

CHAPTER 45

Forensic archaeology in Chile: the contribution of the Chilean state to our memory, truth and justice

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Introduction

The Medico-Legal Service (*Servicio Médico Legal* – SML) of Chile is a centralised public service under the Ministry of Justice, which follows the provisions of Law No. 20.065, which establishes in its Article 2 that ‘The purpose of the SML is to provide technical and scientific advice to the courts and research institutions throughout the national territory, in the fields of legal medicine, forensic science and other related matters’ (Lagos Escobar et al. 2005, <http://www.leychile.cl/Navegar?idNorma=243150>). By judicial and governmental order (Exempt Resolution No 3153 2007, 1), the SML has emphasised the identification of victims of human rights violations in the period from 11 September 1973 to 11 March 1990, thus executing public policies regarding truth, justice and reparation of the aforementioned cases.

The Special Forensic Identification Unit (*Unidad Especial de Identificación Forense* – UEIF) of the SML was created in 2011; its main function is the following:

to assist the jurisdictional and investigative authorities in human identification and determination of cause of death in complex cases, in order to perform expert analyses, actions and procedures in line with quality standards, coordinating and collaborating with organisations and institutions, both public and private, national and international, related to the field of Forensic Identification (Exempt Resolution No 004742 2011, 1).

Among its tasks, the UEIF must ‘perform expert analysis pertaining to partially skeletonised remains including complete, incomplete, single and commingled individuals of forensic interest. The areas of expertise include evidence-gathering processes, anthropological, dental,

associated evidence and forensic analysis, besides other relevant aspects’ (Exempt Resolution No 004742 2011, 1). The UEIF must also ‘[c]ontinue with forensic activities in cases of human rights violations for the period September 1973 to March 1990, in line with the guidelines of the Human Rights Program of the SML’ (Exempt Resolution No 004742 2011, 2).

Two things may be deduced from the preceding paragraphs. First, the UEIF continues with the work of the Human Rights Program of the SML, in operation between 2008 and 2010. Second, the approach to complex cases is comprehensive and multidisciplinary, including a forensic approach from the time of evidence gathering to the various analyses from different disciplines, all of which must work together to provide information in a comprehensive and coordinated manner to the judicial body, the victim’s families and society as a whole. In this model, the contribution and participation of forensic archaeology is present from the time of discovery to laboratory analysis by qualified and trained professionals, along with the implementation of its methods and approaches in the development of protocols and procedures. This incorporates, from the time of its initial intervention, the concept of chain of custody, a protocol which, in Chile, establishes norms for evidence collection and its treatment or management, under the direction of prosecutors and judges, who are responsible for guiding the investigation and protecting the site where the finding took place, according to the provisions contained in Articles 80 and 83 of the Criminal Procedure Code (*Código Procesal Penal*) of Chile.

In our country, the development and contribution of archaeology to the forensic field is closely linked to the

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violent and abrupt break of democracy in September of 1973, which involved the murder and disappearance of supporters of the socialist regime of President Salvador Allende (1970–1973) and many civilians by the Armed Forces, with the support of key members of powerful economic groups in the country. The military coup that put an end to nearly a century of democratic tradition in Chile initiated a terror dynamic that divided, and still divides, this nation where illegal detentions, torture, exile and forced disappearance became everyday issues in people's lives. The return to democracy after a plebiscite was called in 1988 allowed a cautious, still under military disclosure, of the horror experienced by thousands of families, who despite fear and threat, organised themselves to search for their missing relatives and demand truth and justice. Since the beginning of the 1990s, archaeologists and anthropologists have joined their efforts voluntarily and, following a few judicial instructions, collaborated in the search and recovery of the remains of the victims illegally buried in cemeteries, ravines, mine shafts, furnaces, military land and desert plains (Cáceres Roque 2011).

