave.

However, the human remains are very few and our precedessors, as well as ourselves, have found traces of human industry only sporadically. The cave must only have been used in the last period of its history as an occasional shelter for small groups of guanaco hunters. Who were those hunters? We know nothing of their physical makeup. The bones found by NOrdenskiold and the ones found by us near the cave are only insignificant small ones and are of a too uncertain origin to be of interest. Of the carved stone fragments found by us on the floor, only an arrowhead in schist of a squat triangular shape with a large peduncle and a small, thick biface of the same material present a well determined shape. They correspond to the tools found on the ground almost everywhere in the area.

The owners of these tools were probably the last Indians that came to the region of Ultima Esperanza or their close ancestors. The prehistory of the reion is not well known and it is difficult to establish with such

poor evidence whether these Indians belonged to the sea group of Fuegiens or to the land group of Tehulches. The likelihood is that it was the Fuegiens, because the cave was once separated from the Atlantic pampas and the hunting grounds of the Tehuelches by tens of kilometers of absolutely impenetrable forests, today partly burned. On the other hand, the fjord of Ultima Esperanza was still frequented a few years ago by the last groups of Fuegien Indians migrating throughout the archipelagos in canoes. Some excavations made more to the south show that once these Indians hunted the guanaco utilizing stone tools [no longer of the type used] today. Finally, the discovery of a few fragments of carved whale bones, on the floor of a small cave near the main one, is an argument in favor of the hypothesis that the Indians who frequented these areas belonged to a sea-faring population. In favor of the opposite hypothesis must be stressed the fact that the two carved stone tools mentioned above could have been found anywhere on the surface of the pampas of the extreme south of Patagonia. Perhaps no actual distinctions between pampas Indians and sea-faring Indians were as apparent a few centuries ago as in the last decades of their history and maybe they had a certain technical sameness.

All of the preceding doesn't reveal anything of the coexistence of man and the Mylodon. Naturally, it is on the first grey layer that the famous hide was found. This doesn't prove much, because the ground is loose and dried near the entrance of the cave, and the top layer fairly thin. It is not improbable that a horse's hoof, hitting a hard object lying on the next layer, partly uncovered it. As this hide, according to vonHeinz' testimony, was very dry and folded, it must have formed a voluminous package and was perhaps never completely buried under the rubbish from the ceiling. In any case, it can be considered as certain that it was also buried in the lower layer because if it had been entirely in the upper layer, it would have been enough to shake it to extricate it and it would not have been necessary to dig around it, as von Heinz affirms.

Ancient filling levels.-- Toward the base of the top layer and separated from it in the damp parts by a floor or white concretions is a pulverulent layer of ashes, pink in color. At the end of the cave it

forms a homogeneous level 20 to 30 cm thick. It is practically pure, being free of pebbles or archaeological or paleontological traces, at least in the places where we have dug. In the anterior part, much drier, these ashes are mixed with the lower layers to a depth that can reach 50 to 75 cm.

These ashes give us the key to the mystery of the hide and dung preservation for thousands of years. It is a thick layer of volcanic ash and, not as some thought, the remains of a human hearth. It covered all at once the Mylodon dung layer, and in the cave's dry parts, where the dung was in a better state of preservation, prevented any further decomposition. Analysis of these ashes is pending. Perhaps it will tell us to which group of eruptions of the Andes they come from and their date because other layers of ashes of which the chemical composition is different in some points to the ones of southern Patagonia and coming from postglacial eruptions are dated with fairly good accuracy.

To the contrary of Nordenskiold who, as we have seen, had found in this layer some bones of a small equid identified by the name of Onohippidium Saldiensi, we have found these ashes almost devoid of any mixture. As they didn't contain any pebbles fallen from the ceiling that can be found in the whole filling in various densities, one can deduct that the deposit of ashes came from a unique and catastrophic event which happened very fast during which the disintegration of the ceiling didn't have time to happen. It buried the Mylodon dung and chased all the animals from the cave without killing them,no skeleton of these animals having been found on the surface. After the eruption, the Mylodons didn't return to the cave or did so for so little and in such a sporadic way that they didn't leave any visible tracks.

