

ASKING FOR THE CONTEXT: CONSERVATION STRATEGY FOR JOSEPH BEUYS' *THE END OF THE TWENTIETH CENTURY*

Maike Grün

ABSTRACT

The Munich installation artwork *Das Ende des 20. Jahrhunderts* (*The End of the Twentieth Century*, 1984) by Joseph Beuys consists of 44 pillared basalt blocks. A cone was drilled out of each block, and then reinserted with clay and felt. The prepared stones were installed in the Haus der Kunst in Munich by the artist in 1984 and relocated to the Pinakothek der Moderne in 2002. Today, some of the materials used for the artwork are very deteriorated. The stones also show a variety of peculiarities and traces of unknown origin. All this has necessitated a discussion of the readability of the artwork and its conservation requirements. In this paper, the provenance of the materials used and the creation of the work are described through discussions with those who participated in its creation as well as with the aid of scientific investigations and descriptions of the materials. This provides a descriptive picture of its process of creation and its state of preservation. A conservation concept is developed based on these contextual insights.

ZUSAMMENFASSUNG

Die Münchner Rauminstallation *Das Ende des 20. Jahrhunderts* (1984) von Joseph Beuys besteht aus 44 Basaltquadern, aus denen jeweils ein Konus gebohrt und wiederum mit Ton und Filz eingesetzt wurde. Die so vorbereiteten Steine wurden im Jahr 1984 im Haus der Kunst in München vom Künstler installiert und im Jahre 2002 in die Pinakothek der Moderne umgesetzt. Heute befinden sich die verwendeten Materialien in einem zum Teil stark gealterten Zustand. Zudem finden sich zahlreiche Eigenheiten und Spuren unbekannter Herkunft. Dies entfachte eine Diskussion über die Ablesbarkeit des Kunstwerks und dessen konservatorische Betreuung. Der vorliegende Beitrag zeigt die Herkunft der Materialien und die künstlerische Realisierung der Arbeit anhand von wissenschaftlichen Materialuntersuchungen, Materialbeschreibungen und Gesprächen mit damals beteiligten Personen auf. Hierdurch ergibt sich ein anschauliches Bild sowohl des Entstehungsprozesses als auch des Erhaltungszustandes. Anhand dieser kontextuellen Erkenntnisse wird ein Erhaltungskonzept für die Rauminstallation entwickelt und zur Diskussion gestellt.

INTRODUCTION

Joseph Beuys (1921–1986) is regarded as one of the most important artists of the last century. The Sammlung Moderne Kunst in the Pinakothek der Moderne in Munich owns the largest of the four versions of his installation *The End of the Twentieth Century*, Fig. 1. In 1984, Beuys arranged the 44 stones in the Munich Haus der Kunst, then known as the 'Staatsgalerie



Fig. 1 *The End of the Twentieth Century* in the Pinakothek der Moderne, Munich, 2002. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

moderner Kunst', where they were exhibited in the same room without change until 2002. The work was then relocated to the newly-constructed Pinakothek der Moderne, which meant that *The End of the Twentieth Century* was the first artwork to move in, more than six months before it opened. It was not only its placement in a room differing architecturally in many ways from that in the Haus der Kunst which enabled the artwork to make a new impact and gain more attention. The main topic of discussion was the fact that the original arrangement of the stones, created personally by Beuys, had to be touched. This prompted the Doerner Institut to publish a comprehensive publication on *The End of the Twentieth Century* that addresses the theoretical and practical issues associated with the artwork and its translocation from an inter-disciplinary point of view [1].

In addition, the materials, processing techniques and the state of preservation of the room installation were subjected to new examinations and tests. This work of art shows a variety of peculiarities and traces whose provenance had been unexplained until that point. Which of these features were intended by Beuys or even simply accepted by him? Which tasks did Beuys delegate, and which did he carry out himself?

Some of the contributions in this publication deal with the conditions under which the work was created [2–4]. This paper describes the development of a conservation strategy for the Munich version of *The End of the Twentieth Century*. This strategy is based on these contextual insights as well as more complex investigations on the state of preservation.