However, in addition to the weak democratic structure and the non-existence of institutional coordination, the systematised judicial secrecy and lack of state guidelines, there was no organisation that could take scientific and methodological responsibility for the analyses of these complex cases, unlike what happened in Argentina, with the formation of the Forensic Anthropology Team (Fondebrider and Scheinsohn, Chapter 43, this volume). In view of these circumstances, the SML assumed responsibility for the recovery and analysis of cases demanding technical and methodological capabilities that were far from the reality of the institution. Without real political will and financial support that would facilitate the required technical standards to address these cases, an impoverished SML that had been mutilated by the same dictatorship took on the daunting task of identifying hundreds of bodies, with more limitations than capabilities.

Despite these conditions, an archaeological perspective was applied to the expert tasks, but not in the optimal way. In 2000, with the incorporation of archaeologist Pamela Brito,¹ there was for the first time the urgent need to comply strictly with the methodological standards of the discipline, both in terms of recovery of evidence and the recording of the excavations, elements that so far had been met irregularly, with foreseeable consequences for laboratory analysis. In 2003, with the arrival of the archaeologist Mrs Ximena Novoa, together with a technical team made up of two anthropologists, two odontologists and one physician, archaeo-

logical methodology began to be applied systematically in terms of the approach to the sites, as well as the proper written and photographic record of each stage of the excavation and evidence-gathering process.

Patio 29 – the turning point for the incorporation of archaeology in forensic investigation

One of the most emblematic cases in investigations associated with human rights in our country is the Patio 29 case. During the first weeks following the military coup, an attack on the civil population took place in the capital city, Santiago. At that time, anyone who did not respond to orders from the military or the uniformed police risked being killed and his or her body left on the street, thrown into the Mapocho River or left at the entrance of cemeteries or the Medico-Legal Institute (*Instituto Médico Legal*).²

The bodies piled up at the premises of the SML, which could not cope with carrying out the autopsies as well as identifying the bodies. In most cases, the bodies could not be returned to their families, and had to be referred for burial in the General Cemetery, one of the oldest and largest cemeteries in the country, in the vicinity of the SML. Thus, with just a number assigned to the unidentified corpse, the bodies were frequently buried in so-called Patios, large lots where individuals who had died unexpectedly or did not have the resources to be buried in family tombs were temporarily buried. About 400 of these victims were buried in Patio 29;³ and because these were temporary graves, in 1979 the Cemetery began to remove the bodies to reuse the graves (Human Rights Program Report 2007–2010, 37). In view of this situation, the Vicariate of Solidarity (*Vicaría de la Solidaridad*) denounced the fact and managed the restriction of this operation, which was partially achieved: only 108 graves for unidentified people were preserved.

From 2 to 14 September 1991, a team of volunteer archaeologists and anthropologists who formed the Forensic Anthropology Group (*Grupo Antropología Forense* – GAF) exhumed 107 graves, where 125 bodies⁴ were found. The bodies were sent to the SML; however, it was not until 1992, due to the dissolution of the GAF, that this institution began the analysis aimed at identifying victims and determining their cause and manner of death. By 2002, 96 individuals had been identified by 'traditional' anthropological methods, including the controversial use of craniofacial superimposition. However, since 1994, there have been doubts about the quality of the processes and methodologies used to

¹Deceased in April 2003.

²Name of the SML at the time.

³According to the Complete List of Patio 29, issued by the General Cemetery of Santiago, 24 June 1991.

⁴Grave 108 was exhumed in 1997, totaling 126 bodies.

reach those identifications, doubts that were accepted by Minister Sergio Muñoz, who ordered the SML to perform genetic analyses (mitochondrial DNA) to verify identifications already made. By April 2006, the results delivered were categorical (Bustamante and Ruderer 2009): of 94 cases analysed, 48 were exclusionary, 37 cases uncertain and the rest did not give useful results for comparison.

The response was immediate. The associations of families of victims of political violence demanded a radical response from the State of Chile, which led to an audit of the SML that revealed the scarcity of its resources, as well as limited support for technical and methodological development necessary to approach the complex human rights cases. A panel of internationally renowned experts from different areas related to human identification was convened, and presented a proposal for comprehensive intervention. Then, the Human Rights Program was formed which, by virtue of the power vested in it, raised the need to develop a multi-disciplinary expert technical area that should be trained to work with a holistic approach.