Under the pink layer of ashes and in places more or less mixed with them begins the Mylodon dung. In the front of the cave, the second probe is constituted of vegetal remains of small size, compact and well preserved, in which can be seen twigs, grass fragments, light red hair in abundance, and evacuations [turds] complete and hardened containing small gravel. The whole of the organic vestiges are coated in their superior part by the pink ashes extremely fine and dry. Each shovelful during the excavation raised big suffocating clouds that flew with the wind and smelled like Armenian paper.

On the surface of the dung are evacuations complete and not trampled on. They correspond to the/abandonment period of of the cave. The thickness of the dried dung is about 30 to 75 cm. Its composition is homogeneous. Besides the organic remains that constitute it we found in it some small bone fragments bearing the traces of teeth and a small piece of Mylodon hide incrusted with its small dermic bones. A few pebbles from the ceiling can also be found but very sporadically. None of the vestiges can be attributed to man.

In places the dried dung is compressed perhaps on account of the rocky ground and of the dripping waters. Then it becomes darker; the vegetal remains and hairs disappear. OUtside of these local features, all the Mylodon dung layer and without discontinuity with the dried dung, is constituted of a homogeneous substance, flour-like and soft to the touch, dried and pulverulent, darker and more brown than the preceding. As this one, it contains some chewed splinters of bones and some pebbles fallen from the ceiling. At the bottom, in contact with the rock, the layer becomes darker and damper. It appears black, but in drying out it becomes dark brown. It seems that all the thickness of the filling, being dried dung or a flour-like substance has exactly the same origin and comes from the Mylodon evacuations, but the organic deposits have followed a different evolution by reason of different chemical conditions.

In probe numbers 1 and 3 executed in the center of the cave, the discoveries present themselves under a different form. The dried dung has disappeared. The layer of pink ashes is not mixed with the filling below and rests directly on a flour-like and pulverulent sediment like the filling of the bottom of the front of the cave. No vegetal remains can be seen. In it the paleontological finds are much more abundant than in the front of the cave. Among them Th. Josien has identified many vertebrae, a half jaw and various remains of Mylodon (teeth, jaws, tibia, the top of a femur, ribs). The back of a skull which was lying down on the rocky bottom, unfortunately in a bad state of preservation, was reconstructed. A fragment of a left maxillary still having its superior molar is the only vestige discovered by us that can be attributed to the big cat of the cave (1). None of these bones present traces that can be considered as

(1) This fauna's study, made by Th. Josien, is pending and will be published at the same time with the results of the excavations.

having belonged to humans. Some were badly charred, especially those coming from the bottom part of the decomposed dung layer. These charred bones were found in the darker parts of the decomposed dung (there are not any in the dried dung). Nowhere, in spite of the most careful sifting, has charcoal been discovered and it is evident that the charring of the bones is not due to a human hearth, but to a slow dung's combustion that went irregularly into all the thickness of the filling, forming here and there some pockets of various colors. The difference between the filling of the front of the cave and the filling at the back of the main room is explained by the configuration of the rocky ground. The floor of the main room is raised in the middle in a very neat mound which divides it into two parts. At first this mound doesn't show. It corresponds to an irregularity of the rocky ground which, in that place, raises up abruptly. It divides the cave into to pits, one anterior and one posterior, of which the conditions of humidity and hence of preservation of sediments and other remains are very different. The back pit does not seem to have any drainage. When the Mylodon dung was accumulated there it became a real manure pit. All the organic vestiges are completely decomposied, except around the block mound where Hauthal did his excavations. In the front of the cave to the contrary, the waters must have drained outside under the fallen rocks of the entrance. The dryness and later the volcanic ashes' protection assure the perfect preservation of the dung and of the organic vestiges it contained.

The history of the Mylodon cave.-- Finally, the problems laid by the Mylodon cave are considerably reduced and it is possible to reconstruct roughly its fillings' history and the one of its inhabitants. This history is not very old. Even the most ancient layers of the filling are post-glacial and must have begun about 15000 years ago. The areas around the cave were covered by ice as is shown by the erratic blocks strewn a little everywhere. The region of Ultima Esperanza is situated inside the zone covered by the continental glacier cap and was uncovered by the ice at a recent phase of the last withdrawal. The cave filling is uninterrupted from its foundation to the ashes layer. If it had been interrupted during its formation by a new advance of the glacier, this change would be shown by a discontinuity in the dung filling or at least by a different density

of the fallen rocks from the ceiling. As it is not the case, it must be considered as entirely postglacial.

