FINAL REPORT “Unknown metals and minerals in prehispanic mummies from the Ica region” (English: Final Report "Unknown metals and minerals in prehispanic mummies from the Ica...

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5 authors, including:

Joakim Jensen

University of Copenhagen

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FINAL REPORT

PROJECT'S NAME:

“Unknown metals and minerals in pre-Hispanic mummies from the Ica region”

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One year

EXECUTIVE STAFF:

• Dr. Ing. Toribio Pando, Pedro Angel •

Dr. Ing. Rosales Huamani, Jimmy Aurelio •

Dr. Ing. Landauro Abanto, Alberto

• Dr. Ing. Valverde Espinoza, Santiago Gualberto

• MSC. Ing. Mauricio Perez, Felix •

MSC. Lic. Ily Marilu Maza Mejia •

MSC. Guerrero Villalba, Juan Carlos

• Dr. Cremer, Sabine

• Sullca Quispe, Kevin Josue

• Leon Colqui, Yelwins Anthony

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1 SUMMARY

The tridactyl mummies of Nasca have caused uncertainty in the scientific world since 2016. Although it is unlikely that the bodies are subject to falsification, at least according to the current scientific knowledge, the numerous metallic implants remain disconcerting. Its final composition is unknown in detail. Only your analysis can prove without a doubt what metals were used in ancient times and how. Furthermore, deposits of rocks can provide information about the extent to which they were probably used certain minerals and metals in the area. The possible chemical compounds found Beyond this they must also be subject to extensive scientific analysis before the pseudoscientists or ufologists report on the subject and ridicule the matter.

In this investigation report, an attempt was made to present evidence or indications regarding the nature of the three-fingered (tridactyl) mummies of Nasca, which can later serve in last resort to prove the veracity of them or the opposite, if the objects are a new quality of fake mummies made with a technique not known to date.

Figure 1.

X-ray of the mummy Josefina, abdominal part with eggs, right parts

of the pectoral implant

Taken from *Alien Project (GAIA).*

2 INTRODUCTION

2.1 Tridactyl mummies

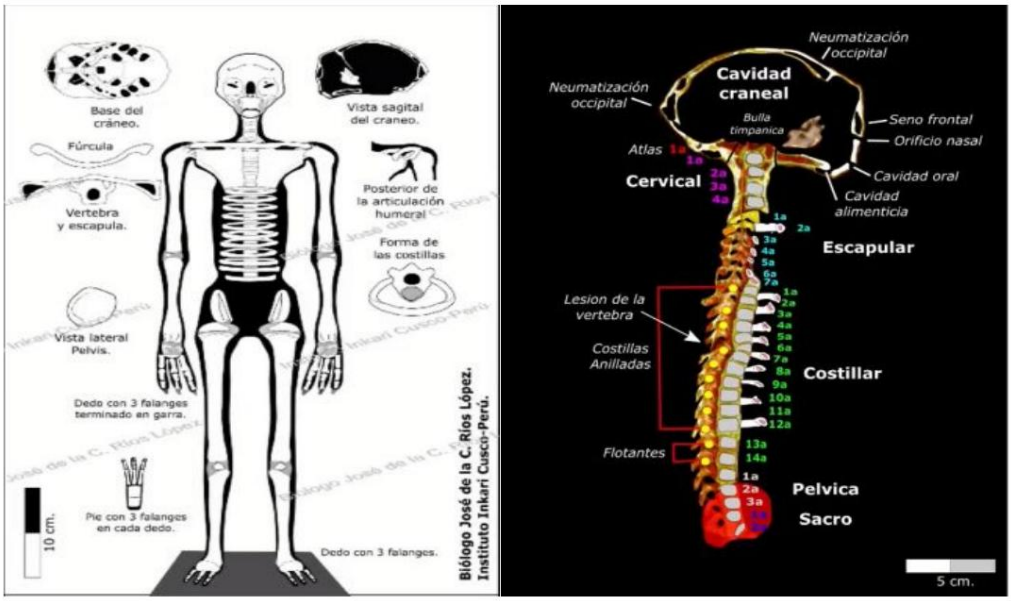
Two types or species of tridactyl mummies are known to this day:

1) The small mummies of approximately 60 cm called "Albert", "Victoria" and "Luisa" who are currently at the San Luis Gonzaga University of Ica, and Previously there was a mummy called "Josefina" of the same size as after certain studies carried out by institutions and organizations were claimed for their discoverer. His current location is unknown.

Characteristics of these mummies are, among others: elongated skull that contains the desiccated brain, ear canal without pavilion, a single bone in both the forearm as in the foreleg, almost circular ribs, the atlas square instead of circular, hollow bones like birds, share only about 30% of their DNA with the homo sapiens. The anatomy coincides with that of a human being in the presence of the main parts of a human skeleton, but with great differences in their structure such as the number of vertebrae, type of bones, it does not have two clavicles but a single furcula as in birds, the parts of the knee fit together almost like gears, and there is the presence of one or more implants in each of the mummies, etc. The implants in mummies considered female are the largest and most complex as shown by x-ray and CT.

Figure 2.

On the left: *details of the small tridactyls,* on the right: *details of the skull and vertebra of the 60 cm tridactyls*



Source: Dr. J. de la Cruz Ríos López (Mexico)

2) The other specimen is the 168 cm “María” mummy with human and other characteristics unknown. She is considered a hybrid. Without going into many details, mentions only some characteristics of this mummy such as (according to Prof. Galetskii, Saint Petersburg University): elongated skull; a single bone in the forearm and the before leg; spinal column equal to that found in a human body, the The only difference can be found in the absence of vertebra No. 7; there is no tailbone in it; in the lumbar part there is an anomaly that is probably melanomas; In the waist area there are two unidentified hard objects, they are not even metals or bones; On the extremities there are wounds which show a as if they had been caused by the long claws of an animal such as example a puma; There are fecal remains called coprolites in the digestive part; in

In the fingers there are no muscles that join the phalanges and each finger has four phalanges; he heel shows a different shape that would not have allowed the entire plant to be placed in contact with the earth's surface, on the contrary, when walking it was supported only on the heel and toes. For the rest, María's anatomy coincides with the

of a human being. No implants were found.

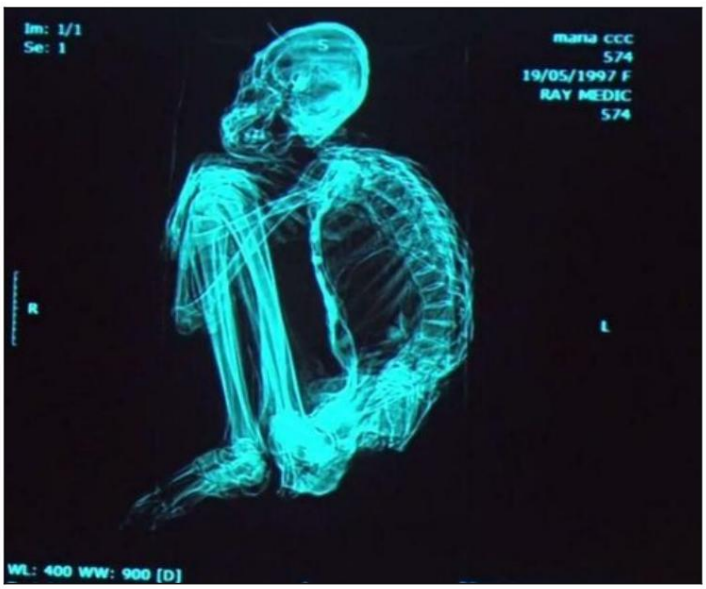
Figure 3.

CT of the mummy Mary

Source: *Alien Project (GAIA)*

Figure 4.

X-ray of the mummy Mary



Source: *Alien Project (GAIA)*

2.2 Objective, purpose and approach

The South American subcontinent and Peru in particular are strongly influenced by the foreign research. In particular, traditional knowledge such as medicine and agriculture, but also various types of stories, are generally not written down and transmitted orally from one generation to the next. It's a second world of knowledge that follows its own rules and has numerous very different forms of its own. These influences of orality and the still scarce interpretation of historical traditions on ceramics and tissues make an issue like the exploration of unknown bodies a particular challenge when it comes to investigating its origin.

One of the objectives of the research project was to build a bridge between the written and verbal historical knowledge and the presence of the Palpa petroglyphs (department of Ica) and Toro Muerto (department of Arequipa) and the question of how both information systems could better complement each other to track the truth about the mummies of Nasca.

It was of great importance that, in addition to impartial research into the age of the mummies, their origin and their DNA, that an investigation be carried out that pays attention to the implants that can be found in each of the small mummies of approximately 60cm.

Available information about implants in mummies is shown above all in the INGEMMET report from February 2017. An important focus of this research was the analysis of some samples that had been taken from one of the mummy's implants Louise.

We were also interested in whether any cuts or traces of glue were shown on the skin of the mummies.

Therefore, the goal of any investigation should be to separate the improbable from the probable according to our knowledge, placing the emerging indicators in favor or in

against the authenticity of the mummies, in the historical and current context according to the analysis of the implants, mummy bodies, certain rocks and sediments in the area.

2.3 Problem and initial situation

In regions of Peru with a high number of artifact and mummy finds, the number of huaqueros has skyrocketed in a few decades. In particular, the excavations that surrounding the discovery of the Lord of Sipán have contributed significantly to this since the end the last century.

This makes it difficult to research current, especially when selling important historical finds to wealthy collectors abroad without being aware of them, create as accurately as possible the general image of a culture complex and arrive at the correct knowledge about the way of life of its bearers and their intercultural contacts.

The Nasca mummies, which have been completely torn from a funerary context and some of which show serious damage, unfortunately add to this problem of the effects of the huaqueo.

The acceptance of scientific results, taught by institutes and universities of good standing reputation (Abraxas, St. Petersburg University, Lakehead University, Biotecmol, etc.) is made difficult by the track record of donors, among whom are mainly the organization GAIA, which focuses on topics of ufology and the paranormal. Some of the researchers commissioned by said organization had created the basis for distrust for themselves, by previously declaring other extraterrestrial mummies.

Another problem is that, for example, the research of the biologist Dr. Carla is ignored. Martínez (Colombia) who during the press conference at the congress (Lima, Peru) in December 2018 stated: “The loose head from which the INCARI institute took tissue to studies of mitochondrial DNA, is not reliable to be representative of the bodies dried tridactyls of 60 cm object of this study, since she has not had a study

scientific for a prior verification of its real biological correspondence with a body complete tridactyl desiccation."

