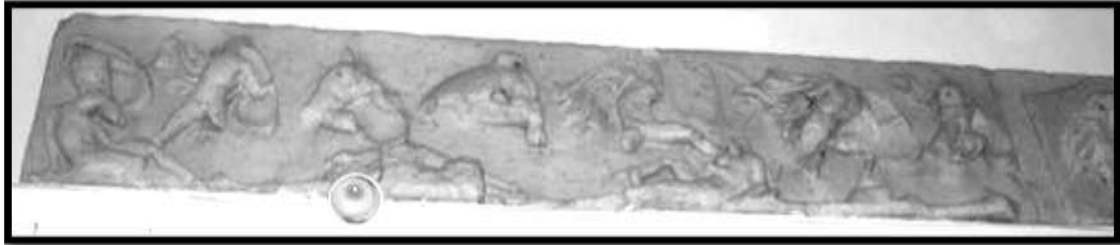


**2. PART OF THE FRIEZE FROM THE TEMPLE OF ATHENA**  
**NIKE**

**2.1 SLAB 1**



*Panel before conservation*



*Panel after conservation*

### **2.1.1 DESCRIPTION OF THE OBJECT**

**TITLE:** Part of the frieze from the Temple of Athena Nike, Slab 1, copy of Frieze from Athena Nike Temple in Acropolis in Athens in Greece, 5<sup>th</sup> century B.C.

**NUMBER(S):** 079, N079 (115)

**TYPE OF OBJECT:** Relief, plaster cast with a metal structure inside, attached to the wall with metal fixings.

**MAKER:** Unknown

**SIGNATURE/INSCRIPTION:** None

**DATE:** 1827

**OWNER/LOCATION:** Edinburgh College of Art, Lauriston Place, Edinburgh, EH3 9DF. Main Building, ground floor, North-East corridor off Sculpture Court

**DIMENSIONS/WEIGHT (APPROX):** H: 350mm W: 2020mm D: 60mm

Weight (approx):

### **2.1.2 BRIEF CONDITION REPORT BEFORE CONSERVATION**

**STRUCTURAL STABILITY:** Good, but crack in between panels by dexter edge.

**SURFACE DUST AND DIRT:** Severe, 100% coverage.

**VISIBLE PAINT LAYERS/UNSIGHTLY MARKINGS:** Layer of cream-yellow paint on surface of the cast; small spots of paint splash on surface of the panel; white paint smears by the lower edge of the cast and on sinister edge.

**CHIPS AND LOSS:** Areas of loss associated with cracks; chip in middle part of the panel by top edge.

**ABRASIONS:** Not significant



#### **Cracks**

**Chips, abrasions, missing surfaces**

**Paint splashes**

**Ferrous items under plaster**

**⊕ Area of paint sample**

**PREVIOUS REPAIRS:** unknown

### **2.1.3 ORIGINAL MATERIALS AND TECHNIQUES**

The object is a plaster cast with a metal reinforcing structure inside. The surface of the sculpture is cream-yellow. In order to find out the stratigraphy, and to identify the materials of the polychromed layer, samples of the plaster with paint were taken from the cast and sent to the University of Northumbria for analysis.

**Investigation of coating samples from ECA Plaster Cast Collection, Edinburgh.  
Consultant: Brian W Singer.**

#### **Frieze from the Temple of Athena Nike, panel 1 – Cross-section**



*Photograph of the cross-section sample from Frieze from Temple of Athena Nike – panel 1*



*Photograph of the cross-section sample from Frieze from Temple of Athena Nike – in UV*

A cross-section of the paint revealed, from the top layer downwards, as photographed, the presence of several layers; a top pale orange-grey-white layer containing white and orange and yellow particles above a white layer. Beneath this is the thick plaster layer with some orange-brown material in it.

Observation under UV light showed that the pale orange-white layer showed some greenish white fluorescence, which may indicate that it may contain zinc oxide (zinc white). The next white layer fluoresced blue-white indicating that it may contain lead white. The thick plaster layer showed a yellowish orange fluorescence indicating that it may contain shellac; hence this sample was selected for GC-MS investigation.