When the ice retreated from the region of Ultima Esperanza about 15,000 years ago, the cave was open, gaping and absolutely empty. The animals extant from the preceding periods which during the freezing era had gone to the more temperate plains of the Atlantic, reinvaded little by little the newly liberated territories. Already the number of their species was reduced, a big edentate, a hippidium, a few rodents and a big cat seem to be the only ones to have arrived in that epoch in the region of Ultima Esperanza. The Mylodon adopted the cave as shelter as soon as it became accessible. It is possible that at times he must have left it to the big cat,unless this one satisfied itself with raids during which he killed one or the other of the big animals and in which he sometimes found death.

This first phase lasted maybe a few thousand years, maybe less. Only the dating of the most ancient samples of the filling will give us the time elapsed between the first occupancy and the big volcanic eruption which buried everything under a thick layer of ashes and which happened less than 10,000 years ago. This eruption indicates the beginning of a second period. When it happened the cave must have been still inhabited since the top layer of the dung is still intact, barely trampled on and directly in contact with the ashes. After the eruption the Mylodons don't seem to have returned to the cave. In any case, they didn't use it as a permanent shelter and not for long. Of this second period we don't know much. Does it correspond to the arrival of man in the region, as Nordenskiold believes? Does it correspond to a period of many years or many centuries? Does it correspond to the phase of the disappearance of the last equids from Patagonia? The absence of any lithiques [stone ?tools] or bone remains corresponding to that level of our probes prove to the contrary that it was a unique, catastrophic event, covering a very short time. The problem remains open and can be solved only by a controlled excavation.

The last period of the cave's filling begins after the era of the volcanic ashes. It is not used any more as permanent shelter by a living creature, except by very small rodents which appeared to have been numerous

and of which the bones were found mixed with the cement and pebbles fallen from the ceiling. Some foxes come into it to eat their prey. Some Indians occasionally roast pieces of guanacos. In the meantime, the ceiling continues to disintegrate as it has been doing for thousands of years, but now it constitutes the only filling. The pebbles or dust which fell buried themselves in the beginning in the dung, later in the pink ashes which had covered everything; still later they became the cave floor. During silent summer nights we could hear the fall of one of these pebbles. The top grey layer continued, mixing in at some archaeological level the few Indian vestiges of the top and the few insignificant objects -- papers, matches, etc., that we had forgotten.

It does not seem probable to us that the question of this summary of the history [of the cave] can be taken up again. The study of vegetal and animal remains, the analysis of the ashes and other sediments which are now in the process of being done will bring new precision [to our understanding of] the evolution of the postglacial flora, fauna and climate of southern Patagonia.

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Translation done by

Georgette B. Spaulding from: La grotte du Mylodon (Patagonie occidentale) Journal Societe des Américanistes, XLIII, Paris, 1954, pp. 173-206, 1 pl. 2 figs.

Annotated bibliography follows, not translated.

La découverte de la peau de Mylodon en 1895 dans une caverne de Patagonie Occidentale suscita un très grand nombre de commentaires dans les années qui suivirent et jusque vers 1902 dans la presse de la plupart des pays du monde. La bibliographie complète de ces notes et articles serait difficile à réunir et d'ailleurs sans intérêt. Le nombre des études fondées sur des documents originaux est restreint. Le même auteur a souvent fait paraître le même texte en espagnol, en allemand, anglais ou français. Nous donnons ici une liste assez importante de ces études en rappelant que les travaux apportant des éléments nouveaux au problème de la grotte du Mylodon se limitent à ceux de E. Nordenskiöld, Hauthal, Roth et Lehmann-Nitsche, Moreno et Smith-Woodward. Il faut mettre à part la datation beaucoup plus récente du fumier de Mylodon par le C^{14} (Fr. Johnson). Le reste n'est guère que compilation.

Nous avons limité les études de paléontologie à celles qui se réfèrent à la grotte d'Ultima Esperanza, à l'exclusion de celles qui traitent d'une façon générale des édentés, des équidés et des félins d'Amérique du Sud.

