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How the 'Seven Deadly Agents of Destruction' can help preserve the *Crystal Palace Dinosaurs*

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Introduction

Compared to collections kept safe inside museums, outdoor sculpture is affected by additional risk factors. Sculpture in the public realm is exposed to the elements, pollution and direct sunshine. It is more vulnerable to vandalism and the proximity to nature can also take its toll. At the same time, the condition of outdoor sculpture is often not monitored as rigorously as that of museum collections. However, damage doesn't go unnoticed by the public and, channelled in the right way, the public's critical eye can be turned to positive pressure, increasing support for conservation work and helping to improve conditions for the displays.

To conservation professionals, the Canadian Conservation Institute's framework of *Ten Agents of Deterioration* is a familiar and well-established way of describing risk factors to cultural heritage. This paper describes an attempt to translate this framework into a short animated film about risks to outdoor sculpture, using the *Crystal Palace Dinosaurs*, a renowned Victorian sculpture park in south London, as the stage for the message. The film is aimed at a broad audience of non-professionals of all ages and it is hoped that it will deliver an increased sense of both understanding and ownership of the sculpture park.

The *Crystal Palace Dinosaurs*

The *Crystal Palace Dinosaurs* are the first life-sized sculptural reconstructions of extinct animals, built to engage and enlighten the public on the paradigm-shifting advances in science in the mid-19th century (Owen 1854, McCarthy and Gilbert 1994, Pigott 2004, Bramwell and Peck 2008). They were constructed as a central attraction in the second parkland home of the Crystal Palace after the hugely successful 1851 Great Exhibition in Hyde Park. The sculptures were created between 1852 and 1855 by the renowned natural history artist Benjamin Waterhouse Hawkins and placed on artificial islands with corresponding geological formations constructed to illustrate concepts of stratigraphy and deep time. All this was set in beautiful landscaped grounds

designed by Joseph Paxton, the architect of the Crystal Palace. The principal scientific adviser of the scheme was the famous anatomist Professor Richard Owen, who originally coined the term dinosaur in 1841 and went on later to found the first Natural History Museum in London. The term *Crystal Palace Dinosaurs* is commonly used to describe the whole ensemble, including all models of prehistoric animals and all geological illustrations.

The 32 sculptures span a range of animals from the earliest land vertebrates through to the megafaunal mammals that went extinct at the end of the last ice age. Four are species of the biological group officially called dinosaurs – *Megalosaurus*, *Hylaeasaurus* and two *Iguanodons*, which are perhaps the most iconic. They were reconstructed in alterative stances as there was on-going controversy about their form, but both proudly wear a horn on their noses that later was realised to be a thumb spike. There are also a number of huge marine reptiles emerging from the surrounding lake such as plesiosaurs and ichthyosaurs, and among the mammals are the camel-like *Anoplotherium* and a family of the Giant Irish Elk. Although most of the fossils known then, and reconstructed in Crystal Palace, were British, there is also a *Megatherium americanum*, a giant ground sloth reconstructed from bones brought back by Charles Darwin from his voyage with the HMS Beagle, and several other animals from other continents. Darwin was known to have visited the *Crystal Palace Dinosaurs* after their unveiling, and went on to publish the *Origin of Species* only five years after their completion.

The models of extinct animals were mostly cast from 'artificial stone', the Victorian equivalent of concrete. The technique employed to make the large models is unparalleled and Waterhouse Hawkins describes the process of assembling the standing *Iguanodon* as 'not less than building a house upon four columns' resulting in 'the largest [model] of which there is any record of a casting being made' (Waterhouse 1854: 4). First a lifesized clay model was made, then moulds taken in sections from which the final model was cast. A paint finish was added to increase the lifelike appearance.

The *Geological Illustrations* include a full-size reconstruction of a lead mine, representatives of Britain's major economically important rock types and a layer-cake stratigraphy complete with shifted geologic faults. These too have been recognised as the 'first large scale attempt at illustrating geological ideas beyond the media of the textbook or museum' (Doyle and Robinson 1993: 181). Real rock was brought in from numerous quarries and the 'natural and picturesque adjustment' was overseen by Joseph Paxton (Waterhouse 1875: 28).

The importance of the ensemble was formally recognised when they were listed as Grade II structures in 1973 and upgraded to Grade I listed structures in 2007. Grade I listing is the highest mark of recognition in the UK and is shared by monuments like Stonehenge, St Paul's Cathedral and the Houses of Parliament. *The Crystal Palace Dinosaurs* are still seen by hundreds of people every day. The audience largely consists of local families with young children, but also includes palaeontologists, geologists, historians and tourists on

targeted visits. They are striking sculptures (Figure 1) and the message they convey of science as a process of debate and refinement of interpretation of evidence is probably one of the most critical, salient messages for the public today. Their relevance is perhaps even greater now, and their ability to engage the public remains just as powerful as it has been for 160 years.