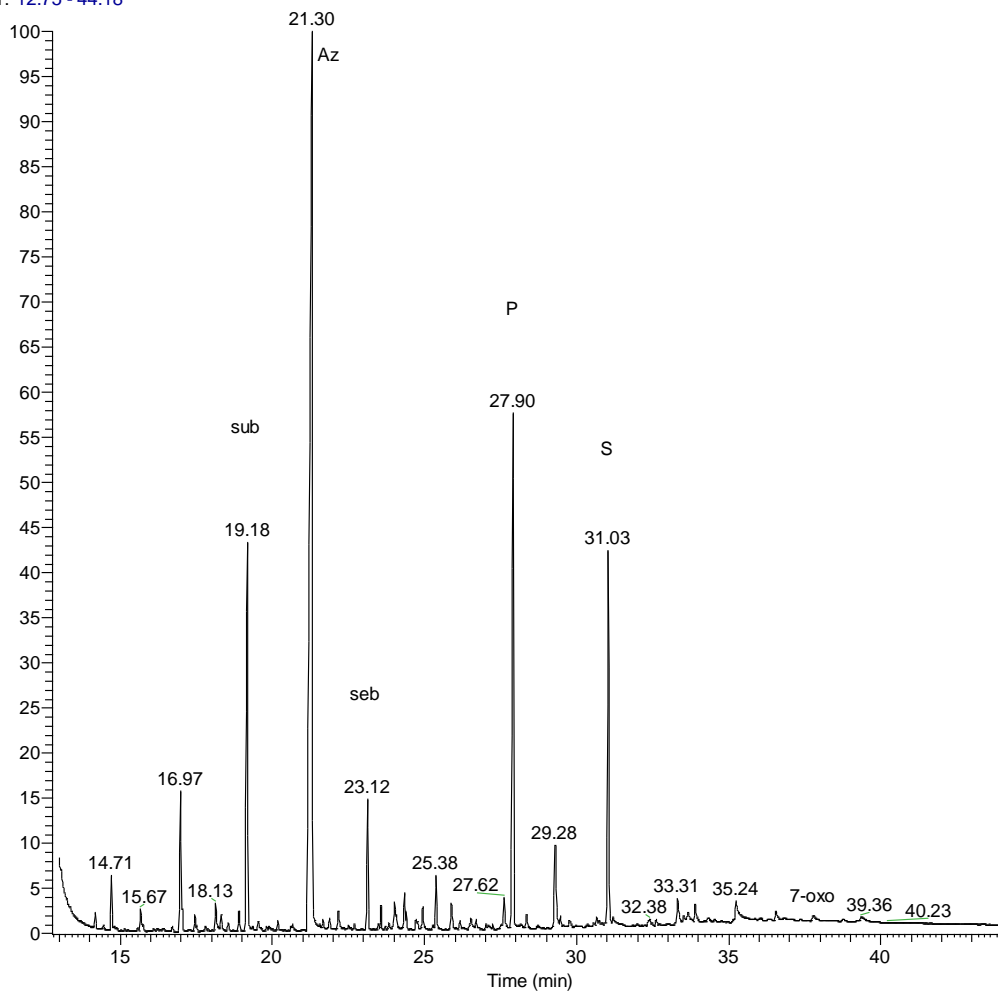
### GC-MS Analysis

A Sample containing both the plaster layer and the paint layers was cut from sample *ECA 079-082* and was treated with trifluoromethylphenyl trimethyl ammonium hydroxide (5% in methanol) and the mixture separated by GC-MS the chromatogram (Figure 2) which showed a strong peak for the methyl ester of nonandioic acid (azelic acid) with an azelate to palmitate ratio of 2.6 indicating a drying oil<sup>1</sup>. The ratio of palmitic acid (hexadecanoic acid) to stearic acid (octadecanoic acid) (as their methyl esters) is 1.5, which is in the range for linseed oil<sup>1</sup>. The azelate to suberate ratio is 3.9 and the azelate to sebacate ratio is 14.2, which together indicate that the oil has been heat bodied<sup>2</sup>.