Ameghino Florentino. — « Première notice sur le Néomylodon Listaï. Un représentant vivant des anciens édentés gravigrades fossiles de l'Argentine. » La Plata, août 1898, ou *Œuvres complètes*, tome XII, p. 477-482.

(Première note faisant état de la découverte de la peau d'un animal vivant ou éteint depuis peu, qui aurait été autrefois aperçu par le naturaliste Ramon Lista et qui ne serait autre que le Mylodon. Brève histoire paléontologique des édentés gravigrades. Description de la peau. Cette note est une de celles qui a le plus contribué à la croyance que le Mylodon avait survécu jusqu'à l'époque actuelle. Elle a été reproduite dans diverses revues :

Natural Science, vol. XIII, n. 81, 1898, p. 324-326.

Nature, vol. 58, n. 1510, p. 547.

Naturwissenschachtliche Rundschau, vol. XIII, n. 52.

Anales de la Sociedad Cientifica Argentina, tome XLVI, p. 294-295.

Ameghino Florentino. — « Un sobreviviente actual de los Megaterios de la antigua Pampa. » *La Piramide*, I, La Plata, 1899, p. 51-54 et *Œuvres complètes*, tome XII, p. 755-760.

(Historique de la découverte et description de Mégathérium fossile. Légende des Tehuelches sur le Tigre d'eau ou Iemisch qui ne serait autre que le Mylodon.)

Ameghino Florentino. — « Néomylodon Listaï. » Dans *Sinopsis geologico paleontologica. Suplemento. Adiciones y correcciones.* (Dans *Segundo Censo Nacional de la Republica Argentina*, Buenos-Aires, 1898, tome I, p. 111-255, 105 fig.) La Plata, 1899, p. 8.

Ameghino Florentino. — « El mamifero misterioso de la Patagonia (Néomylodon Listaï). Un sobreviviente actual de los megaterios de la antigua Pampa. » La Plata, 1899, 15 p.

(Réimpression des deux articles précédents.)

Ameghino Florentino. — « Das Neomylodon Listaï. » *Mutter Erde*, II, n. 27, 1900, p. 2-5.

Ameghino Florentino. — « Grypothérium, nom de genre à effacer. » *Comunicaciones del Museo Nacional de Buenos-Aires*, tome I, n. 7, 1900, p. 257-260.

Barrett-Hamilton G. E. H. — « A portuguese parallel to Neomylodon Listaï » *Natural Science*, vol. XV, n. 94, 1899, p. 462.

Cabrera Angel. — « Los Yaguares vivientes y extinguidos de la America Austral. Cueva del Milodon. » *Notas preliminares del Museo de la Plata*, tome II, p. 8-40.

(Discussion sur la position systématique du grand félin rencontré dans la grotte. Il s'agit d'un véritable jaguar de taille exceptionnelle que l'auteur propose de nommer Panthera onça mesembrina.)

CORDOVEZ Marcial. — « Los restos del Mylodon y la gruta de su nombre en la Patagonia Occidental. » *Actes de la Société scientifique du Chili*, XII, 1902, p. 22, 2 photos.

(L'auteur faisait partie de la Commission des limites. Historique de la découverte et des visites faites à la grotte. Une des photos représente un gigantesque morceau de peau chiffonnée.)

GALLARDO A. — « Bibliografia. II. Ciencias Naturales. » *Anales de la Sociedad cientifica argentina*, tome XLVIII, 2e semestre 1899, p. 341-346.

(Analyse des études parues en 1899 sur les découvertes faites dans la grotte du Mylodon.)

GAUDRY Albert. — *Comptes rendus des séances de l'Académie des Sciences de Paris*, tome CXXIX, n. 13, sept. 1899, p. 491-492 et décembre 1899.

(Résumé des travaux de Erland Nordenskiold.)

« Sur le Néomylodon de Patagonie. » *Bulletin de la Société géologique de France*, 1899, p. 496.

« Sur une nouvelle découverte de peau fossile à la cueva Eberhardt. » *Bulletin de la Société géologique de France*, 1900, p. 808.