Since 2007, with the incorporation of Alejandra Didier Perez, archaeology has become a comprehensive and permanent part of the majority of the cases studied by the UEIF. The application of archaeological methodology has enriched the analysis of bone evidence and associated cultural elements, contextualising the findings; and due to the precision of the records generated, it has become an essential element of the chain of custody. In 2008, and in close connection with the Los Arrayanes Ravine case, a new methodology to deal with associated evidence, implemented by archaeologist Mrs Isabel Martínez Armijo, was incorporated. Specifically, a methodology of textile analysis was designed, which was extrapolated to other associated evidence of forensic interest. This methodology has become a hallmark for the Unit, which proves the importance of this discipline in analyses aimed at identifying the victims, as well as determining the cause and manner of death.

The UEIF understands forensic archaeology as the application of traditional archaeological theory and methods to the investigation of forensic cases, where there is a possibility of finding the perpetrators of a crime, and moreover, bringing them to justice. Currently, the UEIF, in accomplishing this objective, has forensic archaeologists that lead excavations, search areas and recovered evidences from the crime scene incorporating otherwise traditional fieldwork techniques, legal and criminalistic procedures such as the use of chain of custody and the expertise of professionals from a variety of disciplines: geology, botany, marine biology and cartography. The exercise of this area of study within the UEIF incorporates work both on site and in the laboratory.

While forensic archaeology can be applied to different types of cases, the UEIF currently incorporates within its range of activities criminal, mass disaster, posthumous paternity establishment and human rights cases. Additionally, and given that the population that has inhabited this land has always enjoyed access to many natural resources, there are numerous archaeological sites often found, especially within the Central Valley and northern part of the country, which the UEIF team needs to evaluate in order to discard its medico-legal interest.

Given the variety of sites this unit faces, and taking into account that each one of them is unique, these are dealt with on the basis of their particular characteristics, such as geography, climatic conditions and the nature of the evidence, whose recovery is intended, the possible methods to be used and the resources available to maintain custody and secure conservation of the evidence.

In all phases of the fieldwork at hand (search, detection and recovery of human remains and associated evidence), steps are taken to ensure that the process adheres to strict quality work parameters, which comply both with internationally approved procedures⁹ and with the methodology proposed in the 1989 United Nation's Minnesota Protocol: Manual for the Prevention and Investigation of Extra-Legal, Arbitrary and Summary Executions. Among these steps are complete written, photographic and occasionally audio-visual records of all fieldwork, site plans and relevant measurements, storage of the evidence using custody seals, and constant safe-keeping of it until its final transport to the UEIF.

Regarding laboratory work, the archaeology field within this Unit specialises in the analysis of cultural evidence found in association with human remains, in an attempt to contribute to the objectives of the investigation: determining the cause and manner of death, and the circumstances in which this took place. As previously stated, this procedure was standardised by Isabel Martínez Armijo from 2007, after the finding of numerous remains of human rights victims and their associated evidence in a site called Los Arrayanes Ravine. From this location, around 500 pieces of cultural evidence were recovered, including small fragments of clothing, shoes and personal effects.

Today, the process entails a quantitative and qualitative analysis and recovery of trace evidence, as well as written and photographic records of any pertinent finding. Additionally, the examination comprises a description of the type of materials and fibres that compose the cultural evidence, specification of their models, patterns and colours, and determining their state of conservation and/or degree of degradation. Last, the evaluation of damage suffered by the evidence is of primary importance, especially if they transcend destruction caused naturally by the passing of time or

⁹The procedures are explained in the Section Fieldwork.

the environmental conditions to which they have been exposed, such as fire arm trauma. In all these processes, care is taken to maintain quality control, by appointing a responsible and a control party.