An attempt was made to find indicative components for shellac by displaying single ion chromatographs (Figure 3). Mills and White report<sup>3</sup> that shellac can be identified by characteristic, but unidentified compounds, showing a 276 ion and a 308 ion. Compounds containing a 155 ion are also abundant in shellac. However this sample did not yield compounds peaks at similar retention times with a mass 276 ion (Figure 3) and also with a mass 308 ion (Figure 3). There are abundant peaks with a 155 ion count (Figure 3) but these were found to be due to epoxy-carboxylic acids, these, being oxidation products of the oil. Also present is a small peak for methyl 7-oxodehydroabietate which indicates the presence of coniferous resin, most probably pine resin.

Thus there is no evidence to indicate that sample *ECA079-82* contains shellac, though it does contain some coniferous resin such as pine resin and it also contains, mainly, heat bodied linseed oil, probably in the paint layers and possibly also in the organic material within the plaster.

RT: 12.75 - 44.18

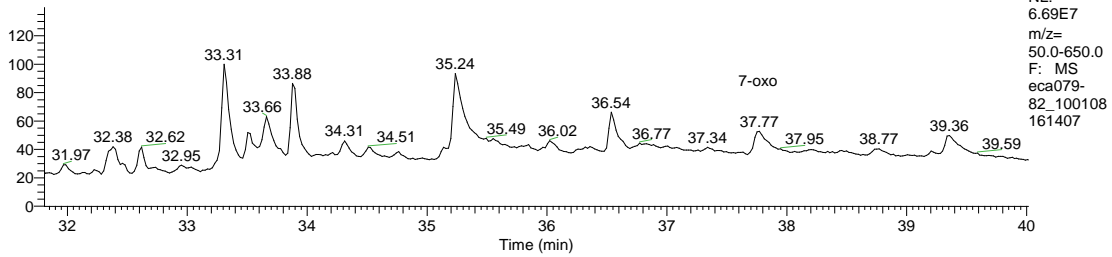


NL:  
1.74E9  
m/z=  
50.0-650.0  
F: MS  
eca079-  
82\_100108  
161407

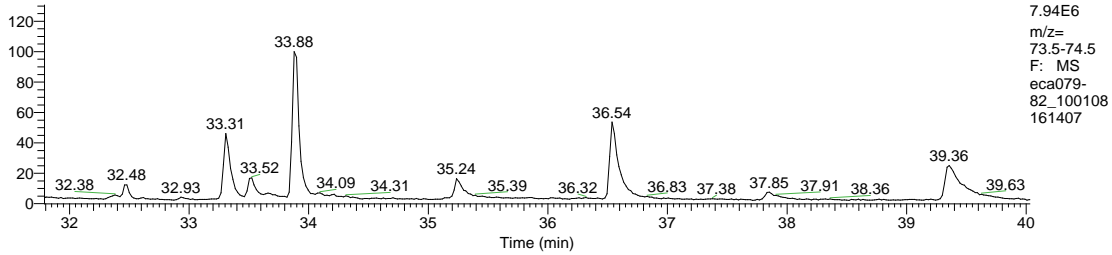
*Oil / resin analysis of ECA 079-08; Seb= dimethyl sebacate, Az = dimethyl azelate, Sub = dimethyl suberate, P = methyl palmitate, S = methyl stearate, 7-oxo = methyl 7-oxodehydroabietate*

C:\Xcalibur\...eca079-82\_100108161407  
 frieze of temple of Athens, Nike  
 RT: 31.81 - 40.01