She continued: "The mitochondrial DNA results from this loose head and the large one hand are only valid for these samples and are not comparable with the other results of the dried tridactyl bodies for not presenting a scientific study that allows us to associate these loose pieces with the complete bodies studied. From scientific rigor it is not can extrapolate the mitochondrial DNA results obtained by the INCARI institute to explain with them the DNA of the 60 cm dried tridactyl bodies that have been subjected study by the Gaia and Tercer Milenio teams. ... DNA analysis...of this head loose shows 100% belonging with homo sapiens. This result cannot be used to call into question the results of the massive sequencing of BioTecmol and the Federal University of Saint Petersburg made with tissue extracted from the vertebrae of Victoria (dried tridactyl body without head) ... "

Figure 5. *CT of the "Wawita" mummy. Source: Alíen Project (GAIA).*

There are pieces the size of approximately 30 cm that were undoubtedly assembled at from animal parts. The research team led by the French archaeologist Thierry Jamin and the Mexican reporter Jaime Maussan reported the event.

During the press conference in December 2018, Prof. Galetskii from the University of St. Petersburg explained the x-rays of the so-called Wawita mummy. They clearly showed that the child had five fingers on each hand and five on each foot, and that of each of those limbs had been removed postmortem two fingers artificially. The boy He probably suffered a violent death, as wounds were discovered in his abdomen,

caused by a sharp object such as a knife.

By testing the manipulation of the child's corpse through X-ray and CT images, s comparisons can be made with the images of tridactyl mummies, from which such violent interventions can be ruled out.

Figure 6. *Sculpted loose skull and large hand. Source: Inkarri – Cusco.*

2.4 Risks

2.4.1 Coronavirus

In any phase of the research there was a risk of contagion because the vaccines developed perhaps did not offer reliable protection. The problem was faced with the use of masks in terminals, buses and in meetings.

2.4.2 Strikes and stoppages

Due to general discontent with rising living and energy costs, they broke out strikes already before the 2021 presidential elections. Some longer strikes They also affected the Ica region. The end of 2022 and the first months of 2023 Ica region was affected again, this time by strikes based on the arrest of the former president. These strikes directly affected our research, we were unable to travel to carry out the last works.

2.4.3 Disease

Due to stressful heat and dust conditions and the continued threat of coronavirus mentioned above, the project was also at risk of being compromised in any moment.

2.4.4 Lack of materials/equipment

To ensure sampling and research in the open field, it depended on some materials/equipment, some were not available or very expensive.

3 STATE OF THE RESEARCH

Since 2016, there have already been several research results on various related objects with the mummies of Nasca. Specifically mentionable are the mummies María, Josefina, Louisa, Victoria and Albert, from whom tissue and bone samples were taken and which were sent abroad for analysis. In particular, it is worth mentioning the universities and laboratories in Canada, Russia and the USA, which provided most of the knowledge till the date. However, the results of research in the field of DNA, C14, forensic medicine, implant analysis have not aroused serious interest on the part of the scientific community or the general public. This contempt, the failed requests for help to the Ministry of Culture, the inadequate preservation of mummies, and much more, has prevented the development of extensive research work to this day.

3.1 Theoretical foundations

The topic of this research work has links with archeology and social history. Several theoretical references became evident from the development of the topic and the questions. research.

While many disciplines develop theories deductively and apply them to empirical reality, archeology works in an exploratory and theory-generating way, it is That is, it develops theories from empirical material and proceeds inductively.

The theory of cultural relativism, which tries to avoid classifying other cultures based on

own cultural imprint and worldview, offers very interesting approaches in relation to this job. Cultural relativism recognizes the diversity of cultures and postulates that cultures do not They can be evaluated or compared from the point of view of another culture. Phenomena cultural, such as those that could emerge from a more careful analysis of the mummies of Nasca and the probable site where they were found, can only be understood and evaluated in a ethnic perspective in its own context.

These theoretical foundations need to be kept in mind at any time, also in a purely technical research.

3.2 Related research

Related research on subareas of this topic has been conducted at various institutions in Asia, Africa, Europe and Australia.

There has been evidence of tampering and forgery of mummies in Egypt since the antiquity. A few decades ago, the sarcophagus of a supposed Persian princess was examined; in At that time, with the help of common methods such as C14 and handwriting analysis, was able to prove a forgery beyond a doubt.

Nowadays it has become difficult for artifact forgers, especially because of the advances in the field of DNA research and C14 analysis, that his fraud could resist scientific analysis.

3.3 Preliminary work of the research project

The preliminary work of the research project is based on the one hand on the evaluation of the press conference at the Peruvian congress in December 2018, in which the then Deputy Villanueva advocated for further investigation of the Nasca mummies and for This called for a press conference with international participation.

As experts, he received specialists from Peru, Mexico, Colombia, France and Russia in the areas of forensic medicine, general biology, DNA analysis and archaeology.

Additional results came from funding from Inkarri, an NGO from Cusco, GAIA and Tercer Milenio, the last two are organizations that receive little credibility due to

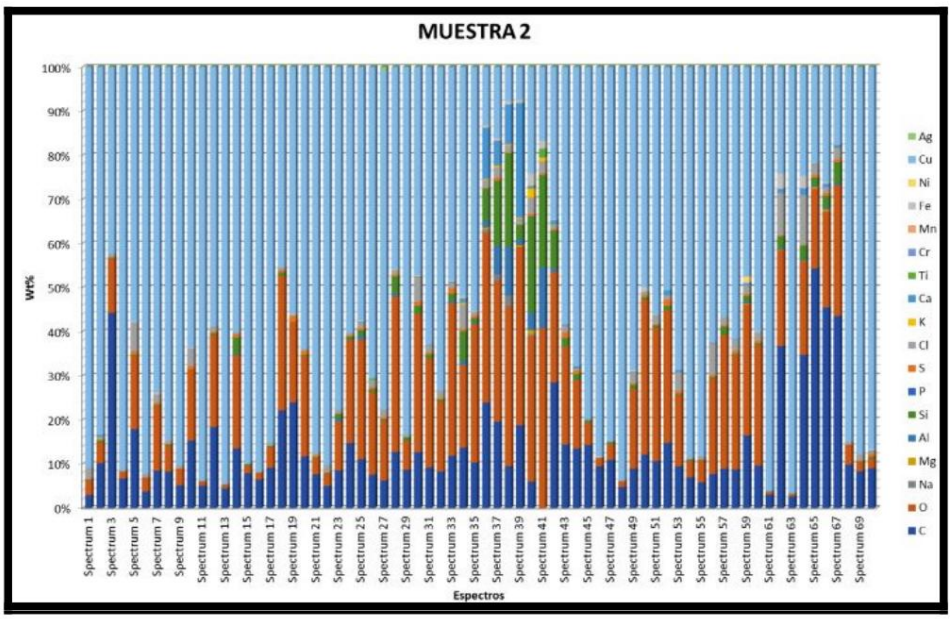
international scientific level for its relations with the field of ufology.

Most of this involves analyzing genetic material and creating images of computed tomography (CT) and x-ray of the mummies. Metal implants, which do not were missing in any of the small mummies presented so far, they were always mentioned and described as far as possible.

3.3.1 INGEMMET report, February 2017

In February 2017, the Inkarri Institute in Cusco published the results of the microanalysis elemental carried out by EDS (Spectroscopy of Energy Dispersion) and INGEMMET to six samples sent by the INKARI-CUSCO Institute.

The first sample is composed of several fragments extracted from the pectoral implant of the mummy called Josefina, which three of them are collected for analysis. 5 were analyzed



regions in the collected fragments and a total of 70 spectra were performed with elemental mass concentration measurements for each region. Additionally, map EDS of the elements carbon, oxygen, silicon, sulfur, chlorine, calcium and copper for one of the three fragments. The set of mass concentration measurements performed in EDS for each zone compiled in the following summary bar chart.

The sample consists mainly of metallic copper (on average 85% by mass in the region purer) and some alteration has been observed to form oxidation products such as

cuprite or plagioclase or alteration minerals such as Atacamite or Brochanthite. This copper also contains impurities (iron, sulfur, etc.) that may be characteristic of the minerals from which the copper used to design the implants was extracted. These impurities They may also indicate the extraction method used, in particular the presence of sulfur (probably chalcocite-type sulfides).

Sulfur and chlorine levels in alteration products (e.g., atakam) may indicate a alteration that occurs in an atmosphere rich in chlorine and/or sulfur, such as in a coastal or volcanic environment. This sample also has mineral chemical signatures (carbonates, silicates, salts) that can be exogenous contributions (groups around the implant) or the result of crystallization in situ under specific conditions.

There is also a mineral chemical signature (carbonate, silicates, salts) for this sample, which under certain conditions it can be the result of an exogenous contribution (gauge surrounding the implant) or crystallizations in situ.

In the context of the research, this sample corresponds to an object from the time pre-Columbian in terms of its chemical composition (copper, whose purity -perfectible- is totally compatible with the refining methods known and available at the time). Furthermore, the oxidation and weathering products observed involve slow and therefore help confirm the age of the sample object unless it has been exposed to a very aggressive environment (pollution). The mineral signature observed also would point in this direction in the case of in situ crystallization (slow process)

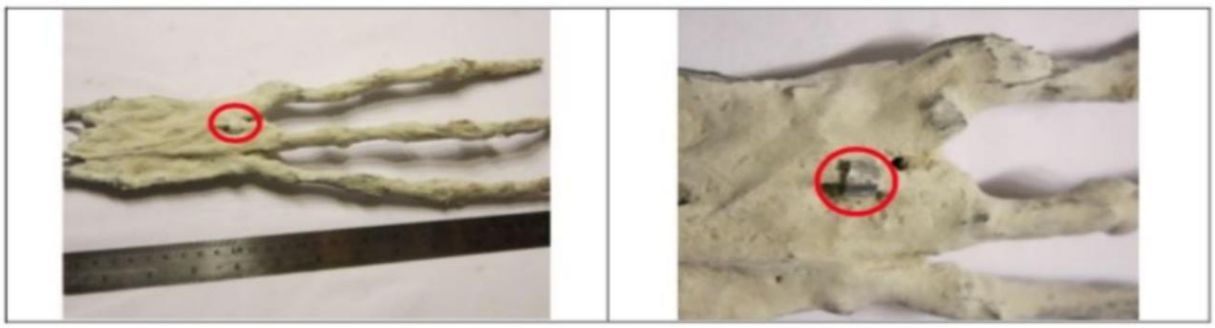
3.3.1.1 Lot n°1 - sample 03: annular metal implant of a tridactyl hand

A. Presentation

Sample: fragment extracted from an annular implant of the tridactyl hand that the doctor Paul Ronceros delivered to the INKARRI-CUSCO Institute.

Figure 7.

Photographs of the tridactyl hand where the source object of the sample 03 of lot n°1 (surrounded in red).



B. Summary of SEM/EDS characterization results

For this sample, 4 areas were analyzed in the sampled fragment, carried out for a total of 27 spectra, each with a measurement of elemental mass concentrations. Also An elemental mapping was performed on a part of the fragment.

Figure 8.