BRIEF TECHNICAL DESCRIPTION [4]

Forty-four basalt stones with lengths between 1.20 and 1.80 m are arranged on the floor over an area of slightly less than 70 m². These basalt columns have irregular cross-sections and up to seven faces. Some of them lie inclined or completely on top of one another; a single pillar rises above the rest in an upright position. The stelae are covered to varying degrees by an ochre-coloured weathered crust, which is reddish in places. The fractured or processed surfaces exhibit the typical dark grey colour of basalt stone.

A cone was cut out of one end of each basalt column and then reinserted into the corresponding mother stone. Each cone was then fixed in its borehole with clay. For all but 10 stones, the cut surface of the cone was previously wrapped with an additional strip of felt.

CHRONOLOGY OF ITS CREATION

The creation of *The End of the Twentieth Century* is closely associated with Beuys' project *7000 Eichen* (7000 Oaks) for *documenta 7* in 1982. Following the theme *Stadtverwaltung statt Stadtverwaltung* (City Forestation instead of City Administration), Beuys had a wedge-shaped pile of basalt columns arranged on the Friedrichsplatz in front of the Museum Fridericianum in Kassel. These columns were then 'planted out', each paired with a tree, throughout the city of Kassel over a period of several years.

The stones for *7000 Eichen* came from several quarries. The quarry at Weilberg am Rhein provided dark basalt columns of a slender, straight, regularly prismatic shape, mostly with five or six sides. The Beilstein quarry in the Westerwald region also

delivered slender basalt columns, however, the latter displayed nervously agitated surfaces. Their corrosion layer was a chalky white and flaked off [5]. For *The End of the Twentieth Century*, Beuys decided on columns from Landsburg, a quarry that lies to the south of Kassel and is operated by the Stormarnwerke. The stones produced here have different proportions compared to those of other quarries, and are “very much thicker and longer, and rather more amorphous in shape [...] The colour of their surfaces [...] is a loamy ochre” [5]. Geologically, they belong to the group of alkali-olivine basalts [2].

At this point, one should consider how the particular, seemingly geometric shape of the basalt columns arises. Basalt is solidified lava. Columns are formed:

when lava flows collect as magma lakes in morphological depressions, in which they gradually cool down. The polygonal margins correspond with tension fractures, which occur as a result of volume reduction during the cooling and solidification process. Tension fracturing starts at the point of contact between the magma and its cold environment, for example at the surface and along the base of the lava flow, and from there the fractures penetrate the solidifying magma body. [2]

Towards the end of the *documenta*, namely in September 1982, Beuys developed the idea of drilling cones out of the basalt stones. He charged U We Claus and Walter Giskes with the task of undertaking drilling trials on some of the stones in the basalt column depot in Kassel [5].¹ Beuys said: “Sort out the heaviest, the biggest ones. And so we choose the thickest ones” [6]. U We Claus and Walter Giskes rented space at the workshop of the stonemason Arnold Hofmann in Frielendorf in order to work the stones. After the first five specimens had been completed, Hofmann took over the work on approximately 100 stones, which he fetched directly from the Landsburg quarry. The majority of these stones are now to be found in the four existing versions of *The End of the Twentieth Century*.

The 44 Munich stones belonged to the first batch fetched from the stonemason’s workshop in May 1983 to be exhibited in the Galerie Schmela in Düsseldorf. Before the stones were loaded onto lorries, Beuys fixed the cones with clay and felt in their respective mother stone. After their arrival in Düsseldorf, Beuys arranged the stones in the basement exhibition room of the gallery. The room was darkened and had to be illuminated by the visitors from behind a barrier by means of watertight flashlights.

The room was like a grotto. The walls are made of stone so they are not white. It felt like a cavern. And there the stones lay, like a pack of animals ... And Beuys had just told us to turn the light off. This made it even more eerie. It looked really good. Completely different to when the light was on [7].