GAUDRY Albert. — *Congrès international d'Anthropologie et d'Archéologie préhistorique*, 1900, p. 146-147.

(Intervention à propos d'une communication de Lehmann-Nitsche sur l'Homme fossile de la formation pampéenne.)

HAUTHAL Rodolfo. — « Erforschung der Grypotheriumhöhle bei Ultima Esperanza.» *Globus*, 76, n. 19, nov. 1899, p. 297-303.

(Version allemande de l'étude parue en 1899 dans la *Revista del Museo de La Plata*.)

HAUTHAL Rodolfo .— « Quelques rectifications relatives au Grypothérium de la caverne Eberhardt. » *Comunicaciones del Museo Nacional de Buenos Aires*, tome I, n. 7, oct. 1900, p. 241-252.

HAUTHAL Rodolfo. — « Die Haustiereigenschaft des Grypotherium domesticum Roth, die Glacialverhältnisse bei Ultima Esperanza und die Berichtigung des Namens Grypotherium domesticum », *Globus*, vol. LXXVIII, n. 21-22, déc. 1900, p. 333-338 et 357-360.

HAUTHAL Rodolfo, ROTH Santiago et LEHMANN-NITSCHE Roberto. — « El mamifero misterioso de la Patagonia, Grypotherium domesticum. » *Anales del Museo de La Plata*, IX, 1899, p. 409-478.

I. HAUTHAL. — « Reseña de los hallazgos en las cavernas de Ultima Esperanza (Patagonia Austral) », p. 409-418.

(Historique des découvertes, description de la grotte et des fouilles et des trouvailles faites par l'auteur.)

II. ROTH. — « Descripcion de los restos encontrados en la caverna de Ultima Esperanza », p. 419-459.

(Grypothérium, félin, équidé, etc.)

III. LEHMANN-NITSCHE. — « Coexistencia del hombre con un gran desdentado y un equino en las cavernas patagonicas », p. 460-478.

(Description des vertiges osseux en se préoccupant plus spécialement d'y retrouver des traces de travail humain. Description des objets d'industrie et des vestiges humains.)

JACOB Dr Christfried. — « Examen microscopico de la pieza cutanea del mamifero

misterioso de la Patagonia, « Grypotherium domesticum. » *Revista del Museo de La Plata*, tome X, 1899, p. 61-62, 1 pl.

(Description de la méthode d'étude, colorants utilisés, examens microscopiques.)

JOHNSON Fr. — « Radiocarbon dating », supplément à *American Antiquity*, vol. XVII, n. 1, 2e partie, juillet 1951.

(L'échantillon n. 484 est constitué par du fumier de la grotte du Mylodon. Sa datation a donné une ancienneté de 10.832 années avec une erreur possible de plus ou moins quatre cents ans.)

LEHMANN-NITSCHE Robert. — Cf. HAUTHAL, 1899.

LEHMANN-NITSCHE R. — « L'homme fossile dans la formation pampéenne. » *Congrès international d'Anthropologie et d'Archéologie préhistorique*, XIIe session, Paris, 1900.

(Simple note sur le Mylodon. N'apporte pas de faits nouveaux. Discussion sur le nom à attribuer au Mylodon de la grotte. Propose simplement Mylodon Darwinii. Reprend la thèse de la présence de l'homme.)

LEHMANN-NITSCHE R. — « Der Mensch und das Grypotherium in Süd-Patagonien. » *Verhandlungen der Gesellschaft deutscher Naturforscher und Ärzte*, vol. LXXII, sept. 1900, IIe partie, p. 129-131.

LEHMANN-NITSCHE R. — Présentation de collections rapportées d'Ultima Esperanza en France et en Allemagne. *Congrès international d'Anthropologie et d'Archéologie préhistorique*, 12e session, Paris 1900, et *Correspondenz-Blatt der deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte*, XXXI, n. 10, oct. 1900, p. 115.

LEHMANN-NITSCHE R. — « Zur Vorgeschichte der Entdeckung von Grypotherium bei Ultima Esperanza. » *Naturwissenschaftlichen Wochenschrift*, XV, 1900, n. 33, 35, 36, p. 385-392, 409-414, 426-428. Constitue sous le même titre le cahier 29 de *Naturwissenschaftliche Abhandlungen*, Berlin, 1901, 46 p.