In fact, this type of laboratory analysis has come a long way, demonstrating its relevance in aiding the investigation, but also given the value that the recovery and reconstruction of the material culture holds for the family of the victim. Through the associated evidence, the families can even re-establish a link with their beloved ones, seeing them in a favourite piece of clothing that they helped to choose, or a pair of glasses that the person always wore. Many times, the cultural evidence will become more representative to them than the remains themselves, especially if what are being handed back to them are only fragments.

The Los Arrayanes Ravine case

On 5 September 2007, an incomplete long bone, a shoe and a shoe heel were sent to the SML in Santiago by the Court of Appeals in San Miguel, in order to perform an urgent study of the date of the evidence submitted. In relation to the bone, it was also requested 'to establish whether it corresponds to male or female sex, height and other anthropomorphic characteristics of the subject it would belong to'.⁶

In the report submitted to the court, it is pointed out that the bone piece corresponds to the human remains of an adult; however, it was impossible to estimate sex, height, the presence of individualising traits or perimortem lesions, or the time of death.

In relation to the footwear remains, the visual and physical inspection report states that:

'it is a nationally manufactured shoe, for the left foot, made of leather, male moccasin model, apparently black colour, size 40 (...), it corresponds to a model that was very popular from 1965 to 1980, made by a craftsman (hand-made)'.⁷

The findings of Judge Héctor Solís Montiel, whose investigation partly related to the abduction of 22 peasants from the town of Paine – Case No. 04–02 'F' Paine – located south of Santiago, give rise to one of the most complex field campaigns in the history of the SML, where, under its coordination and organisation, professionals and technicians of the SML together with the Investigations Police (Civil Police), Uniform Police (*Carabineros de Chile*), as well as national and foreign professionals, collaborated in this endeavour.

In relation to the victims associated with the case, the National Commission on Truth and Reconciliation (*Comisión Nacional de Verdad y Reconciliación*) states that

In the town of Paine, between September and November of 1973, there were serious violations of human rights by state agents, specifically officers from the Carabineros and the Army, accompanied by local civilians who collaborated in the repression that was mainly directed towards the peasant sector (...) on October 16th 1973, 23 people were arrested in Campo Lindo, 24 de Abril and Nuevo Sendero settlements, 22 of which are missing (...) The morning of that day an operation was carried out (...) searching the homes and sometimes acting with unnecessary violence (...) the detainees were taken to the police station of Paine, where some of them were seen by their families. From there, the detainees were taken to the Infantry Regiment of San Bernardo, being ignorant since then of their whereabouts, despite the many administrative and judicial efforts made by the families (National Corporation of Reparation and Justice 1996, 225).

The place is Los Arrayanes Ravine, located in the interior of Fundo Los Quillayes, northern sector of Rapel Lake, VI Region of Chile.

On 7 September, Mrs Alejandra Didier Perez, archaeologist, and Mr Christian Cornejo Flores, technician assistant, both from the Special Unit for Human Rights (Unidad Especial de Derechos Humanos (UEDDHH))⁸ of the SML of Santiago, established the area of interest where the evidences sent to the SML had been found, conducted a reconnaissance of the ravine and gathered the necessary information in order to design the intervention to the site, aimed at detecting and recovering the evidence deposited there.

The UEDDHH team began the second phase of the field campaign on 10–13 September, resuming its work on 21 September and concluding it on 19 October 2007.

Fieldwork

The aim of the fieldwork⁹ was to detect, document and recover, with the proper archaeological methodology, all bone and cultural evidence present at the origin and in the upper course of Los Arrayanes Ravine (Figure 45.1).

The archaeological methodology that was followed (Gallardo 1987; Gallardo and Cornejo 1986, 409–420) focused on the delimitation, superficial and sub-superficial evidence recovery and excavation of a site, complemented by a forensic archaeological procedure established by Dupras et al. (2006), Hunter and Cox

⁶Translation of Writ No 41–2007, issued by the Judge Mr Héctor Solís Montiel, dated 5 September 2007.