The installation was then purchased by the Galerieverein for the Staatsgalerie moderner Kunst in the Haus der Kunst in Munich. In February 1984, Beuys arranged the stones in a new way in a bright room flooded by daylight at the end of the South Gallery on the first floor.

FEATURES AND TRACES — THEIR CREATION IN CONTEXT

Flaking of the weathered crust

The weathered surface of the basalt stones is called a ‘crust’

¹ U We Claus, an employee of the FIU (Freie Internationale Universität) and his teacher Walter Giskes were responsible for setting up the basalt column depot for *7000 Eichen*.

because it is not a homogeneous layer; the transitions from the weathered exterior to the unweathered interior are blurred. Its genesis can be explained as follows:

Along fractures, so-called joints (that arise from the above-mentioned tension fracturing of the solidifying lava), the basalts are susceptible to weathering caused by the circulation of ground water. The consequential transformation of primary, i.e., magmatic minerals into so-called secondary minerals such as clay minerals produces a light-coloured weathered crust. This process can begin at a very early stage, for instance when rainwater penetrates the fractures and reacts vigorously with the solidified but still hot basalt [2].

It can be assumed that the stones — apart from their fracture surfaces, of course — were completely covered by this crust. As seen on the soft flaking edges, this crust must have already been lost a long time previously in numerous — and, in some cases, large — areas. Today, it is still present on all the stones, although to different degrees, from an almost continuous layer to isolated spots.

The flaking process is still not complete. The weathered crust is crumbling on the majority of the stones into differently sized particles — their dimensions vary from a few square millimetres to several square centimetres, Fig. 2. Only seven of the 44 stones have a continuously stable crust. On the majority of the stones (26 of them), the surface is only slightly affected (1–5% of the surface, visual estimation); however, 11 of the stones are greatly affected: here the fraction varies between 10 and 40% of the surface.

A particle of the weathered crust was examined by X-ray diffraction:

The main mass of the minerals in the weathered crust is made up of primary minerals (i.e. magmatic minerals crystallising in the basalt): feldspar (plagioclase), clinopyroxene (augite) and magnetite (an iron oxide). Olivine, which used to be present, has completely decomposed. Secondary minerals, which have been produced by weathering of the primary minerals as well as the basaltic glass, include haematite (an iron hydroxide, i.e. ‘rust’, only in small quantities, < 1%) and, above all, a clay mineral of the smectite group, possibly saponite (>25%). These clay minerals are only a few microns in size, have a flaky habit and thus arrange themselves parallel to each other and parallel to the surface of the rock [8].



Fig. 2 Detailed view of the weathered crust on a stone: it has already been lost in the darker regions to the left; there are several loose particles on the right. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

This explains the flaking of the weathered crust. Wherever the weathered crust has been lost, it leaves behind a darker patch, which sometimes has dark red spots. This is because a less weathered stage has been uncovered. The intermediate stage contains comparatively large proportions of rust-red haematite produced by conversion of metallic minerals in the basalt rock. Haematite then weathers to yield the ochre-coloured goethite, which, along with other factors, explains the ochre-coloured appearance of the outer weathered crust [9].

Scratches on the basalt stone

Many of the stones exhibit scratches, and some of them are deep, Fig. 3. The scratches are much deeper in the weathered crust compared to the grey unweathered basalt. This can be attributed to the fact that the basalt is harder and thus more resistant to mechanical damage.

These scratches on the stones can be explained by their extraction from the quarry. The basalt stones quarried in Landsburg are mainly crushed to grit and gravel to be used in the construction of roads, railways and waterways.

The extraction of the steles intended for Beuys was integrated into normal quarrying operations: the columns were separated from the broken rock that had been obtained by blasting the rock wall:

The wall is blasted. And it collapses. Then there is a large heap of stones. There are still some whole ones, but 95% are broken. We picked out the whole ones. The excavator shovelled them up and put them on one side [10].