SEM image (left) and EDS acquisition spectrum (right) of sample 03 of batch 1. This spectrum shows a zone rich in iron Fe and chromium Cr, as well as the presence of manganese Mn.

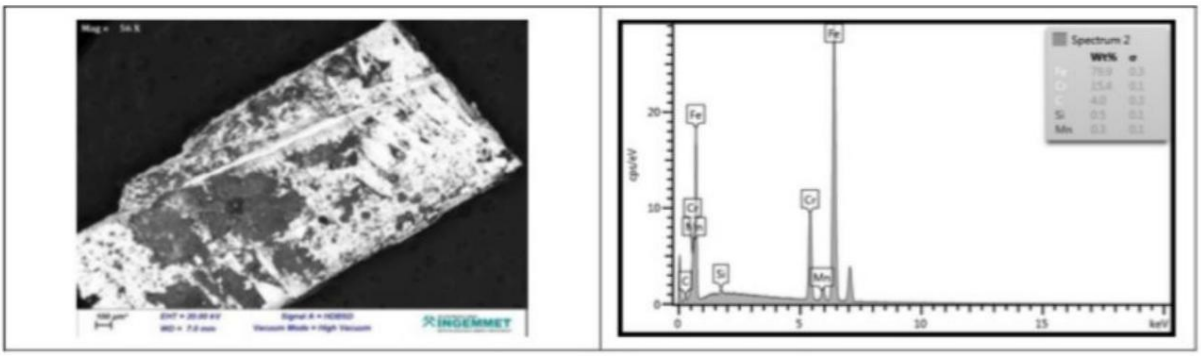
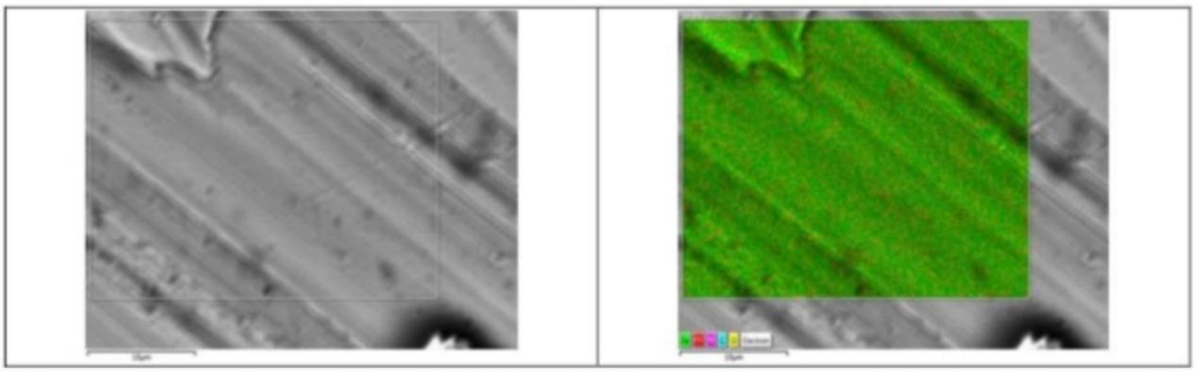


Figure 9.

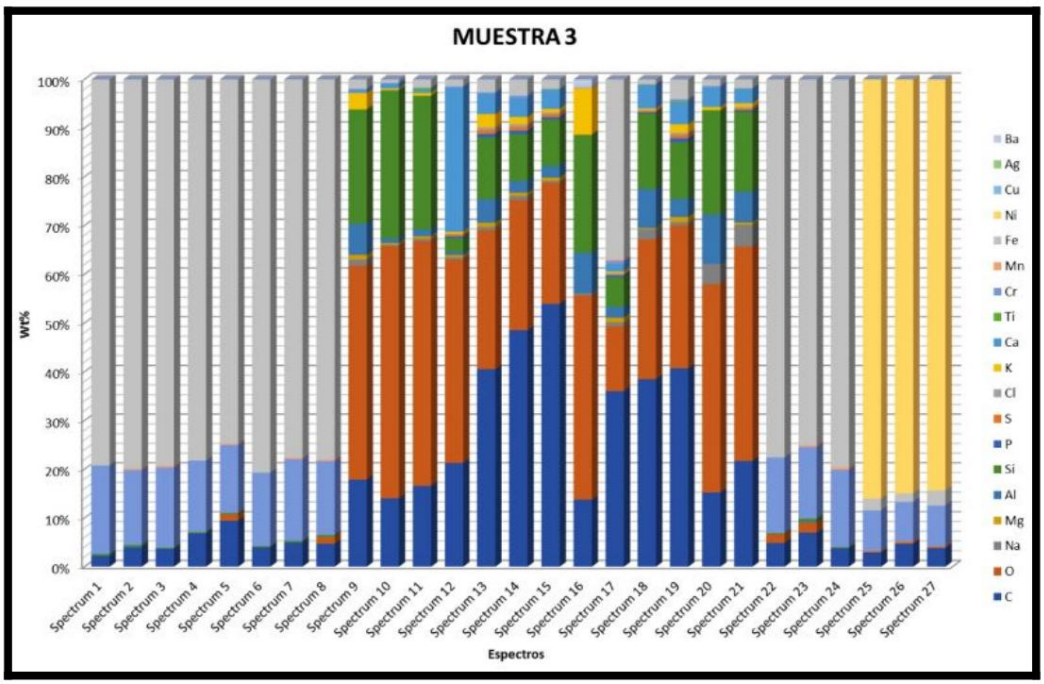
Elemental mapping with elements (C, O, Si, Cr, Fe) of an area of the fragment of sample 03 of lot n° 1. Chromium is located punctually, in the form of small inclusions.



To conclude, the set of
mass concentration measurements carried out in EDS for each zone:

Figure 10.

Summary table of EDS mass concentration measurements in the sample 03 / batch no. 1. We observed the concentrations of iron, chromium, as well as such as elemental mineral and signature nickel, confined to a single area.



This sample consists of an iron-carbon alloy (average 78% iron by 5%
carbon) rich in chromium (average 16%), however, the EDS analysis does not allow making a decision on whether it is steel (stainless) or cast iron (white). It is observed that this alloy does not contain nickel in its intrinsic composition, on the one hand, does not contain nickel, on the other On the other hand, it is detected locally in one of the analyzed areas in an almost pure concentration (average of 85%), which would indicate the existence of a nickel passivation layer for this sample (hypotheses to consider, apart from a possible exogenous contribution, for example, to through contamination). So, for this sample, there would plausibly be

electrodeposited (chemical or electrolytic bath) a steel or cast iron, perhaps coated on the surface with a layer of nickel. A mineral-chemical signature is also observed in this sample, which is probably of exogenous origin (mineral gangue).

C. Discussion of the results in the context of the study.

For study purposes (apart from considerations of elemental compositions: steel or cast iron, electroplating with nickel, etc.), the main "problem" with this sample is that Currently there are no pre-Columbian manufactured objects that contain objects Manufactured from an iron-based alloy. The main reason is purely technical: the civilizations of the time did not master and/or know the necessary techniques to extract and process iron.

The only alternative to explain this fact within the hypothesis of an object created by A pre-Columbian civilization with that characteristic would be that the original object from which parts they took contained native iron of meteoritic origin (observed in other civilizations ancient), with an equivalent chemical composition.

3.3.1.2 Lot 1 - sample 04: metal implant of a tridactyl hand.

A. Presentation

Sample: composed of several fragments extracted from a disc-shaped implant, from a of tridactyl hands. Three fragments were taken from this sample for analysis.

Figure 11.

Photographs of the metal implant from which sample 04 / lot 1 is extracted.

B. Summary of SEM/EDS characterization results

For this sample, 3 areas were studied on the collected fragments, for a total of 23 performed spectra, each with a measurement of elemental mass concentrations. An elemental mapping was also carried out.

Figure 12.

SEM image (left) and EDS acquisition spectrum (right) of sample 04/ batch 1. This spectrum shows a zone rich in silver Ag and gold Au, as well as in the presence of copper Cu.

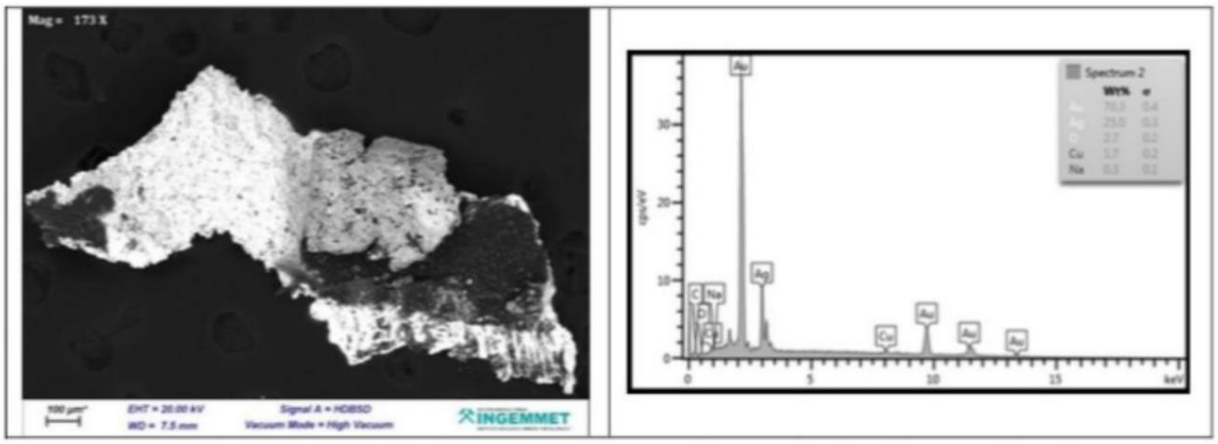
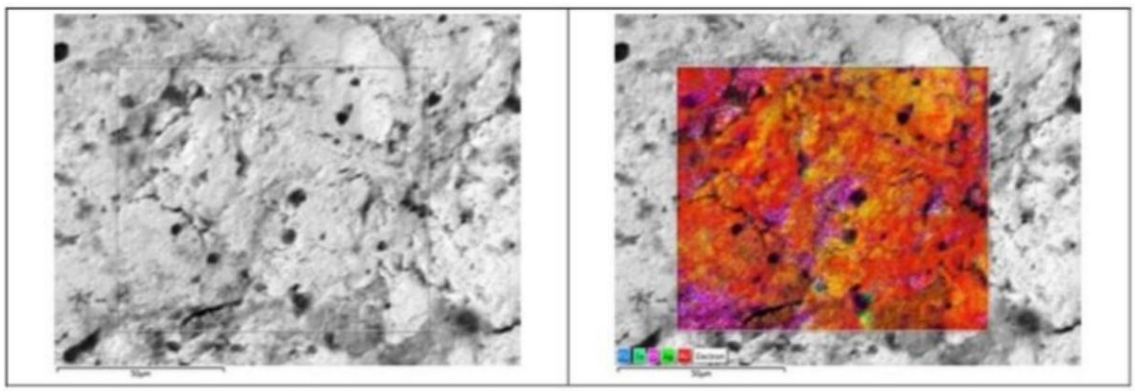


Figure 13.