⁷Visual and physical inspection, dated 26 September 2007, signed by the shoemaker Mr Enrique Ricardo Samur Muñoz.

⁸Name of the UEIF between 2007 and 2010.

⁹Field Work Report, Protocol No 81–07 UE, Case No 04–02 'F' Paine, Court of Appeals of San Miguel, signed by Alejandra Didier Pérez and Angel Medina Bejarano.



Figure 45.1 General view of Los Arrayanes Ravine.

(2005) and Ubelaker (1999), all adapted according to the particularity of the case, which is broken down as follows.

Site investigation

It included a preliminary inspection visit, field reconnaissance with a photographic record, the intervention strategy design, site evaluation by a geologist, a botanist and the canine division of the Investigations Police; surveying¹⁰ with ground-penetrating radar (GPR), metal detector, superficial and sub-superficial recovery, in addition to the photographic and planimetric record using the Global Positioning System (GPS) and Total Station of all evidence recovered (Figure 45.2).

The excavation included in-depth evaluation of pits of 1×1 m in areas identified by GPR with evidence of stratigraphic changes; the recovery of evidence through systematic excavation in trenches along the bottom of the ravine (Figure 45.3); the excavation of natural strata with minor tools (trowel, spatula and brush); sieving of 100% of sediments with 3×3 mm mesh; and sterility control of the units by ground coring.

The records included photography and mapping, using GPS, of all the evidence recovered during the survey with a metal detector, top view photography of the evidence and planimetric view with three coordinates, top view and profile drawings with relevant information, survey with a Total Station of the ravine, evidence recovered during the survey with a metal detector of the points marked by GPR of the four vertices of the excavation units and of the most relevant evidence details.



Figure 45.2 View of the NE slope with flags indicating the probable presence of metal items.

¹⁰Surveying is the method through which it is possible to discover the archaeological record of a locality (translated from Gallardo et al. 1986).

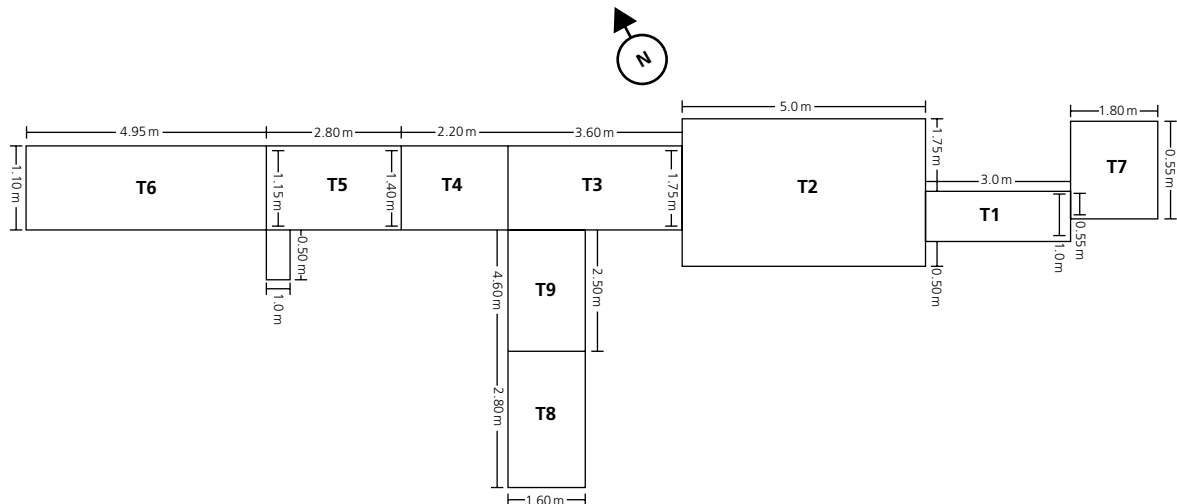


Figure 45.3 Scheme that shows the nine excavated trenches.