It is obvious that the scratches originated during extraction of the columns in the quarry; they were caused by blasting and the subsequent sorting of the broken rock. Beuys himself laid great value on careful handling of the basalt columns:

We noticed it from the first day on. Like Mr Schmidt has said, if he only saw how we shoved the things about and how we handled them. Of course, we aren't allowed to do that when Beuys was there. After all, a quarryman handles stones differently. Whether we put blankets round them during transport, like Beuys wanted, or whether we only used belts, nothing would have happened to them anyway [11].

Chalk crosses on the stelae

Many of the stones have a yellow chalk cross on them like a quickly applied mark, see Fig. 3. Their size varies from 4 to 15 cm.



Fig. 3 Detailed view of a stone with numerous distinct scratches. There is a yellow chalk cross on the upper right. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

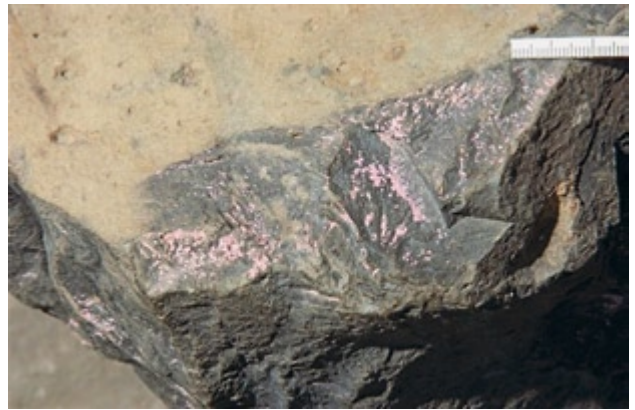


Fig. 4 Splashes of pink paint. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

That is oil crayon. There we were, Beuys, workers from the Stormarnwerk and me, in the quarry — I was also by myself sometimes — and we choose the stones. On those stones that were to come to me in the workshop at Frielendorf for further processing, we made a cross [11].

Hofmann picked them up from there and transported them to his workshop. He was in the quarry two or three times with Beuys.

And then I knew what he was looking for. And then Mr Beuys said: 'Here, Mr Hofmann, keep going, carry on drilling. Drive over there, choose the stones and finish them off' [11].

Splashes of pink paint on the stelae

On four of the 44 stones there is a pink deposit present as a closed layer, as splashes or as droplets, depending on the applied thickness, Fig. 4.²

To explain the origin of this paint, we must return to the basalt column depot in front of the Fridericianum in Kassel. At the start of *documenta* 7, hundreds of the basalt stones were covered with pink paint during the night: "This was probably carried out with tanks and pressurised sprayers" [6]. Responsibility for this was admitted by the so-called 'Pinkies', an activist group who had protested against Beuys' art in several demonstrations and actions:

They wore narrow-brimmed felt hats and carried banners denouncing Beuys' art as being capitalist and that an incredible amount of money was being paid for it [6].

Beuys contracted a company to clean the stones. The Pinkies had to foot the bill:

Afterwards, there was still some paint left on them. The stones were not taken to a laboratory, instead they lay around on the plaza where they were cleaned with a high-pressure cleaner and steam. The paint ran over the plaza into the sewer, and there were definitely some bits that could not be removed properly [6].

Because the affected stones do not have any chalk crosses that would point directly to their origin being the quarry, it is probable that these stones are the initial specimens taken by U We Claus and Walter Giskes in Kassel.

²An analysis of the paint showed that the colouring component is the synthetic organic quinacridone pigment, Pigment Violet 19 (PV19). The fillers proved to be chalk and titanium white. Stege, H., Doerner Institut, unpublished analysis report, 29 March 2004.

³They are alkyd resin paints. Baumer, U. and Koller, J., Doerner Institut, unpublished analysis report, 29 June 2004.



Fig. 5 Numbers written on two stones: left, '35' in white paint; right, '41' in yellow oil crayon. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

Numbers on the stelae

Thirty-five of the stones have numbers on their end faces, written in white or pale grey paint,³ that do not appear to be in any order. Some of them are repeated in red or yellow oil crayon, Fig. 5. They range from '1' to '49', although '20' appears twice and some numbers are missing.

Beuys wanted the drilled cones to remain in the mother stone.