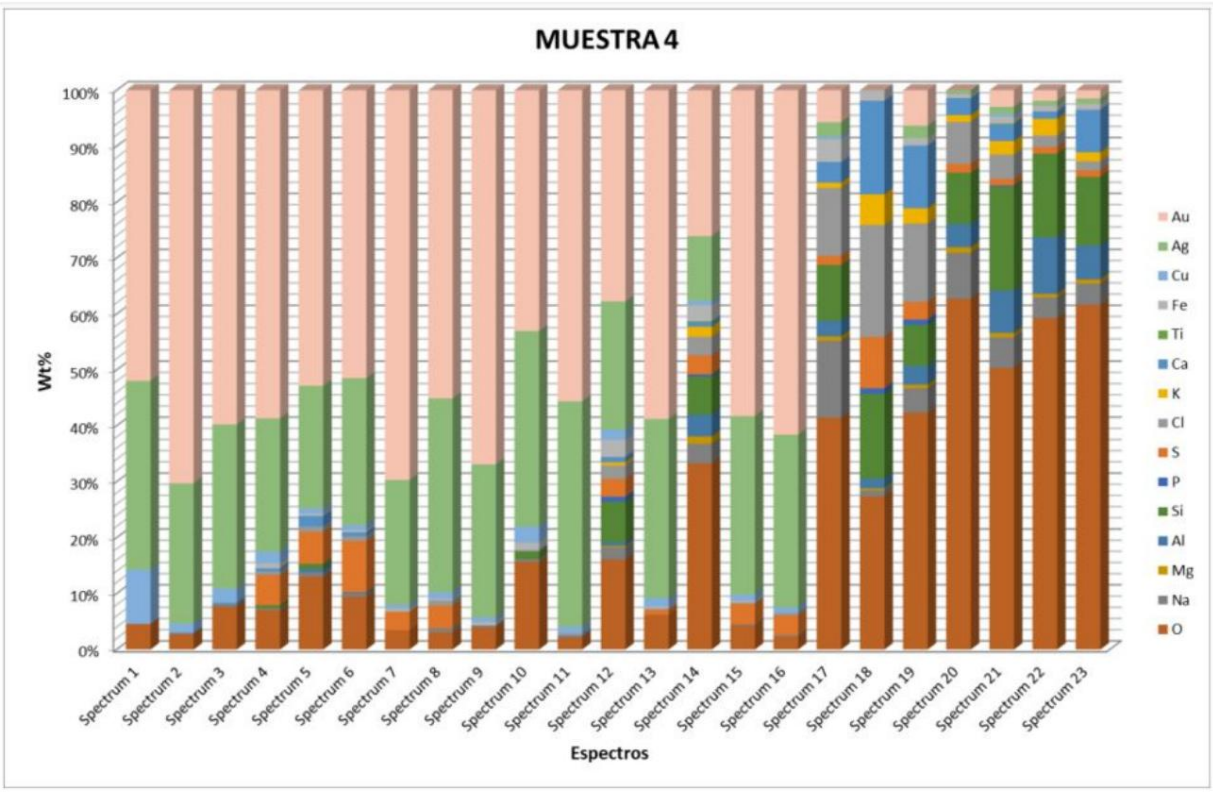
EDS elemental mapping of a sample 04 zone of batch 1: elements O, Fe, Cu, Ag, Au.



In conclusion; The following summary bar chart compiles the set of mass concentration measurements carried out in EDS for each zone:

Figure 14.

Summary table of mass concentration measurements in EDS of the sample 04 of batch 1. The concentrations of gold and silver are almost constant, as well as a mineral chemical signature.



This sample is composed mainly of a gold-silver alloy (and to a lesser extent of copper), in an average proportion of around 60% gold to 30% silver (around 10% copper), without there being hypotheses about the possible manufacturing technique of the object of origin (see below). We observe the presence of other elements such as iron in the form inclusive if we refer to basic cartography, which could give an indication of the origin of the alloy with which the object from which sample 04 was taken was manufactured:
It could be a native gold-silver alloy compatible with Peruvian mineralogy.
It is also possible that a "depletion" refining technique was applied to the object. gilding", in which the results reveal a net enrichment in gold at the level of the

surface, in parallel to the respective decrease in copper (fig. 27).

There is also a mineral-chemical signature (carbonates, silicates, salts) as a result of an exogenous incorporation (mineral gangue that surrounds the sample) or in situ crystallizations (slow processes in favor of certain conditions that would testify to the age of the object fountain).

C. Discussion of the results in the context of the study.

This gold and silver alloy shows a composition quite consistent with alloys used in pre-Columbian times. The presence of impurities such as iron inclusion goes in this direction, a plausible indicator of the use of native gold and silver alloy for the design of the object, in the absence of processes fully controlled by the metallurgist pre-Columbian for the production of this type of alloy. It would also be plausible that (in the piece examined) a "reduction gilding" type alloy has been used, including a gold-silver-copper alloy characteristic of many objects from the pre-Columbian era and much richer in copper in mass proportion, the “tumbaga”.

3.3.1.3 Lot 2 - sample 01: Albert hip implant.

A. Presentation

Sample: fragment extracted from the right hip implant of the mummy Albert, which has the geometry of a disk if reference is made to photographs, x-rays and tomography scans available.

Figure 15.

Photographs of the organism where the source object of sample 01 is implanted from lot 2 (surrounded in red).

B. Summary of SEM/EDS characterization results

For this sample, 3 areas were studied in the sampled fragment, for a total of 13 performed spectra, each with a measurement of elemental mass concentrations.

An elemental cartography (chlorine, copper, silver) is also presented in the introduction.

Figure 16.

Elemental mapping of sample 01 of batch 2 (Cl, Cu, Ag). The distribution seems homogeneous at this scale.

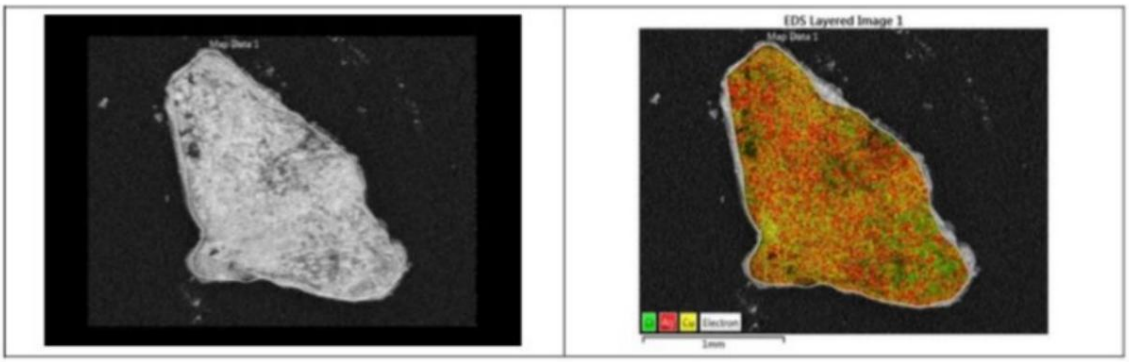
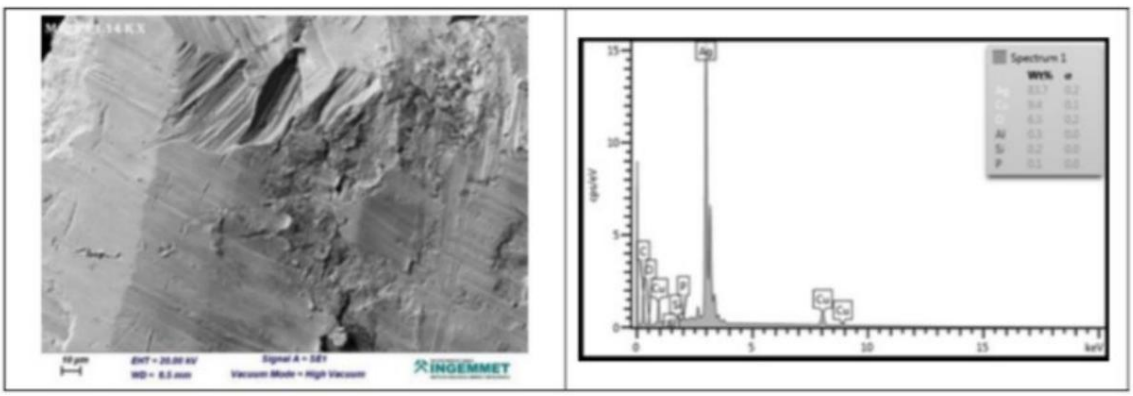


Figure 17.

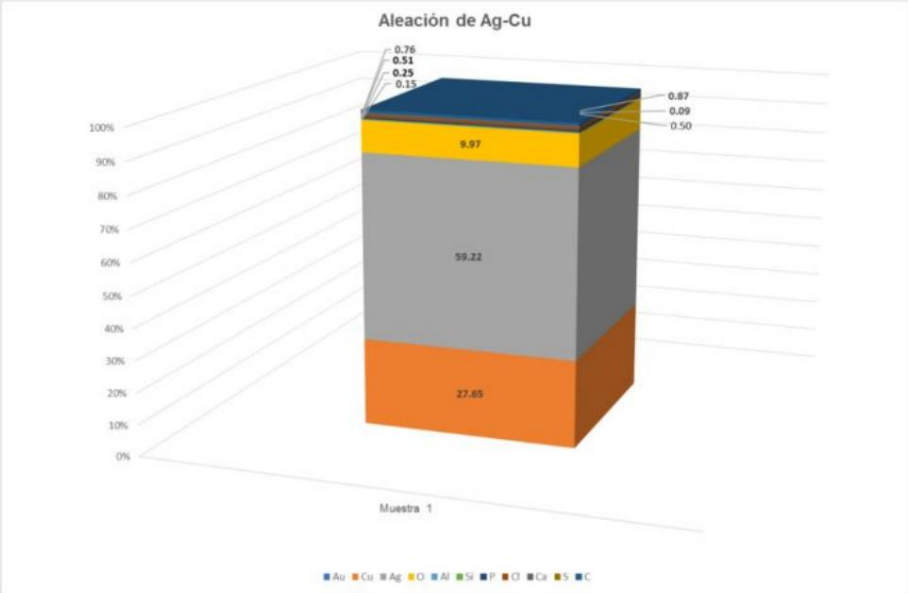
SEM image (left) and EDS acquisition spectrum (right) of sample 01/ batch 2. This spectrum shows an area rich in silver Ag, as well as the presence of copper Cu.