Field laboratory and evidence handling

This includes the individualisation of the evidence with an acronym formed by the identification of the unit of origin and an individual consecutive number. If association was found between pieces of evidence, a unique number was assigned, coupled with letters in alphabetical order. The evidence was packed in a Ziploc-type bag, wrapped in tin foil if necessary to ensure conservation, and placed in corrugated boxes according to the nature of the evidence and protected by sheets or small balls of expanded polystyrene when appropriate. An inventory was made of the bags, duly closed with an evidence seal and placed in each box, and the boxes were sealed with the relevant chain of custody and dispatched with a delivery certificate to the custodian responsible for the transportation of the boxes.

The work to recover bone and cultural remains in Los Arrayanes Ravine followed a methodological design with the application of archaeological techniques, which ensured the full recovery of the skeletal remains and cultural evidence associated with them. Post-mortem damage of the remains was minimised as far as possible, and the necessary information to account for the burial context was gathered.

A total of 546 ballistic elements, 1016 pieces of bone evidence, 79 pieces of dental evidence and 567 associated cultural elements were recovered from the terraces and slopes of the ravine.

The incorporation of evaluations by natural science professionals, such as geologists and botanists, allowed the characterisation of the site's natural environment as well as factors that influenced the deposition of the remains, and those taphonomic processes that could

have generated natural disturbances to the site and therefore to the evidence.

The geology report established that the upper zone of Los Arrayanes Ravine had not been significantly modified by natural processes over the past 30 years or by the use of earth-moving machinery. The botany report indicated that tracks of local animals were observed in the ravine, as well as the effects of current geological erosion due to runoff. Finally, the GPR report established that in the bottom of the ravine, there were at least two areas that indicated artificial removal of the ground and subsequent filling.

The careful handling of evidence in terms of labelling, packaging and transportation safeguarded the conservation, security and chain of custody of the materials, meeting the expert work and judicial system requirements.

From the information gathered in the field, it was possible to determine that the area of Los Arrayanes Ravine corresponds to a place of execution by a firing squad and the primary burial site of more than one individual. Regarding the time period of the events that took place at the site, the associated cultural material allows us to circumscribe the facts as post-1973 and an intervention in 1975 or thereafter.

Human intervention was detected, that is alterations made intentionally by humans, resulting in at least one event of removal of bones and associated personal items. This removal process would have been done manually, ruling out any use of heavy machinery.

Additionally, the site is affected by taphonomic processes related to the action of climatic and orographic agents and wild and introduced fauna, which takes account of site disturbance such as the interment of materials.

Associated evidence

The expert analyses¹¹ carried out by the Expert Technical Area of the Unit also included the personal items and cultural materials associated with the victims found, and separate reports were prepared for metal fragments, footwear, personal items, lenses and frames, as well as recovered textile fragments, shirt collar structures, buttons, zipper sliders and metal rivets, which it would be appropriate to discuss further.

This expert analysis, by archaeologist Mrs Isabel Martínez, began on 15 April 2008 and ended on 13 June of the same year. The overall objective was to determine the number and type of the garments found in the Los Arrayanes Ravine, when they were worn, and sought to identify the origin and fabric type of textile fragments; identify the material of buttons, rivets and collar structures; and determine the type and model of garments they belonged to.

Within the universe of evidence, 318 textile fragments, 120 buttons, metal rivets, zipper sliders and 6 collar structures were analysed.

A methodological procedure relevant for the analysis and classification of archaeological cultural material was used. The textile fragments were grouped based on similar attributes such as raw material, shape, colour and texture, that is by similarities and differences among these evidences. The purpose was to make a qualitative and quantitative description of the universe of evidence, determine the state of conservation of these and the raw material, associate the fragments corresponding to a particular piece, determine the minimum number of the same garment and reconstruct the latter from the universe of fragments, estimating the model and time when they were fashionable.

To achieve the aforementioned objectives, technical datasheets were developed for each type of evidence. The elaboration of the Textile Technical Datasheet was based on forms made and used for pre-Hispanic textiles, adapting them to the requirements of contemporary textile analysis, while taking into account variables that differ from the antique evidence.