Therefore, we had to number all the stones. And therefore the numbers are on the stump of the cone and in the hole. If you took them all out, you would be able to see the numbers. On some of them, to ensure that the stones were not mixed up, we also wrote numbers on the bottom of the stones. But Beuys said: "Make sure that you get rid of the numbers." However, some of the stones were loaded onto the truck with their number still on them, which is why they still have their numbers [11].

The paint used for this was "stone paint which we stonemasons use to colour script" [11].

Felt

As already mentioned, 10 cones, those that were inserted upright in their borehole, were never wrapped in felt, Figs 6 and 7. Stüttgen explains this as follows:

Beuys had filled the annular or (where the cone is in an inclined position) crescent-shaped gap between the cone and the funnel with clay, and he also wrapped the inclined cones with felt so that each cone was softly cushioned and the outer



Fig. 6 Cone inserted with clay only. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.



Fig. 7 Cone inserted with clay and felt. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

face of the inner piece could not come into contact at any point with the inside face of the outer piece [12].

The state of preservation of the 34 felts used by Beuys differs greatly. Ten are in a good state of preservation; however, three of the original felts have been completely lost. These were in the stones positioned in the foreground nearest to the public. This ultimately lead to access to the installation being cordoned off to prevent any further damage or losses. The remaining 21 felts exhibit differing degrees of substance loss, which is mainly attributed to moth damage.⁴ Of these, 14 are slightly moth-eaten; however, the moths have not left much of the felt in two stones. Although the remaining stones show serious damage, their substance is, however, sufficiently preserved and they are still recognisable as felts. Above all, it is the case that Beuys treated the felt wrappings with a clay slurry that has contributed to their preservation — the impregnated areas show little moth damage. There does not appear to be an active infestation at present.

Water marks and white efflorescence on the cones

Nearly all the cones have visible water marks. The presence of water is explained by the fact that Beuys wanted water poured over the clay located in the gaps between the cones and the mother stone during presentation of the installation in the Galerie Schmela. "At the end, when everything was installed, he said we should keep it damp by regularly dousing it with a watering can" [7].

The cones wrapped with felt are particularly heavily water-marked owing to an additional white substance that optically accentuates the water marks. This efflorescence is particularly heavy on the protruding tips of the felt and clay, Fig. 7. It consists of magnesium sulphate (Epsom salts or 'bitter salt') and calcium sulphate (gypsum) [13]. These two compounds have been formed from substances contained in the felt and the clay. There are two possible reasons for the formation of these products.

On the one hand, bitter salt is used in the textile industry as a flame retardant, for pickling and (in felts!) as a weighting agent. This bitter salt could also have reacted with constituents of the clay to give gypsum. The other possible explanation for the efflorescence may lie in the fulling agents used to make the felt. These include [...] sulphuric acid, which is neutralised at the end of the felting process by the addition of soda. Neutralisation produces sodium sulphate, which can re-

⁴ Appraisal and classification of insect infestation by the forensic entomologist Mark Benecke on 20 June 2003. At present, only a partial determination of the species is possible owing to the morphological conditions. Benecke, M., forensic entomologist, personal communication, 15 September 2005.

act with constituents of the clay to give the above-mentioned efflorescence [13].

It is conceivable that these compounds migrated out of the clay and felt as a result of the repeated dousing to become enriched on the evaporation surface.

The visible efflorescence has become greatly reduced over time. This can be explained by the fact that the efflorescence is in the form of a fine powder that only weakly adheres to the exposed areas and can thus be removed easily.

Clay

Two different types of clay have been found. One of the clays, which mainly lies in the deeper areas of the gaps, is a friable, pale ochre mass containing a lot of impurities and exhibiting numerous drying cracks. The other clay is noticeably more homogeneous, with a dark grey colouring and much less cracking, Fig. 8. The presence of these two different clays can be explained thus. Before Beuys fetched the stones from Arnold Hofmann, he asked him to run an errand.