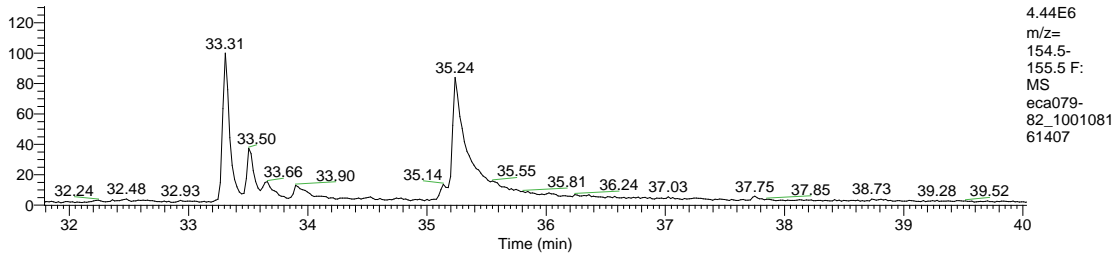
1/8/2010 4:14:07 PM



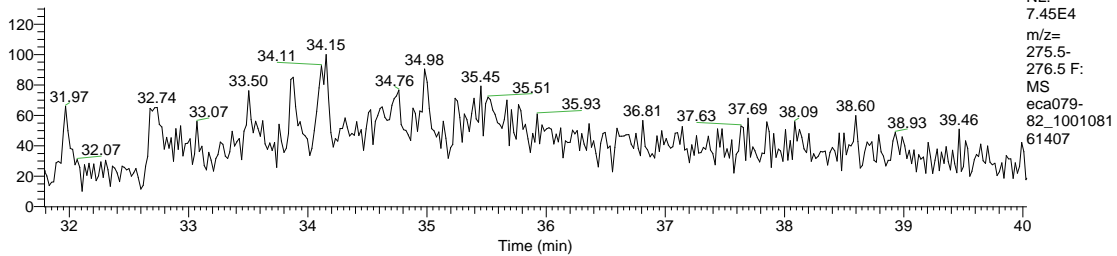
RT: 31.79 - 40.03



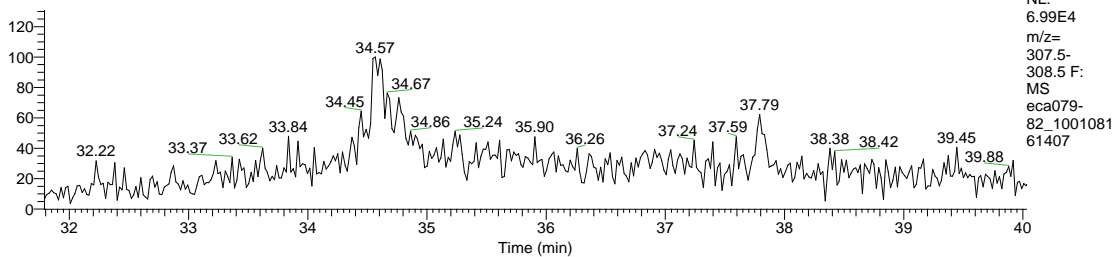
RT: 31.79 - 40.03



RT: 31.79 - 40.03



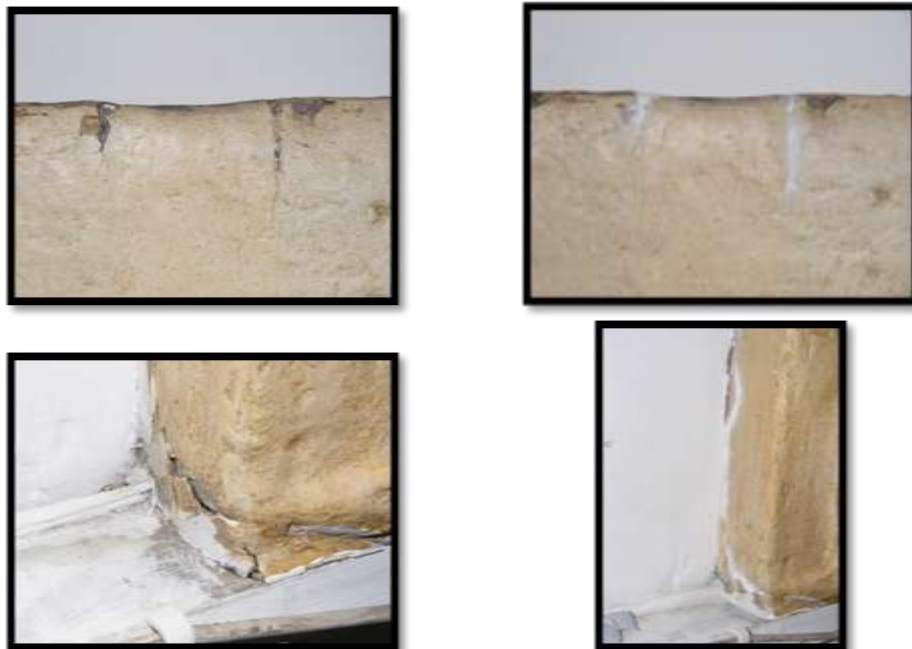
RT: 31.79 - 40.03



Single ion chromatographs from sample ECA 079-082.

#### 2.1.4 TREATMENT REPORT

- Prior to any conservation treatment, the cast was photographed. This photographic documentation was continued throughout all conservation processes.
- Initially, the cast was dry cleaned with soft brushes and Wishab Sponges with a rubber-nozzled vacuum to pick up the loose dust and dirt.
- Following a variety of wet cleaning spot tests, the surface of the panel was cleaned with 2-5% Vulpex Liquid Soap in de-ionised water, using cotton wool swabs.
- All areas of raw plaster were given an application of 10% Paraloid B72 in acetone to provide an isolating layer between the original plaster and the repairs.
- The areas of flaking paint were consolidated with an application of 5% Primal B60A in de-ionised water.
- Areas of loss, open joints and cracks were filled with white micro-balloons mixed with 12% Paraloid B72 in acetone. Larger areas of loss and around the screws were filled with an inert filler to provide extra strength.



*Details of fill repairs*

- All the fills were then toned out with acrylics, mixed with matting agent, to match the surrounding patina.
- Finally, the entire cast was given an application of micro-crystalline wax so as to protect the surface.

### 2.1.5 MAINTENANCE PROGRAMME

Maintenance of the Parthenon Frieze requires to be undertaken from a scaffold. As a result, any cleaning needs to be carried out by operatives that are trained to: a) construct, move and dismantle a portable scaffold tower; and b) clean the Frieze in an appropriate manner.

Graciela Ainsworth Sculpture Conservation could train staff to undertake such cleaning. The training for the use of scaffold would require organising by the Edinburgh College of Art.