Thus, the form includes the following points:

- 1 Name of the specific case.
- 2 Number of the sheet, to control the number of items analysed.
- 3 Number of prototype only related to this specific case.
- 4 Evidence: number the fragment found during the excavation.

- 5 Code: assigned by the Identification Unit team to the different evidences found.
- 6 Unit: that is, the number of the Excavation Unit where the item was found.
- 7 Date of the analysis.
- 8 Box for the picture of the individual fragment with the respective protocol numbers, excavation unit, code and scale in centimetres.
- 9 Description: presentation of the main qualitative characteristics of the item.
- 10 Measurements: quantitative description of the item.
- 11 State of conservation: determination of the state of the fragment and the possibility of determining the causes of the deterioration.
- 12 Type of fibre: natural, synthetic or artificial and whenever possible, specification of the same (e.g. cotton, wool, polyester and acrylic).
- 13 Colour: determined by a colour pallet such as a textile pantone.
- 14 Type of garment: if possible to determine.
- 15 Model: if possible to determine.
- 16 Comments: if necessary, enter data or information related to the item that is not included in the other sections. The manufacturing of the garments is also specified.
- 17 Responsible person: name of the person(s) who prepared the datasheet.

In order to analyse successfully the different fragments recovered and proceed in a second phase to the possible reconstruction of the garments, it was necessary to form different groups including parts of similar characteristics, where the criteria for the formation of each group were the following:

- 1 Weaving technique
- 2 Characteristics of the yarn¹² (number of cords,¹³ twist¹⁴ and doubling¹⁵ that determine the texture of the yarn)
- 3 Type of fabric
- 4 Colour of the yarn
- 5 Design, if any

The initial classification was performed using a macroscopic visual analysis of the items, with the help of a thread counter, an instrument that comprises a support, a ruler in centimetres and a magnifying glass. In this way, it was possible to observe in detail the weaving technique and the formal characteristics of the yarn.

On the other hand, the qualitative description of the fragments was mainly focused on their shape, the colour

¹¹Pericia de Objetos Personales y Materiales Culturales Asociados, Protocolo 81-07 UE Causa Rol UE N° 04-02 'F' Paine, Corte de Apelaciones de San Miguel, signed by Isabel Martínez Armijo.

¹²Group of twisted and many times doubled threads that form a thin cord or yarn that once woven will form the textile piece. The yarn can be twisted in an 's' or 'z' shape depending on the direction of the same (Cornejo Lacroix 1996).

¹³Twisted threads that form a thicker thread, that is a thread can be formed by one or more cords (Cornejo Lacroix 1996).

¹⁴Direction of the twist to join textile threads and form one yarn that can be in an 's' or 'z', that is to the right or to the left.

¹⁵Direction of the twist of the set of cords that form a yarn that could be in an 's' or 'z' and generally opposed to the cord twist.

of the fabric, design, presence of typical garment folds and evidence of stitches. When it was possible to identify the item, for example shirt collar or cuff, trouser clip, this is mentioned in the description. Otherwise, or when identification was not certain, just the aforementioned description was reported (Figure 45.4).

As for the quantitative description, a metal measuring tape was used to obtain maximum and minimum height, length and width.

Finally, to determine the state of conservation, analysis was focussed on the current condition of the fragments, using the qualitative criteria as very good, good, fair to good, fair, fair to poor, bad and very bad. Then the



Figure 45.4 Visual analysis of textile fibres under the stereoscopic magnifier.

alterations of the items were specified: cuts, earth impregnation and that of other organic and non-organic elements, structural deformations caused by missing parts, folds and/or wrinkles, unwoven and frayed fabric, untwisting of the yarn, alteration of the original colours (discolouration, stain, etc.) and others. Burns or stains from being in contact with other objects are mentioned among the causes of the alterations.

Among the group of evidence analysed, 23 elements and fragments of personal items, 10 pieces of evidence associated with glasses and lenses, 66 non-ballistic metal fragments and 82 footwear pieces and fragments were included.