LEHMANN-NITSCHE R. — « La pretendida existencia actual del Grypotherium ; supersticiones araucanas referentes a la lutra y al Tigre. » *Anales del Museo de La Plata*, X, 1902, p. 268-281.

(Étude critique des légendes indigènes relatives à des animaux plus ou moins fabuleux. Rien ne permet de supposer comme le fait Ameghino que ces légendes perpétuent le souvenir du Mylodon. Il s'agit de la loutre et d'un félin (Felis onça) dont l'aire d'extension jusqu'au XVIIIe siècle s'étendait beaucoup plus au Sud.)

LEHMANN-NITSCHE R. — « Die Gleichzeitigkeit der südpatagonischen Höhlenbewohner mit den Grypotherium und anderen ausgestorbenen Tieren der argentinischen Höhlenfauna. » *Archiv für Anthropologie*, XXVII, 1902, p. 583-597, 4 fig.

Version allemande légèrement augmentée du travail paru en 1899 dans les *Anales del Museo de La Plata*.)

LEHMANN-NITSCHE R. — « Nuevos objetos de industria humana encontrados en la caverna Eberhardt en Ultima Esperanza. » *Anales del Museo de La Plata*, XI, 1904, p. 57-70.

(Complète l'article de Roth paru dans le même numéro de la même revue. Description et photos des trouvailles. Recherche des marques humaines sur les ossements et les fragments de cuir.)

LÖNNBERG Dr. E. — « On some remains of Neomylodon Listaï brought home by the swedish expedition to Tierra del Fuego, 1895-1897. » *Svenska Expeditionen*

till Magelländerna, tome II, n. 7, p. 149-170 (pl. XII-XIV). Se trouve aussi résumé dans les *Anales de la Sociedad cientifica argentina*, tome XLVII, p. 258-261.

MERCERAT A. — « Sur le Néomylodon Listaï Ameghino. » *Comunicaciones del Museo Nacional de Buenos Aires*, tome I, n. 5, déc. 1899, p. 155-157.

MORENO Francisco P. — « Note on the discovery of Miolania and of Glossotherium (Néomylodon) in Patagonia. » *Nature*, vol. LX, n. 1556, août 1899, p. 396-398.

MORENO Francisco P. — « Exhibition of and remarks upon, a portion of the skin of Néomylodon Listaï. » *Proceedings of the general meeting for scientific business of the zoological Society of London*, 1899, p. 1.

(Simple note.)

MORENO Francisco et WOODWARD A. S. — « On a portion of mammalian skin, named Néomylodon Listaï, from a cavern near Consuelo Cove, Last Hope Inlet, Patagonia. » *Proceedings of the general meeting for scientific business of the zoological Society of London*, 1899, l. 144-156, 3 pl., 1 photo.

(Moreno faisait partie de la Commission des limites. Raconte ce qu'il sait de la découverte et les sondages qu'il fit lui-même exécuter dans la grotte. Suppose que la peau est déjà ancienne et s'est trouvée conservée grâce à un concours de circonstances extraordinaires. La contribution de Woodward est surtout descriptive et comparative. Description de la peau et des os dermiques. Sans l'opinion de Moreno, la croirait récente : en tout cas elle est remarquablement fraîche par rapport à des restes de Mammouth ou de Rhinocéros de Sibérie, ou de Moa de Nouvelle-Zélande.)

NEHRING A. — « Einige Bemerkungen über die Haustierqualität des « Grypotherium domesticum » aus Süd-Patagonien. » *Globus*, vol. LXXVII, n. 4, janv. 1900, p. 61-62.

NORDENSKIÖLD Erland. — « Meddelande rörande gräfningar i grottorna vid Ultima Esperanza (Södra Patagonien). » *Ymer*, XIX, 1899, n. 2, p. 215 et n. 3, p. 265-266.

NORDENSKIÖLD Erland. — « Neue Untersuchungen über Néomylodon Listaï. » *Zoologischer Anzeiger*, tome XXII, n. 593, juillet 1899, p. 335-336.