To conclude, the following diagram averages and represents all measurements of mass concentration carried out in EDS for each zone:

Figure 18.

Summary diagram of mass concentration measurements performed in EDS in sample 01/ lot 2. This sample mainly consists of a copper-silver alloy with traces of gold.



This sample consists of a copper-silver alloy with a mass ratio of approximately 10% copper for 90% silver up to 10% silver for 80% copper, depending on the area analyzed. These differences are due to several factors:

The main ones are the composition of the alloy used to manufacture the part (ratio copper/silver that favors certain microstructures), the manufacturing process used (casting, cold forging, part finishing, etc.) and the orientation of the sample during the analysis (also conditionally through its extraction from the source object). Also there is a chemical-mineral signature (carbonates, silicates, salts) that could also be organic origin due to the elements involved, in particular phosphorus, which plays a role in bone composition.

C. Discussion of results in the context of the study.

In the context of the study, the composition of this sample is fully consistent with the standard compositions listed for pre-Columbian objects made of an alloy of copper and silver. The microstructure observable in the topographic images suggests that the object was created by "cold" stamping of copper and silver alloy sheets using striking, a technique also known to shape many objects of the period pre-columbian

Regarding the biocompatibility of an implant constructed with an alloy of this type, considering the chemical activity of copper and silver according to the context (pH, ...), - the histological consequences with respect to a living organism would be uncertain and would require the advice from a specialist.

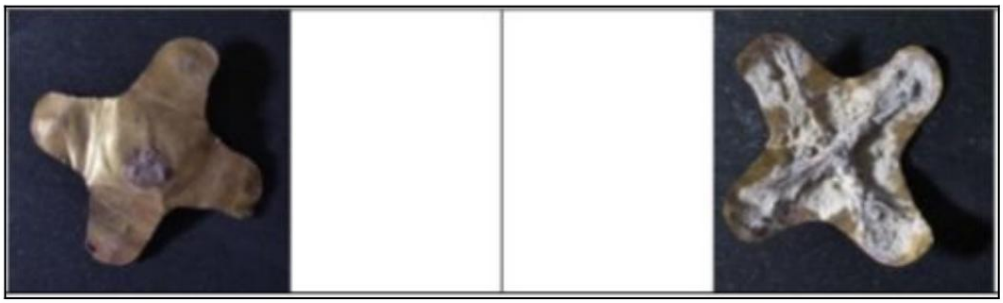
3.3.1.4 Lot 2 - sample 02: metal object in the shape of a cross.

A. Presentation

Sample: two fragments extracted from a cross-shaped metal object.

Figure 19.

Source object of sample 02 of batch 2. We note the presence of possible minerals at the bottom.



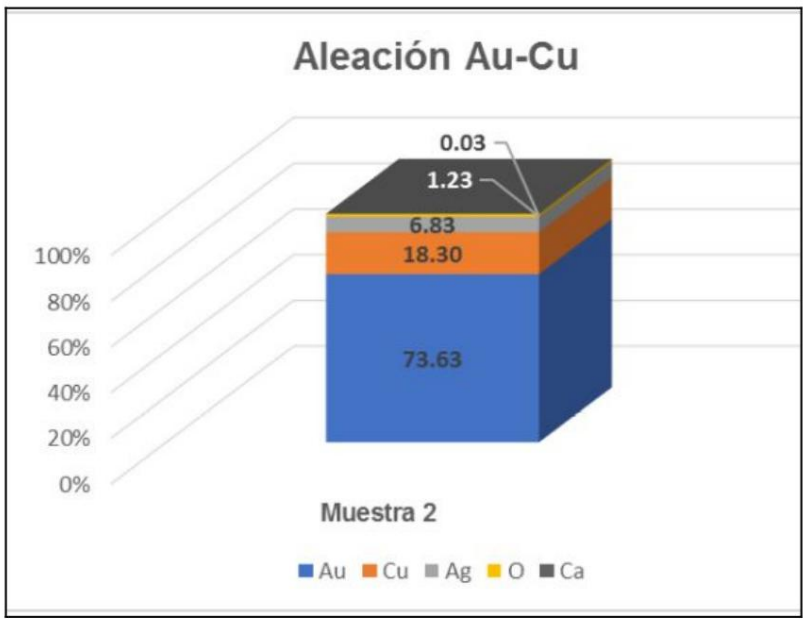
B. Summary of SEM/EDS characterization results

For this sample, 3 areas were studied in the sampled fragment, for a total of 13 performed spectra, each with a measurement of elemental mass concentrations. An elemental cartography (chlorine, copper, silver) is also presented in the introduction.

In the following summary diagram, all measurements of mass concentration performed in EDS for each area of this sample

Figure 20.

Summary diagram of the mass concentration measurements performed in EDS in sample 02 of lot 2. This sample consists mainly of an alloy of gold and copper, or tumbaga, with traces of silver.



This sample presents the chemical composition of a gold and copper alloy (with a little silver, on average 5 to 7% by mass), called *tumbaga.* The average ratio of gold/copper mass concentration varies from about 8% copper, 85% gold to 26% copper and 65% gold, depending on the areas analyzed. The analyzes also show a mineral chemical signature (carbonates, silicates), possibly induced by pollution exogenous.

C. Discussion of the results in the context of the study.

For the purposes of the study, the gold-copper (-silver) alloy that constitutes this sample is characteristic of pre-Columbian manufactured goods, it is called Tumbaga.

Tumbaga technique (also Tumbago) is an alloy with the main components gold and copper. The copper content can reach up to 70%. Tumbaga has a point of lower fusion and higher hardness than gold.

Many objects of this alloy are listed. It is also interesting that the differences in The concentration measurement would result from a technique for refining objects of tumbaga, gilded by "reduction", a technique regularly used by metallurgists pre-Columbian to embellish designed objects. The hypothesis of the application of this technique on this object is confirmed by the porous texture of the surface in areas unaltered, a porous texture visible in the SEM image and created in topographic contrast. This example offers numerous clues that refer to an ancient origin.

D. Additional comments

For all metal samples it should be noted that none of them show traces of arsenic (As) according to chemical microanalysis by EDS. Considering the context of the study, This may be an important indicator of the origin of the objects (pre-Columbian period): the Arsenic, first used by the Mochicas, was sometimes added to alloys as a hardener, which is why it can be found in various objects from the time pre-columbian It is also noted that this element may or may not be present in the minerals used to make the alloys used, which may indicate the place of origin of the minerals used to manufacture the alloys (Petersen G. Georg, William E Brooks, *Mining and Metallurgy in Ancient Peru)* in relation to the culture that designed the objects, in addition to the extraction and manufacturing processes used.

The same observation can be made for the element tin Sn, of which no traces in the elemental microanalysis of the various metal samples. This metal, which used to make bronze (copper-tin alloy), it was only used significantly by pre-Columbian civilizations (about 1400 years ago) since the end of the Moche culture / beginning of the Inca culture, based on the analysis of the available chemical compositions and its use in the manufacture of various artifacts from this period (Petersen G. Georg, William Av. Túpac

E. Brooks, *Mining and Metallurgy in Ancient Peru).* Tin in the alloys above
This period is present only as an impurity (source of the minerals used). The
absence of tin in the various metal samples examined, may be a strong
indicator of the production period of the corresponding source objects in the context of the
study (pre-Columbian civilizations)

3.4 Own preliminary work

A first phase of field research in the Ica desert and in the vicinity of
The famous Nasca glyphs by Sabine Cremer had as a precedent to prove the
research hypothesis regarding the probability of the presence of unknown creatures
by history at the time of the Nazca culture and its predecessors and successors. For this
In the first phase of field research, research questions were formulated and
They chose different methods for their research.

3.4.1 Documentary method and qualitative interpretation of images

There are several reasons to opt for the qualitative interpretation of images using
petroglyphs and the documentary method, which are directly related to the topic of
chosen research.

The documentary method dates back to Karl Mannheim and was developed by Ralf Bohnsack.
Within the documentary method, the image is understood as “a means of meaning
'idiosyncratic' that must be distinguished from language.” The image is understood as a
document for a context of meaning. This idea dates back mainly to the historian
of art Ernst Panofsky, who applied this idea primarily to works of fine art.
Panofsky is concerned with the “real” meaning of the image, with self-revelation not
desired and unconscious of a fundamental attitude toward the world that is equally
characteristic of the individual creator, the individual epoch, the individual people, the community
individual cultural (...).”

For Panofsky, the image is a historical document because it can be used to “reconstruct
the worldview or habits of a specific era.”

Other methodological approaches take up this idea. They not only see the image historically as

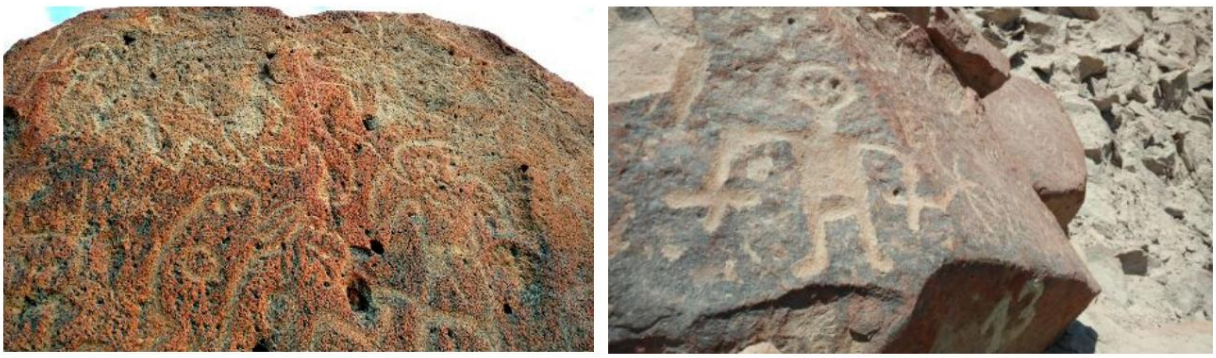
a document of an era, but they also see it in other contexts, such as the context of the phases of development (Wopfner...)". Because the meaning of an action is not a matter individual but social and often collective. Basically, it is the difference between that shows an image and how an image is designed.

3.4.1.1 Research in petroglyph fields

On one of the visits to Ica he went to the petroglyph field in Palpa, approximately 100 meters from the beginning of the route built by the Ministry of Culture.

Figure 21.

Photos: rock in the Palpa petroglyph field (left), rock with image of tridactyl (right)



Source: Sabine Cremer.

At the archaeological site, several petroglyphs of tridactyl beings were found, one of them turned out to be severely damaged, possible factors for this are human intervention or influences climatic conditions responsible for erosion of the upper layer of the rock over time.

On a trip to the region of Arequipa, Valle de Majes, some similar images were found, although much smaller in the Toro Muerto petroglyph field.