The cleaning programme would involve the trained operatives, wearing the appropriate PPE, removing the loose dust using soft brushes and a vacuum cleaner with a rubber nozzle that would have muslin attached to its end. The muslin prevents any potential damage to the plaster from being lost in the vacuum cleaner. Any fragments that are dislodged, and their locations on the cast, should be documented and wrapped carefully in acid free tissue prior to being stored in a safe location. A trained conservator should be contacted immediately in order to repair the damage.

**NB** At no time should cleaning products or any liquid (including water) be used.

We would recommend that this cleaning programme for the Frieze should be undertaken on an annual basis (at minimum). Ease of access would mean that the free standing casts could be cleaned, with the same method, on a more regular basis.



## 2.2 SLAB 2



*Panel before conservation*



*Panel after conservation*

### **2.2.1 DESCRIPTION OF THE OBJECT**

**TITLE:** Part of the frieze from the Temple of Athena Nike, Slab 2

**NUMBER(S):** 080, N080 (116)

**TYPE OF OBJECT:** Relief, plaster cast with a metal structure inside, attached to the wall with metal fixings.

**MAKER:** Unknown

**SIGNATURE/INSCRIPTION:** None

**DATE:** 1827

**OWNER/LOCATION:** Edinburgh College of Art, Lauriston Place, Edinburgh, EH3 9DF.  
Main Building, Ground floor, North-East corridor off Sculpture Court

**DIMENSIONS/WEIGHT (APPROX):** H: 350mm W: 1930mm D: 60mm  
Weight (approx):

### **2.2.2 BRIEF CONDITION REPORT BEFORE CONSERVATION**

**STRUCTURAL STABILITY:** Good, but crack in between panels by dexter edge.

**SURFACE DUST AND DIRT:** Severe, 100% coverage.

**VISIBLE PAINT LAYERS/UNSIGHTLY MARKINGS:** Layer of cream-yellow paint on surface of the cast; small spots of paint splash on surface of the panel; white paint smears by the lower edge of the cast and on sinister edge.