Beuys said he would like to have light grey clay. We have brickyards here, but they do not have light grey clay. I went to several brickyards, but my search was fruitless. Purely by chance, I saw light grey clay in an excavated pit located in a development area, at a place called Trutzheim. I took several bucketfuls with me [11].

Beuys used this material to insert the cones before the stones were transported to Düsseldorf. After arriving in Düsseldorf, in the Galerie Schmela he also requested some dark grey clay.

In the meantime, he thought he would need some more clay. One of his 'disciples' then ran immediately into the Grafenberg forest, which is the nearest forest to Düsseldorf, and returned from the forest after a few hours with a bucket of earth that was totally wrong. It couldn't be used [7].

It thus appears that there were no decisive changes made to the cones in Düsseldorf. However, his wish was fulfilled in Munich: Peter Berkes, then working as a conservator in the Staatgalerie Moderner Kunst obtained some dark grey clay from one of his friends, a potter [14]. Beuys used this clay to make some modifications to the cones in Munich. He removed some of them and repositioned them in their borehole. The dark grey clay now lies on top of the paler clay or was tamped down the sides or is on its own.

In Munich, Beuys did not say that he wanted the gap around the cones doused. The clay thus dried out completely. Today there is a considerable variation in the state of the clay in these gaps; it is very crumbly in many places. Clay particles have broken off



Fig. 8 Detailed view of the gap between a mother stone and its cone: left, the darker clay; right, the paler variety. © VG BILD-KUNST Bonn, 2006. © Bayerische Staatsgemäldesammlungen, Munich. Photo: S. Forster.

in the upper ridge-like areas. In some stones, again those in the foreground, in particular, it has almost completely disappeared. In addition, the gaps are very dusty.

INTRINSIC FEATURES OF THE WORK, AGEING PHENOMENA, DAMAGE?

The features and phenomena discussed above can be divided into two groups with regard to their chronological origin. The features of the first group already existed before the work was installed in the Haus der Kunst — they can thus be termed as intrinsic features of the materials and thus of the work, even if Beuys might not have known all of them or was not aware of them. These include the scratches on the stones, the yellow chalk crosses, the applied numbers, the water marks, including the white efflorescence, as well as the splashes of pink paint. All these features are related to the artistic and technical context of the installation's creation history. Whereas the residual pink paint points to the intellectual conditions under which the work was created in Kassel, the scratches, numbers and crosses attest to the material and technical realisation. The water marks and the white deposits document how Beuys altered the character of the installation between the two different exhibition locations in Düsseldorf and Munich.

The second group consists of features and phenomena that resulted after installation in the Haus der Kunst. These include the ageing phenomena, such as the clay becoming more friable and collapsing, as well as obvious damage, such as moth infestation of the felt and losses due to missing pieces of clay and felt.

The weathered crust has an ambivalent position between these two groups. It is certain that the crust was already flaking off or had already flaked off in places at the time the installation was being created. Without a doubt, there have since been new losses and thus changes in the crust. Is the flaking and loss of the weathered crust an ageing phenomenon or can it be termed damage? It could be regarded as damage if one is directly confronted with the loose particles or bare patches that signify a loss of original substance. Nevertheless, flaking of the weathered crust cannot be compared to the flaking off, for example, a coat of paint. Whereas a coat of paint is a creative means to follow a deliberate aesthetic goal, the *weathering* of a *weathered crust* literally lies in its nature and can thus also be considered as an ageing phenomenon that has to be respected.

CONSERVATION STRATEGY

Before a possible conservation strategy is formulated, it must be clarified as to what extent the changes and losses of the clay and felt have affected the readability of the installation. There are large differences of opinion on this subject: there were loud calls "to restore the original state necessary for understanding" [3]. The question arose as to when one can actually speak of a falsification of Beuys' statement. The transitions are certainly blurred considering that material-related ageing was indeed accepted by Beuys. Even if the majority of the felt and the clay is missing for five of the cones — they are still in place in the remainder. To cut this discussion short — nothing should be done to the present condition of the felts and the clay for the following reasons.