According to Peruvian archeology studies, the petroglyphs of Palpa in the department of Ica were created by the predecessors of the Nazca culture, and some of the glyphs appear to be even older. There is no consensus among scientists on this.

You can see above all facts of daily life and the representation of the environment, which included everything between heaven and earth, such as people, animals domestic and wild, stars, sun, moon, rivers and mountains. In addition, beings were represented that do not look like humans or animals, if anything, only in parts.

Figure 22.

Petroglyphs of creatures with three fingers at the Toro Muerto archaeological site, Arequipa

Source: Sabine Cremer.

Figure 23.

Sabine Cremer with petroglyph of a tridactyl in Toro Muerto (left), the same petroglyph with more contrast (right)

The situation is similar in the extensive Toro Muerto petroglyph field in the department

from Arequipa, approximately three hours from the city of Arequipa.

3.4.1.2 Interviews with experts

In mid-October 2021, to answer the first research question: What
What do the experts involved say about the discovery? Do the hypotheses already formulated have meaning under your criteria? An interview was conducted with experts in the field of anthropology and medicine.

4 RESEARCH MATERIALS AND METHODS

4.1 Exam I

4.1.1 Materials and samples

A combination of different methodological approaches seemed sensible when analyzing the Research Questions Formulated: A Combination of Standardized Surveys quantitative and qualitative interpretive procedures.

Przyborski and Wohlrab-Sahr write in their book: “(...) knowledge of different approaches methodological and its basic assumptions (...) can help to recognize more in the field and about the empirical material base of what one might be possible from a mono point of view paradigmatic".

- Microanalysis methods used in this research
  - Equipment used:
  - SEM: Scanning Electron Microscope
  - Stereographic Microscope
  - Inverted Metallographic Microscope
  - Image Capture
  - X-ray diffractometer
  - Polishing Tables
  - Abrasives for Grinding and Polishing
  - Optical microscopy

The mummy found has alloys adhered to different parts of its bone structure, therefore which cannot be assured at first glance that it is the same alloy. The Scanning Electron Microscopy is a non-destructive method, it is very well related to the chemical characterization of an alloy, in order to determine its properties chemical and physical.

The Scanning Electron Microscope or SEM (Scanning Electron Microscope) is one that uses a beam of electrons instead of a beam of light to form an image. It has a great depth of field, which allows a large part of the sample to be focused at once.
It also produces high-resolution images, which means that spatially nearby in the sample can be examined at high magnification.
The greater the number of electrons scanned in the device, the brighter the image will be. image on the screen, as the electron beam scans the sample you will see the entire image on the screen, a scanning electron microscope can magnify an image up to 200,000 times more, this being its greatest advantage compared to a microscope optical.

To ensure that the skin is free of cuts or other manipulations typical in mummies falsified, optical microscopy was used. This method allows the digital microscope to be passed above the entire surface of a mummy. Taking a sample does not apply in cases where that an examination of an entire surface is required.

4.1.2 Examination of samples from the Luisa mummy

4.1.2.1 Preparation

The preparation was carried out under technical standards:

- ASTM E3 «Preparation of metallographic samples»
- ASTM E 407 «Micro attack of Metals»

Used technical manuals:

- ASM Metals Handbook «Metallography and Microstructure»
- ASM Metals Handbook «Atlas of Microstructures»
- ASM Metal Handbook «Fractography»

The following material was evaluated by multi-elemental spectral analysis:

No.	SAMPLE	SAMPLING	WEIGHT (mg)
1	skull bone	on site	twenty
2	abdomen tissue	on site	twenty
3	leg tissue	on site	twenty
4	egg material	sample supplied	10
5	diatomite	on site	5000
6	splinters of plate metallic	on site	7

Figure 24.

Extraction of egg material from the body of the mummy Luisa (source:

ZDF channel - Terra

A sample of the Luisa mummy's implant was also analyzed.

4.1.2.2 Processing

In this method of analysis the sample is dried at 100°C, then pulverized and placed in spectroscopic graphite electrodes, and subjected to a flow of electrons that produce characteristic electronic transitions of each element in the sample minus elements gaseous. Analytical determinations are made based on wavelength and intensity of each element that makes up the sample, limited by the weights of each sample.

4.1.2.3 Results

The results have not been published and only revealed in detail to a small circle. of people so far for personal reasons of the specialists involved in the investigation. In this context it refers to point 1.3 of this report, and is presented only a summary of certain analyses.

From the results of the analysis of the implant sample by electron microscopy of scanning (SEM) and x-ray diffraction where the presence of chemical elements predominates such as copper (Cu) followed by tin (Sn), silver (Ag), osmium (Os), carbon localized zone of the sample presence of the transition element Osmium (Os) also, material is observed compact copper (Cu) base alloy, there is no presence of arsenic and nickel.

Osmium is the densest material that exists and the hardest metal, the "hardness" is applied Brinell", that is, hardness is measured by the depth of penetration.

The fact that this metal is so dense means that the individual atoms are very dense and compact with each other. And precisely for this reason they also have a high melting point: Osmium melts at more than 3000 °C.

This high melting temperature was also one of the reasons osmium was used as a conductive metal in the first light bulbs, that is, as filaments.

Osmium is considered the most valuable precious metal in the world. Of particular interest is the rarity of the metal, which raises the price. One gram of osmium costs about 1,869.48 euros.

If the Nasca tridactyl mummies are fake, then the question arises as to why the counterfeiters used the world's most expensive precious metal when they could have included

any other metal.

Considering diatomite predominates as a major element (greater than 10%), the presence of Yes, and minor elements (between 10 and 1%) are aluminum (Al), iron (Fe), magnesium (Mg), sodium (Na) and potassium (K), as trace elements (between 1 and 0.0001 %) calcium (Ca) is observed, titanium (Ti) and phosphorus (P).

From the results of the analysis of metal plate chips where copper predominates (Cu), then there is a lower percentage of tin (Sn) and trace elements such as silver (Ag), magnesium (Mg) and sodium (Na).

4.1.2.4 Problems

According to the report of the laboratory involved, metal analyzes were carried out by diffraction of X-rays. X-ray diffraction, also known as x-ray diffraction (XRD), is the X-ray diffraction in ordered structures such as crystals or quasicrystals. In principle, the X-rays show the same diffraction phenomena as light and all other waves electromagnetic. X-ray diffraction is used in materials physics, crystallography, chemistry and biochemistry to examine the structure of crystals, so-called diffractometry X-rays.

The XRD method is not considered the most useful when it comes to metal analysis. But I know reports its use in the analysis of thin layers, thin layer or film (from English), which means layers of solid materials in the micro or nanometer range. These thin layers often exhibit a physical behavior such as resistance or electrical conductivity among others, which differs from of solid bodies of the same material. In this way, it is also possible to achieve properties that would otherwise not be available. Thin layers are used in finishing of surfaces and microelectronics.

4.1.3 Examination of the skin of the Albert and María mummies

4.1.3.1 Preparation

The analysis of the skin of Albert's mummy was carried out with the Gloptics digital microscope. U1600X for magnified view of a surface up to 1600x.

The main objective of the investigation was to look for anomalies such as cuts, stains of glue among others, to begin a detailed investigation of the mummy later regarding a forgery, if any.

The first mummy analyzed was that of Albert, which was placed on an examination table of such so that the front part of the body was freely accessible.

When examining the mummy Maria, only parts of her could be scanned with the microscope mentioned. Removing the mummy from its display case involves too many risks such as falling parts from the feet.

To protect the bodies of the mummies from contamination, safety measures were applied. Proper precautions, such as the use of masks, surgical gloves, and aprons disposable.

4.1.3.2 Processing

In an examination using a portable digital microscope, freely accessible body parts are examined step by step through the instrument, and photographs of various parts are taken with preference of the same surface structure, as well as anomalies, and the images obtained in detail.

Figure 25.

Reptile and details of its keratin epidermal scales

Source: schubu.at, «46. Merkmale der Reptilien).

Figure 26.

Albert mummy skull, 1600x magnification, scaly skin details

epidermal, in parts covered with diatomite. Source: Sabine Cremer.

It was not possible to examine in detail all areas of the body of the mummy Mary due to the lack of

Microscope supports that adapt to the reduced space of the display case.

More micrographs of this mummy are required, for example, for the field of archaeology, in order to evaluate the surface with respect to its nature and typical characteristics.

4.1.3.3 Results

In the subsequent analysis of the photographic material taken during the examination, it was possible to see a skin structure similar to that of reptiles, that is, in the form of scales.

It should be noted that the similarities are more related to lizards from the reptile family. Lacertidae within the order Squamata.

Crocodiles, for example, which are considered reptiles in a broader sense, are more related to birds than to other reptiles. Although crocodiles have been found 2,500-year-old Egyptian mummified bodies, a comparison of those mummies with the of Nasca would be in vain because of how little they have in common.

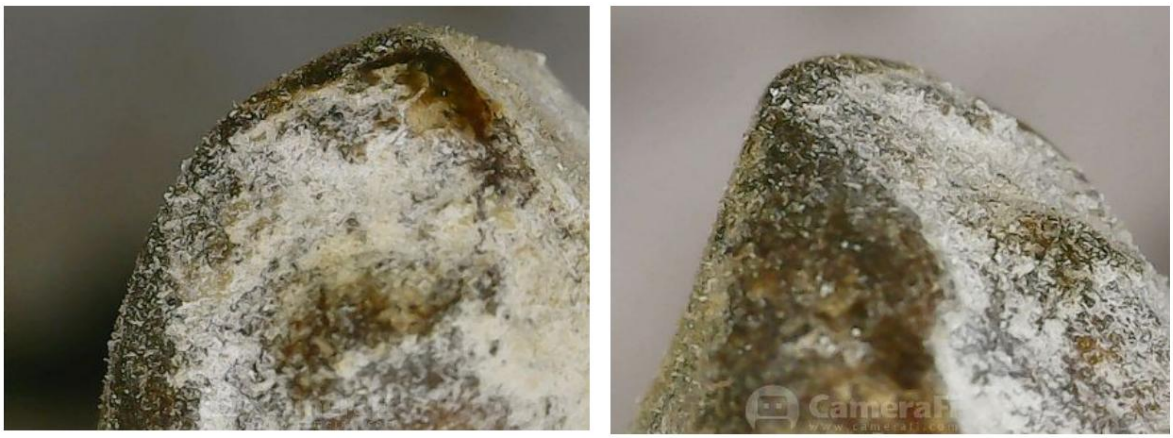
Figure 27.

Mummy Albert, left. mouth (some objects or tissues are seen in the oral cavity); to the right finger of the right hand without fingerprints, an orange color is noted- reddish in parts of the phalanx of the finger

Source: Sabine Cremer.

Figure 28.

Mummy Mary, tip of the finger of the right hand with nail, two angles different, you notice yellow spots and areas in this part of the finger



Source: Sabine Cremer.

Figure 29.