**CHIPS AND LOSS:** Areas of loss associated with cracks; chip in middle part of the panel by top edge.

**ABRASIONS:** Not significant



#### **Cracks**

**Chips, abrasions, missing surfaces**

**Paint splashes**

**Ferrous items under plaster**

**PREVIOUS REPAIRS:** Unknown

### **2.2.3 ORIGINAL MATERIALS AND TECHNIQUES**

The object is a plaster cast with a metal reinforcing structure inside. The surface of the sculpture is cream-yellow. To find out the stratigraphy, and to identify the materials of the polychromed layer, samples of the plaster with paint were taken and sent to the University of Northumbria for analysis. Photograph of a cross-section of the sample taken from **Slab 1** shows two white paint layers, possibly zinc white on the top of white lead.

### **2.2.4 TREATMENT REPORT**

- Prior to any conservation treatment, the cast was photographed. This photographic documentation was continued throughout all conservation processes.
- Initially, the cast was dry cleaned with soft brushes and Wishab Sponges with a rubber-nozzled vacuum to pick up the loose dust and dirt.
- Following a variety of wet cleaning spot tests, the surface of the panel was cleaned with 2-5% Vulpex Liquid Soap in de-ionised water, using cotton wool swabs.
- All areas of raw plaster were given an application of 10% Paraloid B72 in acetone to provide an isolating layer between the original plaster and the repairs.
- The areas of flaking paint were consolidated with an application of 5% Primal B60A in de-ionised water.
- Areas of loss, open joints and cracks were filled with white micro-balloons mixed with 12% Paraloid B72 in acetone. Larger areas of loss and around the screws were filled with an inert filler to provide extra strength.



*Details of fill repair*

- All the fills were then toned out with acrylics, mixed with matting agent, to match the surrounding patina.
- Finally, the entire cast was given an application of micro-crystalline wax so as to protect the surface.

### 2.2.5 MAINTENANCE PROGRAMME

Maintenance of the Parthenon Frieze requires to be undertaken from a scaffold. As a result, any cleaning needs to be carried out by operatives that are trained to: a) construct, move and dismantle a portable scaffold tower; and b) clean the Frieze in an appropriate manner.

Graciela Ainsworth Sculpture Conservation could train staff to undertake such cleaning. The training for the use of scaffold would require organising by the Edinburgh College of Art.

The cleaning programme would involve the trained operatives, wearing the appropriate PPE, removing the loose dust using soft brushes and a vacuum cleaner with a rubber nozzle that would have muslin attached to its end. The muslin prevents any potential damage to the plaster from being lost in the vacuum cleaner. Any fragments that are dislodged, and their locations on the cast, should be documented and wrapped carefully in acid free tissue prior to being stored in a safe location. A trained conservator should be contacted immediately in order to repair the damage.

**NB** At no time should cleaning products or any liquid (including water) be used.

We would recommend that this cleaning programme for the Frieze should be undertaken on an annual basis (at minimum). Ease of access would mean that the free standing casts could be cleaned, with the same method, on a more regular basis.