Figure 1 View of Dinosaur Island. 'Still surviving on their islands in Crystal Palace Park, the models possess a 3-D solidity that appears to offer a direct link with the past' (Secord 2004: 139)

Conservation History

The statues have been on display from their creation in the mid 1850s to the present day. Ownership has changed a number of times during this period, which complicates any attempt to reconstruct their conservation and restoration history. However, it is evident that maintaining a display of 32 outdoor sculptures and numerous geological formations is an enormous, seemingly often underestimated task. There are recurring reports of the sculptures falling into noticeable disrepair and being overgrown by vegetation. The earliest and, in this context, rather significant evidence of the ensemble being in poor condition is from a letter written by the artist Waterhouse Hawkins himself some 20 years after the completion of the project:

> *I beg to inform you that immediately after my return to England from the U.S. America (26th July, 1874), I hastened to the Crystal Palace, to see the condition of my Colossal Models … which I found in a sadly* depreciated *condition … In the limestone in the upper portion of the section there was originally an elaborate model of a Lead Mine, now obliterated with white wash; and at the present time the beds*

> *and bands of coal are disintegrated and destroyed by the ingrowth of vegetables, that has been allowed to attain the size of bushes; and to complete the inconsistency and solecism, the gigantic Irish Elks have been placed on the Coal Measure !!! So that this carefully constructed and truthful section for visual teaching … has been reversed, stultified or rendered mischievous by the supposed guardians of the Crystal Palace property.* (Waterhouse Hawkins 1875: 27–29)

In the same letter Waterhouse Hawkins recalls how he offered

> *to restore the whole department to its original expressive and useful condition as teaching models ... and that I would do this without any other remuneration than the pleasure of renewing the educational value of this still unique combination, and I further added that I would exercise the severest economy in the use of the necessary materials that might be required.* (Waterhouse Hawkins 1875: 27–29)

For reasons not documented his offer was not accepted on this occasion.

There is also early evidence of damage caused by visitors and a note had to be inserted into a guidebook written by Professor Richard Owen asking visitors not to damage the displays (Secord 2004).

The Crystal Palace itself was destroyed by fire in 1936 and the surrounding park land fell into disrepair for a period of time. There are photographic records and film footage of several restoration campaigns over the 20th Century. These included cleaning, reconstructing missing or damaged areas and repainting. A paint survey carried out in 2002 found up to 24 layers of paint on some of the statues (Hirst Conservation 2004). Over the years there are noticeable changes in the colour schemes and particularly in the last quarter of the 20th Century some rather gaudy choices were made. The giant ground sloth for example was painted in a blue-grey colour as opposed to its original muted beige.

The London Borough of Bromley took ownership of the site in 1986. The last large scale conservation campaign was completed in 2002, supported by generous Heritage Lottery Fund funding. When work commenced most of the *Geological Illustration*s were unrecognisable. Six of the 32 sculptures were missing, as was a large section of the former limestone cliff with a reconstructed lead mine that was blown up to allow for re-landscaping in 1962 when a large stadium was built in the vicinity (Doyle 1993). Comprehensive conservation and restoration works were completed and detailed information was captured as part of the project. Archaeological excavations and thorough paint analysis were carried out and the landscaping and planting scheme of the surrounding grounds was improved considerably. Finally a detailed maintenance plan was drafted (London Borough of Bromley 2004).

Unfortunately the plan was not followed with any documented consistency, maintenance seemed to be only at the initiation of the small staff of park rangers, and the sculptures again fell into noticeable disrepair. A condition report completed in March 2015 estimates that conservation works in

the range of £400,000 to £500,000 are required as a consequence (Eura Conservation 2015). These figures have since increased significantly (pers. comm. London Borough of Bromley, October 2015).

Formation of the Friends

The Friends of Crystal Palace Dinosaurs (FCPD) formed in 2013 to act as a voluntary professional and local pressure group. As expressed in the mission statement, the FCPD work to ensure that the *Crystal Palace Dinosaurs* are 'treated respectfully, funded sustainably, preserved professionally [and] employed creatively'.

There are currently ten members on the managing board with professional backgrounds in the academic or cultural sectors, offering a broad, high-level skill set. FCPD is a registered charity and has an active, collaborative relationship with the London Borough of Bromley, which owns Crystal Palace Park and the heritage asset of the *Dinosaurs*. Within their first year the FCPD lobbied and liaised extensively with London Borough of Bromley and Historic England (formerly English Heritage) to commission a condition survey as a basis for an all-encompassing conservation campaign. By late 2014 the London Borough of Bromley found means to commission a professional survey, which has just been delivered. It is anticipated the FCPD will play an integral role in oversight and fundraising both for immediate conservation works and long-term maintenance, as well as interpretation. The fundraising target is therefore likely to be much higher than the estimations for the immediate conservation works.