NORDENSKIÖLD Erland. — « Iakttagelser och fynd, grottor vid Ultima Esperanza y Syduestra Patagonien. » *Kongliga Svenska Vetenskaps-Akademiens handlingar*, vol. XXXIII, n. 3, nouvelle série, 1900, 24 p., 7 planches.

(Exposé détaillé des fouilles effectuées par l'auteur lui-même.)

NORDENSKIÖLD Erland. — « La grotte du Glossothérium (Néomylodon) en Patagonie. » *Bulletin de la Société géologique de France*, 1900, p. 29-32.

(Bref exposé des fouilles effectuées par l'auteur. Il n'a pas pu trouver de preuves certaines de la contemporanéité dans la grotte de l'homme et du Mylodon.)

NORDENSKIÖLD Otto. — « Über die posttiären Ablagerungen der Magellansländer... » *Svenska Expeditionen till Magellanländerna*, vol. L, 1899, n. 2.

PHILIPPI R. A. — « Contribucion a la osteolojia del Grypotherium domesticum Roth i un nuevo delfin. » *Anales de la Universidad de Chile*, tome CVII, juillet-août 1900, p. 105-114, 4 planches.

PHILIPPI R. A. — « Grypotherium. » *Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte*, 19 mai 1900, p. 285-286.

(Raconte le voyage du Dr Reiche à la grotte. Celui-ci n'est pas convaincu de la domesticité. Les os qu'il a trouvés n'impliquent aucun travail humain.)

PRICHARD Hesketh. — *Through the heart of Patagonia*, Londres, Heinemann, 1902.
(Récit de l'expédition envoyé en 1900 par le *Daily Express* à la recherche de Mylodons vivants. Détails sur la faune et sur les Indiens.)

ROTH Santiago. — Voir HAUTHAL.

ROTH Santiago. — « Nuevos restos de mamiferos de la caverna Eberhardt en Ultima Esperanza. » *Anales del Museo de La Plata*, XI, 1904, p. 39-53, 3 pl.
(Étude des restes rapportés de la grotte par Hauthal en 1900 et comprenant quelques instruments et quelques ossements humains et animaux. Thèse de la domestication du Grypotherium démontrée par l'amoncellement du fumier, la présence d'animaux de tous âges, l'existence de déchets de nourriture dont certains mêlés au fumier, etc.)

SKOTTSBERG Carl. — « *The wilds of Patagonia*, a narrative of the swedish expedition to Patagonia, Tierra del Fuego and the Falkland Island, in 1907-1909. » Londres 1911.
(P. 289, quelques pages sur la grotte du Mylodon.)

SMITH-WOODWARD A. — Voir MORENO.

SMITH-WOODWARD A. — « Exhibition on behalf of Dr Moreno of the skull and other specimens of Néomylodon Listaï. » *Proceedings of the general meeting for scientific business of the zoological Society of London*, 1899, p. 830.
(Simple note.)

SMITH-WOODWARD A. — « The supposed existing ground-sloth of Patagonia. » *Natural Science*, vol. XV, n. 93, nov. 1899, p. 351-354.

SMITH-WOODWARD A. — « On some remains of Grypotherium (Néomylodon) Listaï and associated mammals from a cavern near Consuelo Cove, Last Hope Inlet, Patagonia. » *Proceedings of the zoological Society of London*, janvier 1900, p. 64-79.

SPENCER Moore. — *British Association for the Advancement of Science*, Douvres, 1899.
(Sur le fumier de Mylodon.)

TOURNOUER André. — « Sur le Néomylodon et l'animal mystérieux de la Patagonie. » *Comptes rendus de l'Académie des Sciences de Paris*, 14 janvier 1901, 2 p.
(Prétend avoir vu l'animal, qui laisserait des empreintes semblables à celles d'un grand chat.)

STUDER Dr Th. — « Über neue Funde vom Grypotherium Listaï Ameghino in der Eberhardthöhle von Ultima Esperanza. » *Nouveaux Mémoires de la Société helvétique de Sciences Naturelles*, vol. XL, 1906.

VERNEAU. — *Bulletin de la Société d'Anthropologie*, III, 1902, p. 724-725.
(Note à propos de l'article de Lehmann-Nitsche paru dans *Archiv für Anthropologie*, 1902.)