### 2.3 SLAB 3



*Panel before conservation*



*Panel after conservation*

### **2.3.1 DESCRIPTION OF THE OBJECT**

**TITLE:** Part of the frieze from the Temple of Athena Nike, Slab 3

**NUMBER(S):** 081, N081 (117)

**TYPE OF OBJECT:** Relief, plaster cast with a metal structure inside, attached to the wall with metal fixings.

**MAKER:** unknown

**SIGNATURE/INSCRIPTION:** none

**DATE:** 1827

**OWNER/LOCATION:** Edinburgh College of Art, Lauriston Place, Edinburgh, EH3 9DF.  
Main Building, ground floor, North-East corridor off Sculpture Court

**DIMENSIONS/WEIGHT (APPROX):** H: 350mm W: 1760mm D: 60mm  
Weight (approx):

### **2.3.2 CONDITION REPORT BEFORE CONSERVATION**

**STRUCTURAL STABILITY:** Good, but cracks in between panels on both sides of the panel.

**SURFACE DUST AND DIRT:** Severe, 100% coverage.

**VISIBLE PAINT LAYERS/UNSIGHTLY MARKINGS:** Layer of cream-yellow paint on surface of the cast; small spots of paint splash on surface of the panel; white paint smears by the lower edge of the cast and on sinister edge.

**CHIPS AND LOSS:** Areas of loss associated with cracks; chip in sinister part of the panel by top edge.

**ABRASIONS:** Not significant



**Cracks**

**Chips, abrasions, missing surfaces**

**Paint splashes**

**Ferrous items under plaster**

**PREVIOUS REPAIRS:** Unknown

### **2.3.3 ORIGINAL MATERIALS AND TECHNIQUES**

The object is a plaster cast with a metal reinforcing structure inside. The surface of the sculpture is cream-yellow. To find out the stratigraphy, and to identify the materials of the polychromed layer, samples of the plaster with paint were taken and sent to the University of Northumbria for analysis. Photograph of a cross-section of the sample taken from **Slab 1** shows two white paint layers, possibly zinc white on the top of white lead.

### **2.3.4 TREATMENT REPORT**

- Prior to any conservation treatment, the cast was photographed. This photographic documentation was continued throughout all conservation processes.
- Initially, the cast was dry cleaned with soft brushes and Wishab Sponges with a rubber-nozzled vacuum to pick up the loose dust and dirt.
- Following a variety of wet cleaning spot tests, the surface of the panel was cleaned with 2-5% Vulpex Liquid Soap in de-ionised water, using cotton wool swabs.
- All areas of raw plaster were given an application of 10% Paraloid B72 in acetone to provide an isolating layer between the original plaster and the repairs.
- The areas of flaking paint were consolidated with an application of 5% Primal B60A in de-ionised water.
- Areas of loss, open joints and cracks were filled with white micro-balloons mixed with 12% Paraloid B72 in acetone. Larger areas of loss and around the screws were filled with an inert filler to provide extra strength.



*Details of fill repair*

- All the fills were then toned out with acrylics, mixed with matting agent, to match the surrounding patina.
- Finally, the entire cast was given an application of micro-crystalline wax so as to protect the surface.

### **2.2.5 MAINTENANCE PROGRAMME**

Maintenance of the Parthenon Frieze requires to be undertaken from a scaffold. As a result, any cleaning needs to be carried out by operatives that are trained to: a) construct, move and dismantle a portable scaffold tower; and b) clean the Frieze in an appropriate manner.

Graciela Ainsworth Sculpture Conservation could train staff to undertake such cleaning. The training for the use of scaffold would require organising by the Edinburgh College of Art.

The cleaning programme would involve the trained operatives, wearing the appropriate PPE, removing the loose dust using soft brushes and a vacuum cleaner with a rubber nozzle that would have muslin attached to its end. The muslin prevents any potential damage to the plaster from being lost in the vacuum cleaner. Any fragments that are dislodged, and their locations on the cast, should be documented and wrapped carefully in acid free tissue prior to being stored in a safe location. A trained conservator should be contacted immediately in order to repair the damage.

**NB** At no time should cleaning products or any liquid (including water) be used.

We would recommend that this cleaning programme for the Frieze should be undertaken on an annual basis (at minimum). Ease of access would mean that the free standing casts could be cleaned, with the same method, on a more regular basis.