Questioning of the participants showed that Beuys delegated some of the work after issuing precise instructions. This included choosing the stones and the exact positioning of the boreholes. On the other hand, Beuys himself inserted and aligned the cones. He brought the felt with him, he had the clay procured at the different locations according to precise specifications. The clay still shows traces of smoothing from the little stick used by Beuys as well as his fingerprints. There are many references to how Beuys brought life into the stones by inserting the cones:

These special shapes taken from the stone and reinserted by him have [...] the effect of 'organs of consciousness', one could regard them as eyes, for example. These creatures made of prehistoric rock [...] thus appear to be alive, like animals, like wise men [12].

It is thus a central theme of the artwork. Supplementary and reconstructive measures would obscure the important aspect of authenticity. The missing substance is thus accepted.

With regard to the conservation of the installation, the focus should be on preventative measures and more intense monitoring.

Felt

The felts will be regularly checked for infestation by insects, e.g., by moth larvae or beetles. In addition, there will be half-yearly monitoring with a light trap — consisting of a sticky board and a lamp — which will be placed on the floor of the closed exhibition room every night for a period of three weeks. All the insects that attack felt, such as various types of moths, larder, carpet or museum beetles are attracted by the light and adhere to the board. This allows the identification of insects that damage felt, which are very difficult to detect because many keep to dark, hidden areas during the day (e.g., the museum beetle) [15, 16].

Weathered crust

The idea of subjecting the weathered crust to comprehensive consolidation measures seems obvious. This idea would be supported by the preservation of the original substance, particularly because losses of material are associated with a visual transformation. Nevertheless, doubts are in order about the appropriateness of such an intervention that would have a contrary effect with regard to the nature of the crust and, in addition to its irreversibility, could lead to optical changes that are difficult to predict.

As described above, large areas of the crust are indeed loose; however, is it not possible that a loosened particle can be 'stable' and remain in its original position for decades? Two factors can accelerate further weathering: firstly, mechanical loading, for example, by touching it. Secondly, climatic fluctuations in which the hydrophilic clays in the crust absorb and desorb water and thus lose their purchase.

The End of the Twentieth Century is now on permanent display, and will not be moved again in the foreseeable future. Visitors will be prevented, as far as possible, from touching the stones. The environmental conditions are stable. It is still not known how many particles of the weathered crust will be lost over an extended period. This is being monitored: detailed photographs of the affected areas have been taken. These will be checked at regular intervals for any changes. The results of this monitoring and any tests should provide a better measure of whether a conservation intervention is necessary or whether small losses can and should be accepted in favour of authenticity. Optimisation of the conditions surrounding the object should minimize losses caused by the stones being touched.

Supervision and security

The majority of the attendants are provided by a contract security company. The turnover of attendants is thus correspondingly high. To make them aware of the sensitivity of the stones, which is not immediately apparent, an illustrated information sheet has been created. This aims to allow the attendants to be able to enforce the ban on visitors touching the artwork both plausibly and emphatically.

Care of the room and the artwork

The company contracted to clean the public areas has received strict instructions to maintain sufficient distance from the in-

stallation whilst working. They clean only the floor outside the area covered by the stones. The areas of flooring between and underneath the stones are dusted by specially instructed exhibition technicians from the Pinakothek der Moderne. All cleaning work on the stones themselves is carried out by the conservators. This includes both dusting the stones as well as cleaning the gaps around the cones. Even so, only coarse contaminants can be removed with tweezers, because vacuuming would remove the original substance, some of which is finely divided, such as the clay crumbs or the white efflorescence.

CONCLUSION

Questions regarding the provenance and significance of the numerous traces and peculiarities on the stones of the installation that are relevant to the conservation could only be answered by studying their interrelationships. In addition to studies of the materials and to scientific investigations, interviews with contemporary witnesses played a major role in this work — without the accounts of their recollections of the creation process, important aspects would have remained in the dark. These insights were extremely significant for the development of the projected conservation strategy. Without the incorporation of this context, one can even claim that it would not have been possible to reach logically consistent decisions.