Left eye of the mummy Albert

Source: Sabine Cremer.

Figure 30.

Mummy Maria, tip of the toe of the left foot, brown spots are observed. reddish in parts of the skin and nail

Source: Sabine Cremer.

As can be seen in the previous photos, the Albert and María mummies present a dark gray skin with epidermal scales. In order to be able to say with high probability if the skin of The mummies do not contain even the slightest cut or drop of glue (regardless of the cadmium at this point), more micrographs are needed, which should be taken after the mummies have been completely cleaned of diatomaceous earth.

The orange to reddish brown spots or areas seen on certain parts of the skin of the Tridactyl mummies are probably the result of cadmium that has been found on top of the skin and underside of diatomaceous earth.

Cadmium pigments are some of the most durable pigments known, little affected by exposure to light, extreme weather conditions or use in

high temperature environments. Cadmium sulfide (CdS), which is golden yellow in color, is the cadmium base pigment. By substituting zinc for part of the cadmium in CdS, a range of yellows - deep gold [1.9% zinc sulfide (ZnS)], gold and lemon-yellow to primrose-yellow (20% ZnS).

The replacement of mercury by cadmium produces a range of orange-reds:

deep orange [11% mercury sulfide (HgS)] through light red, medium red and red dark to maroon (26.5% HgS). Pigments containing mercury are less expensive, but they are less stable at high temperatures and bad weather. The replacement of selenium by of sulfur in CdS also produces a variety of orange-red: light orange [15 per cent cadmium selenide (CdSe)] to light red, medium red and dark red to garnet (65% CdSe).

An extensive study of cadmium is recommended to know with certainty the exact composition of cadmium in the skin of tridactyl mummies.

In 1817, Friedrich Stromeyer and Carl Samuel Hermann independently discovered cadmium in contaminated zinc carbonate. Stromeyer noticed that impure zinc carbonate discolored when heated: a behavior that zinc carbonate did not exhibit pure. For almost 100 years, the metal was only mined in Germany.

Figure 31.

Left to right: vice-rector M. Alarcón, Sabine Cremer, Dr. Hernández together with the mummy Albert tridactyl.

Cadmium is obtained as a byproduct of the smelting of zinc and lead-zinc ores. Most cadmium is extracted by zinc hydrometallurgical plants, generally called zinc electrolytic plants. Smaller quantities are obtained by plants zinc pyrometallurgical plants and by lead smelters that process lead-zinc ores. Zinc processing is based on the reduction of the metal from oxides. The zinc concentrates, which are sulfides, and typically contain 0.5 to 1.5 percent cadmium, are first roasted to convert the minerals into oxides and smaller amounts of sulfates.

The above mentioned leads to the question how the cadmium that covers mummies in ancient times, approximately 600 to 1700 years ago. Throughout the history some human knowledge is lost, as the cases of the battery of Baghdad and Roman cement. On the other hand, no other mummy has been found on the ground. Peruvian with traces of cadmium to this day, at least there is no report of the fact.

4.2 Exam II

In June 2023, a new extraction of samples from one of the mummies was carried out. (mummy named Edgarda) and a loose hand in the presence and by parts of the team of researchers from UNI and the University of Ica Luis Gonzaga. The samples taken There were 3, a metal sample extracted from the chest of the mummy Edgarda and a sample of mineral dust extracted from its coating, plus a sample of the loose tridactyl hand. The three samples were subjected to chemical analysis by XRD and X-ray fluorescence, in order to know its chemical composition and extract some type of information that was not initially taken into consideration. A bibliographic search was also carried out the possible origins of the samples analyzed according to the geological point of view.

Figure 32.

Mummy Edgarda with metal implants, before sample extraction

Figure 33.

Mummy Edgarda. Sample extraction.

Figure 34. *Loose hand with implant*

Figure 35.

Loose hand implant after sample extraction

4.2.1 Samples and materials

Figure 36. *Table, description of the samples and the chemical analysis performed.*

Sample	Type of sample	Analysis
Edgarga chest	Metal	X-ray fluorescence with dispersive energy.
Edgarda hand	Metal	
Coating edgarda	mineral powder	X-ray diffraction

Chemical composition analyzes were carried out using two techniques on the three extracted samples.

(table Nº1) by the LABICER laboratory (of the faculty of sciences of the national university

of engineering), for which the florescence spectrophotometer equipment of X-ray EDX 800 HS brand Shimadzu (see figure No. 1), and the X-ray diffractometer brand Panalytical (see figure Nº2).

to. Chemical composition analysis of metal samples by fluorescence X-rays

This analysis allows for qualitative and semi-quantitative information on the composition. chemistry of a solid sample, its principle of analysis is to measure the energy drop of the atoms when excited by an x-ray beam. The main advantage of this analysis is which is a multi-elemental analysis and quickly in a sample with almost no treatment prior, the technique indicated for the purposes since the metallic samples extracted do not They had a very large surface area. This analysis has the disadvantage that it only analyzes metals that are in the range from sodium to uranium on the periodic table, therefore the Light metals cannot be detected under this technique.

Figure 37. *Energy-dispersive X-ray fluorescence equipment.*

Figure 38. *Results of the chemical composition analysis by X-ray fluorescence in the Edgarda's chest metal sign.*

Element	Results	Analysis method
Silver, Ag	89.88	X-ray fluorescence
Calcium, Ca	3.61	
Copper, Cu	3.06	
Silicon, Yes	1.86	
Sulfur, S	0.78	
Iron, Faith	0.45	
Lead, Pb	0.20	
Phosphorus, P	0.16	

Figure 39. *Table of results of chemical composition analysis by X-ray fluorescence in the metal sample of the hand loose tridactyl.*

Element	Results	Analysis method
Silver, Ag	62.74	X-ray fluorescence
Copper, Cu	34.33	
Gold, Au	1.31	
Phosphorus, P	0.57	
Sulfur, S	0.44	
Silicon, Yes	0.31	
Tungsten, W	0.26	
Rubidium, Rb	0.04	

Both samples have a silver-based matrix and vary considerably in the copper content, the sample taken from the loose hands has a concentration of copper of more than 30% compared to the sample extracted from the mummy's chest. The silver Sterling is the alloy that most closely resembles the metallic sample in chemical composition. extracted from the chest of the mummy Edgarda (92.5% Ag and 7.0% Cu). It is known that in a Cu-Ag alloy copper content up to 25-30% by weight increases hardness and resistance and moderately reduces ductility and electrical conductivity. Beyond This percentage by weight, copper decreases the oxidation resistance of silver and intensifies tarnish by hydrogen sulfide or sulfur dioxide.

b. Chemical composition analysis of powder sample by X-ray diffraction

It is the only analysis that can provide information about the chemical composition in the form of phases crystalline by analyzing the diffractogram of a sample. To perform the quantification of the crystalline phases of the sample, the High score software was used under the principle of Rietveld refinement using the PDF-4+2023 library (currently the database most complete crystallographic instruments on the market). This analysis allows us to know the composition mineralogy of a sample, but only of the crystalline phases, the material cannot be quantified amorphous of it.

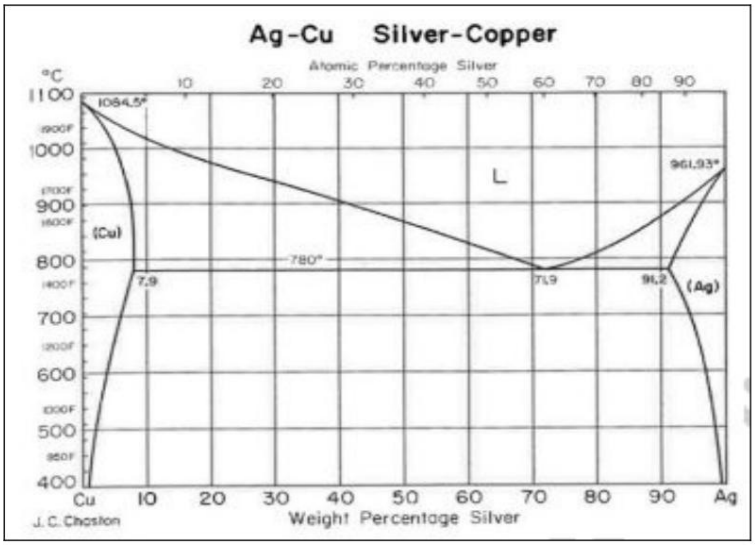
Figure 40. *X-ray diffractometer.*

Figure 41.

Results of the chemical composition analysis of the mineral powder sample.

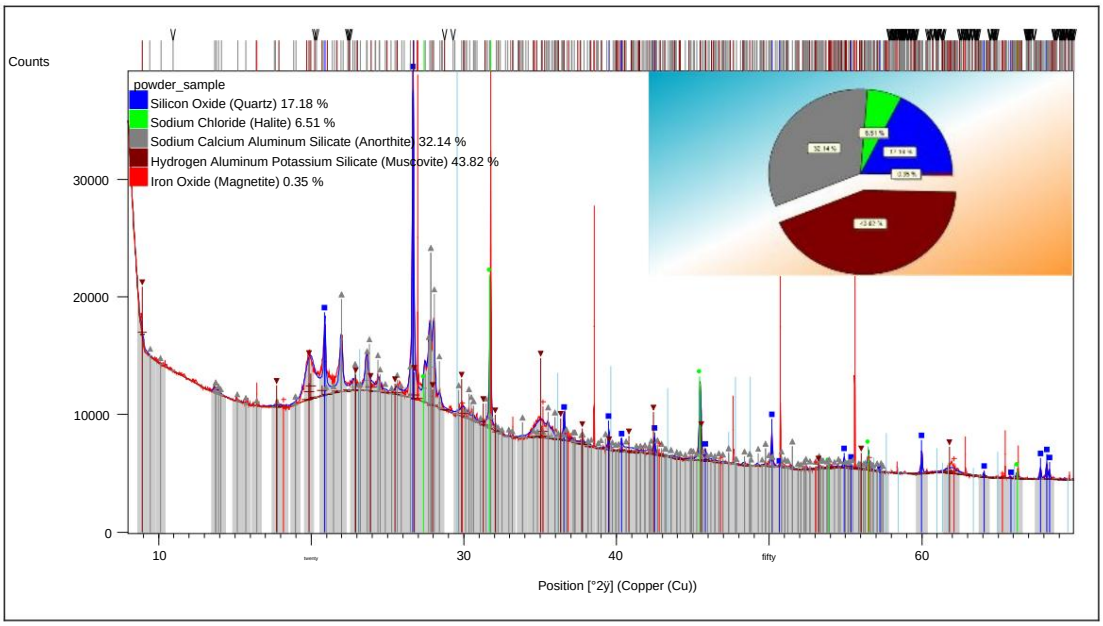
Silicon oxide	**Formula**	**Results**	**Analysis method**
compound (quartz)	SiO2	17.18	X-ray diffraction
Sodium chloride (halite)	NaCl	6.51	
Aluminum silicate, calcium and sodium (anorthite)	Na0.482Ca0.518Al1.518Si2.482O8	32.14	
Aluminum silicate, hydrogen and potassium (Muscovite)	H2KAl3(SiO4)3	43.82	
Iron oxide (magnetite)	Fe3O4	0.35	

Figure 42. *Phase diagram of the Copper – silver alloy.*



The mineral sample has a high content of silicates and the presence of sodium chloride, which is expected due to the origin of the sample, the most notable thing from its diffractometer is the presence of amorphous material that can be evidenced in the thick bands and high background of the eastern spectrum Amorphous material can have various origins, from organic to amorphous silicates.