## 2.4 SLAB 4



*Panel before conservation*



*Panel after conservation*

### **2.4.1 DESCRIPTION OF THE OBJECT**

**TITLE:** Part of the frieze from the Temple of Athena Nike, Slab 4

**NUMBER(S):** 082, N082 (118)

**TYPE OF OBJECT:** Relief, plaster cast with a metal structure inside, attached to the wall with metal fixings.

**MAKER:** Unknown

**SIGNATURE/INSCRIPTION:** None

**DATE:** 1827

**OWNER/LOCATION:** Edinburgh College of Art, Lauriston Place, Edinburgh, EH3 9DF.  
Main Building, Ground floor, North-East corridor off Sculpture Court

**DIMENSIONS/WEIGHT (APPROX):** H: 350mm W: 2080mm D: 60mm

Weight (approx):

### **2.4.2 BRIEF CONDITION REPORT BEFORE CONSERVATION**

**STRUCTURAL STABILITY:** Good, but crack in between panels on dexter side of the cast.

**SURFACE DUST AND DIRT:** Severe, 100% coverage.

**VISIBLE PAINT LAYERS/UNSIGHTLY MARKINGS:** Layer of cream-yellow paint on surface of the cast; small spots of paint splash on surface of the panel; white paint smears by the lower edge of the cast and on sinister edge.

**CHIPS AND LOSS:** Areas of loss associated with cracks.

**ABRASIONS:** Not significant



**Cracks**

**Chips, abrasions, missing surfaces**

**Paint splashes**

**Ferrous items under plaster**

**PREVIOUS REPAIRS:** Unknown

### **2.4.3 ORIGINAL MATERIALS AND TECHNIQUES**

The object is a plaster cast with a metal reinforcing structure inside. The surface of the sculpture is cream-yellow. To find out the stratigraphy, and to identify the materials of the polychromed layer, samples of the plaster with paint were taken and sent to the University of Northumbria for analysis. Photograph of a cross-section of the sample taken from **Slab 1** shows two white paint layers, possibly zinc white on the top of white lead.

### **2.4.4 TREATMENT REPORT**

- Prior to any conservation treatment, the cast was photographed. This photographic documentation was continued throughout all conservation processes.
- Initially, the cast was dry cleaned with soft brushes and Wishab Sponges with a rubber-nozzled vacuum to pick up the loose dust and dirt.
- Following a variety of wet cleaning spot tests, the surface of the panel was cleaned with 2-5% Vulpex Liquid Soap in de-ionised water, using cotton wool swabs.
- All areas of raw plaster were given an application of 10% Paraloid B72 in acetone to provide an isolating layer between the original plaster and the repairs.
- The areas of flaking paint were consolidated with an application of 5% Primal B60A in de-ionised water.
- Areas of loss, open joints and cracks were filled with white micro-balloons mixed with 12% Paraloid B72 in acetone. Larger areas of loss and around the screws were filled with an inert filler to provide extra strength.
- All the fills were then toned out with acrylics, mixed with matting agent, to match the surrounding patina.
- Finally, the entire cast was given an application of micro-crystalline wax so as to protect the surface.

### **2.2.5 MAINTENANCE PROGRAMME**

Maintenance of the Parthenon Frieze requires to be undertaken from a scaffold. As a result, any cleaning needs to be carried out by operatives that are trained to: a) construct, move and dismantle a portable scaffold tower; and b) clean the Frieze in an appropriate manner.

Graciela Ainsworth Sculpture Conservation could train staff to undertake such cleaning. The training for the use of scaffold would require organising by the Edinburgh College of Art.

The cleaning programme would involve the trained operatives, wearing the appropriate PPE, removing the loose dust using soft brushes and a vacuum cleaner with a rubber nozzle that would have muslin attached to its end. The muslin prevents any potential damage to the plaster from being lost in the vacuum cleaner. Any fragments that are dislodged, and their locations on the cast, should be documented and wrapped carefully in acid free tissue prior to being stored in a safe location. A trained conservator should be contacted immediately in order to repair the damage.

**NB** At no time should cleaning products or any liquid (including water) be used.

We would recommend that this cleaning programme for the Frieze should be undertaken on an annual basis (at minimum). Ease of access would mean that the free standing casts could be cleaned, with the same method, on a more regular basis.