Among the sample of garments, it was possible to identify a high percentage of shirt remains, followed by remnants of trousers, undetermined clothes, upper garments, sweaters, jackets, boots, a sock and a hoodie; 13 textile garments were partially and/or completely restored (Figure 45.5).

The universe of fragments analysed corresponded to some adult male elements worn in a period ranging from 1960 to 1975, or in subsequent years. The state of conservation is fair/poor due to the environmental conditions to which the fragments were exposed. Many of the elements analysed show individualising characteristics, allowing comparison with ante-mortem information provided by the families of the victims and recognised later by them.

Likewise, it should be pointed out that evidence T5E28 and T2E63 correspond to a pair of glasses, which have a fracture as a result of a gunshot whose probable trajectory goes from the inside to the outside of the item (Figure 45.6).

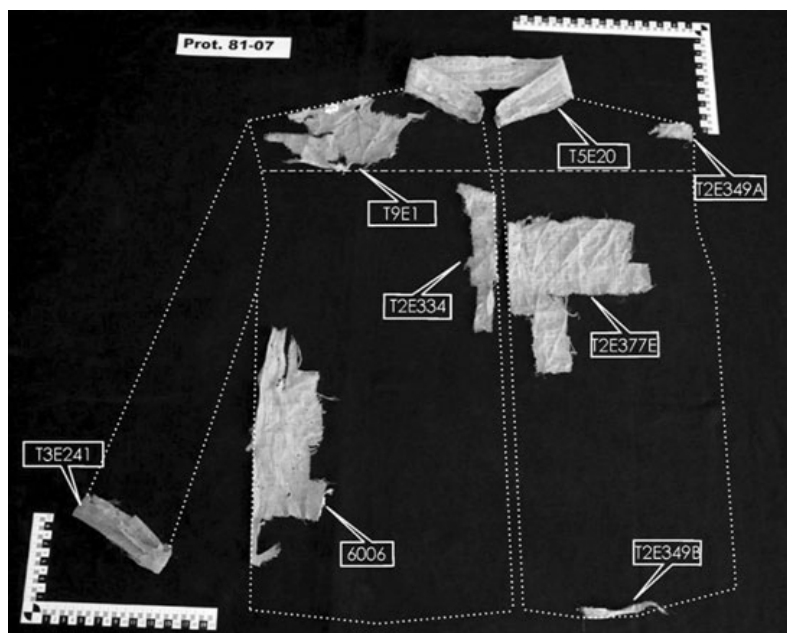


Figure 45.5 Reconstruction of the shirt whose fragments are part of Group 1.

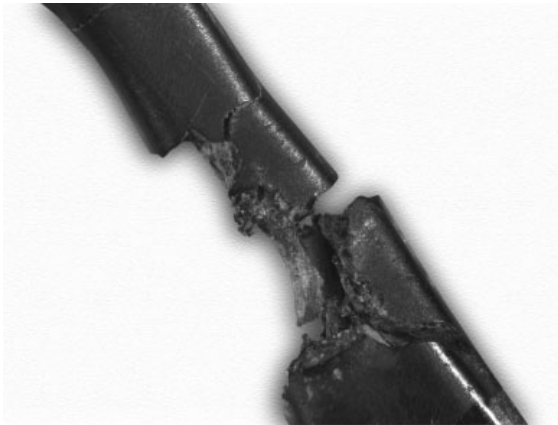


Figure 45.6 T5E28. Detail of the outer face of the left earpiece.

The Los Arrayanes Ravine case is still in process, pending the results of genetic analysis. As of September 2013, 13 genetic profiles have been obtained from which 12 victims associated to the Paine case have been identified. The application of forensic archaeology from the time of search for the remains to the analysis of the associated cultural evidence led to success, considering the adverse geographical conditions of the site, the poor state of conservation of the bones and teeth remains and the intervention of the military, who removed the physical evidence in order to eliminate the traces of these victims.

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