Figure 43. *Diffractogram of the mineral powder sample.*



4.2.2 Geological approach

4.2.2.1 Tridactyl mummies from Nazca and their relationship with the various geological environments

In relation to the results presented by INGEMMET in previous studies, the presence of calcareous sandstone type rocks. Sandstone, a sedimentary rock whose chemical composition is the same as that of sand, therefore the rock is composed essentially quartz, small amounts of feldspar and other minerals could also be found. minerals. The cementing material that binds the sandstone grains together is usually composed of silica, calcium carbonate or iron oxide. Its color is determined by the material cementer; For example, calcium carbonate produces white sandstones, similar to found in the mummies which presents contents of Ca, C, O, which corresponds to the mineral of calcite (CaCO3), because the analyzed grains are arranged on a matrix of calcite. Tarbuck and Lutgens (2005).

It is possible to correlate it according to its location and the presence of diatomites in a formation. geological with its respective deposition environment, which would allow us to explain the presence of chemical elements in the “Nazca Mummies”.

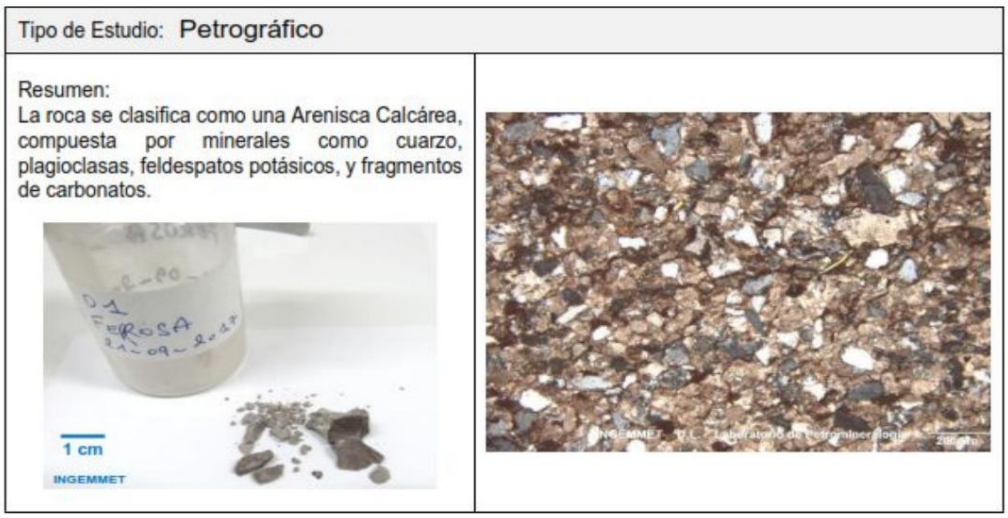


Figure 44. *Previous petrographic studies carried out by INGEMMET (2017).*

Figure 45. *Left. Sample of calcareous sandstone, with characteristics similar to those presented in INGEMMET. Right. Microscopic image of diatoms (photo: David Siodlak)*

Diatoms or diatomaceous earth are siliceous, formed by diatom microfossils, which They are unicellular aquatic algae that secrete a siliceous skeleton and belong to a group diverse and very large algae found floating in marine waters and lakes. The Diatomite is a sedimentary rock that appears in light colors, it is friable because it is It is mostly composed of skeletal remains of diatoms, so its percentage of silica is high, in addition, it is a highly porous rock, of low specific weight or density and with a very fine particle size.

This type of rock can be correlated to the Pisco Formation, which presents this type of composition, a white lithological sequence, consisting of diatomites, with intercalations of tuffaceous sandstones and shales, present from the Pisco River to Camaná. The studied levels consist mostly of white and slightly yellow diatomite with laminations interspersed with fine detrital levels. The Pisco Formation (Middle Miocene-Pliocene) corresponds to the last major sedimentation sequence, its environment being coastal marine deposition. The layers of this formation have been interpreted as the result of a fairly widespread marine transgression (Muizon & Bellon, 1980; Sebrier, 1982).

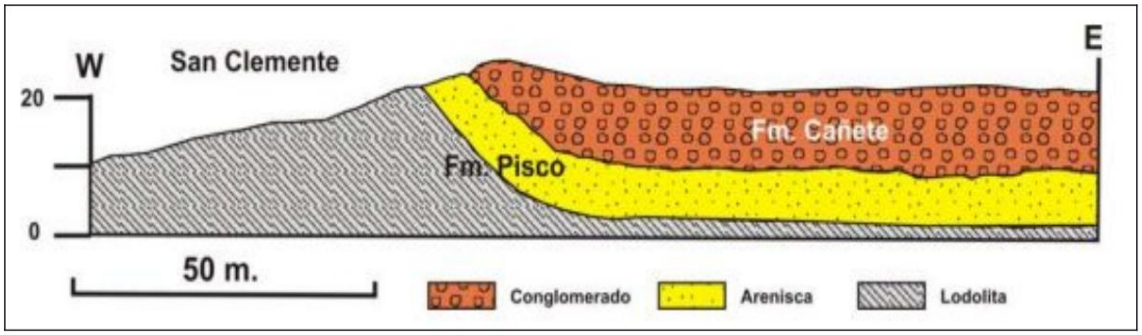


Figure 46. *Geological section of the Pisco Formation composed mainly of sandstones.*

Diatomite outcrops are recorded in the upper part of the Pisco Formation of the Palpa and Lomitas quadrangles (Terrestrial hills, Pampa Las Salinas, Pan de Azúcar, Pampa de Coyungo, La Tiza, Las Brujas, etc.), possibly the locations of the mummies due to the abundant presence of diatomites.

4.2.3 Conclusions

It could be deduced that the metal piece extracted from the chest of the mummy Edgarda has better mechanical properties than the part extracted from the loose hand and the latter It has lower resistance to oxidation. About the silversmithing process Some researchers and chroniclers mention that in ancient Peru they only worked with native silver and others refer to the fact that purification processes were carried out from querargyrite, but investigating metallurgy in the south of our country it is known that silver and copper appear natively in quantity only in the Middle and Late periods. This This is probably because native silver was infrequently found in the surface and was obtained by a kind of rough casting. Silver and copper must have be rare until this smelting process was discovered by the inhabitants of the lands high. Many of the major silver mines of the Incas appear to have been in the central Bolivia, but most of the silver in the vicinity of Ica contains lead, and Even if only one of the samples contains lead, the lead content may be indicative that the silver comes from the Ica region or from an inefficient cupellation process. He sulfur content in the two samples can give us an idea that the silver analyzed It may come from a sulfide mineral. According to William C. Raíz, silver alloys with a

content of more than 20% copper are synthetic alloys or that are not available in naturally in ores, perhaps evidence that the mixtures obtained from these metals were intentionally alloyed or an unknown alloy with properties not yet known. studied, although it cannot be deduced which of the propositions is correct.

In the phase diagram of silver and copper, this alloy has its eutectic point at 28.1% copper, which results in a low melting point alloy, the sample metallic from the loose hand has a concentration below the eutectic, which which should form on the surface of the sheet metal yellowish or copper-colored because these metals are almost insoluble in the solid phase. The remaining content in the alloys is a matter of discussion since they may be impurities inherent to the mineral of origin or of an origin not yet studied.

Considering diatomites, the sequence reflects events in a shelf marine environment siliciclastic assigned to the Pisco Formation (Adams, 1906), corresponding to the basin of the same name on its eastern edge. Diatoms have been recognized at these levels characteristics of the lower Miocene.

Figure 47. *Research team June 2023. Left to right: Irvin Zúñiga Almora, Sabine Cremer, Pedro Toribio Pando, Roger Zúniga Áviles together with the tridactyl mummy Edgarda and the loose hand.*

5 REFLECTION ON RESEARCH

5.1 Epistemological classification of the research work itself

As they are different approaches to the theory of science, the research work can be classified mainly into the relativist-pluralist method-epistemology. In the opinion of some important scientists, approaches to knowledge are not subject to a fixed value. Consideration of the history of science allows us to conclude that the acquisition and Knowledge change has not always occurred in accordance with scientific principles. theoretical in the past, but by circumventing these methods and, therefore, was largely successful. anarchic, so to speak. An example is Galileo Galilei, who, as we understand him today, He worked in a rather speculative way. Science is not defined by rules specific, but the investigation must be independent and neutral. It has been successful break with certain methods at certain times so that progress and fulfillment emerge. knowledge. The acquisition of knowledge should not be restricted by rigid guidelines that possibly leave aside intuition and creativity.

5.2 Research potential

What was new about our research project was the intellectual approach of considering with equal justification for the ancient findings and the results that the discovery of the Nazca mummies. The underestimation of the analysis results already achieved and the Sometimes inadequate written preservation of cultural memory in archives prevents holistic development of strong cultural (self)awareness to this day. The reference to one's own cultural roots is crucial to developing a distinctive cultural identity and, therefore, therefore, a cultural self-confidence.

This had implications for our research, the result of which was to arrive in a way independent and neutral to the appropriate formulations on the authenticity of the mummies of Nasca. Implants played an important role in this, a precise analysis of them will allow us to know what techniques were used in its development, if they are known or completely unknown, ancient or more recent.

5.3 Contribution to science

The research project will provide important basic data on the topics of what inexplicable, the unknown and what was understood in the initial investigation in an exploratory manner and from an empirical point of view. Based on these data, approaches are developed to teach information and research skills.

Based on the data obtained and the experiences carried out, we would like to contribute the following as a result of the project:

- Presentation of the data obtained before the scientific world/national institutions and/or international
- Distribution of data in the corresponding scientific media
- Promotion or generation of scientific and/or academic cooperation agreements with national or international institutions.
- Promotion or generation of exchange or academic mobility with institutions national or international.
- Representation of the Institution as an academic/professional expert in media national or international communication

Figure 48.

x-ray of the skeleton of the mummy Josefina with pectoral implant

Source: *Alien Project – GAIA.*

Av. Túpac Amaru N° 210, Lima 25, Peru
Telephone: 381-5630/ Telephone Central: 481-1070 Annex 4207
Email: investigafigmm@uni.edu.pe

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