ACKNOWLEDGEMENTS

The author would like to thank Ursula Baumer, Dr Mark Benecke, PD Dr Andreas Burmester, Dagmar Drinkler, Sibylle Forster, Erich Gantzert-Castrillo, Yvonne Garborini, Bruno Heimberg, Dr Johann Koller, Dr Christoph Krekel, Dr Thomas Kunzmann, Dr Alexander Rocholl, Gillian Scheibelein, Jan Schmidt, Christina Spaarschuh, Dr Heike Stege, Jenny Trautwein and Susanne Willisch.

MATERIALS AND SUPPLIERS

Light trap: The Terminator Flea Trap, Killgerm Chemicals Ltd, P.O. Box 2, Ossett, West Yorks WF5 9NA, UK.

REFERENCES

- 1 Willisch, S., and Heimberg, B., (ed.), *Das Ende des 20. Jahrhunderts von Joseph Beuys. Die Umsetzung vom Haus der Kunst in die Pinakothek der Moderne*, in preparation.
- 2 Rocholl, A., 'Joseph Beuys' *The End of the 20th Century* — A Geologist's Perspective', in *Das Ende des 20. Jahrhunderts von Joseph Beuys. Die Umsetzung vom Haus der Kunst in die Pinakothek der Moderne*, ed. S. Willisch and B. Heimberg, in preparation.
- 3 Klüser, B., 'Munich, Joseph Beuys and *Das Ende des 20. Jahrhunderts*', in *Das Ende des 20. Jahrhunderts von Joseph Beuys. Die Umsetzung vom Haus der Kunst in die Pinakothek der Moderne*, ed. S. Willisch, and B. Heimberg, in preparation.
- 4 Grün, M., 'From the quarry to the Haus der Kunst — talks with those involved on the material and the technical realisation of the Munich installation *Das Ende des 20. Jahrhunderts* by Joseph Beuys', in *Das Ende des 20. Jahrhunderts von Joseph Beuys. Die Umsetzung vom Haus der Kunst in die Pinakothek der Moderne*, ed. S. Willisch, and B. Heimberg, in preparation.
- 5 U We Claus, 'Symphytum: zum *Ende des 20. Jahrhunderts*', in *Joseph Beuys Symposium Kranenburg 1995*, ed. Förderverein Museum Schloß Moyland, Basel (1996) 322.
- 6 U We Claus, interview by the author, 10 June 2003, transcript, 15–17.
- 7 Schmela, U., gallery owner, interview by the author, 1 December 2003, transcript, 3–4.
- 8 Kunzmann, Th., and Rocholl, A., Ludwig-Maximilians-Universität, Munich (LMU), Department for Geo- and Environmental Science, unpublished analysis report, 16 August 2005.
- 9 Rocholl, A., MU, personal communication, 24 August 2005.
- 10 Schmidt, R., former authorised signatory of the Stormarnwerke, interview by the author, 23 September 2003, transcript.

- 11 Hofmann, A., interview by the author, 23 September 2002, transcript, 4–11.
- 12 Stüttgen, J., '*Das Ende des 20. Jahrhunderts*', in *Joseph Beuys*, exhibition catalogue, ed. H. Szeemann, Kunsthau, Zürich (1993) 180.
- 13 Krekel, C., Doerner Institut, unpublished analysis report, 19 April 2002.
- 14 Berkes, P., interview by the author, 28 January 2002, transcript, 2.
- 15 Garborini, Y., Museum Ludwig Cologne, conservation department, personal communication, 20 September 2005.
- 16 Benecke, M., forensic entomologist, personal communication, 15 September 2005.

AUTHOR

Maike Grün received her diploma in paintings conservation from the Hochschule für Bildende Künste in Dresden (2001). She has been employed by the Doerner Institut since 2001 as a conservator for the Sammlung Moderne Kunst in the Pinakothek der Moderne. Address: Bayerische Staatsgemäldesammlungen, Doerner Institut, Barer Str. 29, 80799 Munich, Germany. Email: gruen@doernerinstitut.de