As public support is essential to any fundraising strategy involving community assets, FCPD also works closely with a range of cultural and educational organisations to deliver active, participatory engagement with the *Dinosaurs*. The group engages in outreach projects such as the community arts festival Fun Palaces in October 2014, where the theatrical performance *Dinosaur Doctors* was devised and staged to a family audience in the park. Talks were presented at the Natural History Museum in London and the Lyme Regis Fossil Festival amongst others. A comprehensive website was launched and social media following is being built via Facebook and Twitter.

How the Ten Agents of Deterioration became the Seven Deadly Agents of Destruction

In preparation for the future conservation campaign of the *Crystal Palace Dinosaur* ensemble we realised that we needed to explain to the public why costly conservation was needed again. After all, the last large scale project took place just over a decade earlier, which is a fairly short period in public memory.

The Friends of Crystal Palace Dinosaurs discussed a variety of options, including using the established *Ten Agents of Deterioration* framework, as developed by Stefan Michalski (Michalski 1990 and 1994) and Robert Waller (Waller 1994) at the Canadian Conservation Institute. When we discussed this approach to systematically describing threats to cultural heritage at a FCPD board meeting, Chris Aldhous, a professional creative communications strategist with extensive experience in the advertising sector, suggested making a short animation film called the *Seven Deadly Agents of Destruction*.

The underlying idea was to make the case for maintenance without using such a drab and obligation-lumbered word. The film would show how the *Dinosaurs* are under direct attack and need protection. It would illustrate that there are strong and persistent enemies that can nevertheless be fought through a noble battle.

The medium of animation film is ideal to visualise decay mechanisms that in reality are very slow or small scale, such as granular disintegration from freeze-thaw action. It has the potential to combine learning with entertainment and caters for short attention spans. The film will be placed on the YouTube website and shared via the Friends of Crystal Palace Dinosaur's website and social media. The aim was therefore to make it as inclusive and re-watchable as possible.

Audience Research

To gain some understanding of the pre-existing knowledge of the likely audience for the film we devised a survey. The questionnaire was publicised via the FCPD's website, Facebook and Twitter accounts, which will also be the channels for advertising the *Seven Deadly Agents of Destruction* film. Consequently the sample group is not representative of the 'general public' but a specific target group. The survey was created using Google forms and comprised both multiple choice and open questions. As this survey was completed via the internet it is understood that answers to general knowledge questions are perhaps not a true representation of people's spontaneous knowledge but some information might have been looked up online. It would be interesting to compare results with a repeat survey in the park next to the actual sculptures in the future.

A total of 170 completed surveys were returned. 85% of the respondents were from south east London, 12% from elsewhere in the UK and 4% from overseas. The majority (64%) had seen the dinosaur sculptures within the last month, and a further 28% within the last year, leaving 8% that had not seen them within the last year.

The general knowledge of the ensemble was good, as expected given the target group. 65% of the respondents knew that the *Crystal Palace Dinosaurs* are Grade I listed and, when asked which materials the sculptures were made from, 67%

of the answers were correct. The age of the sculptures was appropriately estimated to between 150 and 170 years by 57% of the people; interestingly 40% of the remaining respondents underestimated the age of the ensemble, in fact 19% thought the ensemble was less than 100 years old. 95% agreed that their feeling of pride in South London is increased by the presence of the Dinosaur sculpture park and a further 76% agreed that the ensemble deepens their understanding of Britain's unique historical contributions to science. A small selection of answers provided in response to the free text question 'What do the *Crystal Palace Dinosaurs* mean to you?' is shown in Figure 2.

Figure 2 Selected responses to the question 'What do the *Crystal Palace Dinosaurs* mean to you?'

To assess the perceived condition of the sculptures a multiple choice of commonly used condition descriptors was offered. Only 11% ranked the ensemble's condition as good (no need for conservation apart from some light vegetation removal). 45% chose fair (some cosmetic works, such as painting is needed, but structurally sound), whilst 35% rated the condition as poor (considerable conservation work needed to ensure their safekeeping for the coming years). 9%, which is equivalent to 15 people, opted for unacceptable (in need of immediate conservation or some sculptures may be lost). There was no obvious difference in judgment between people who had seen the dinosaurs within the last month, last year or longer.

The professional condition report suggests that the overall ensemble is in poor condition; however, on a more detailed level the state of some individual sculptures is unacceptable whilst other sculptures could be ranked as fair.

Damage perception was further assessed by asking people which specific types of issues they had noticed. Ten options were given and set to re-shuffle for each individual to avoid bias (Figure 3). All of the options, such as breakages, flaking paint and moss growth are relevant to the *Crystal Palace Dinosaurs*. On average people ticked only three to four boxes and one in five respondents (22%) didn't notice any damage. The three most commonly observed types of damage were cracks (49%), flaking paint (44%) and broken smaller parts such as teeth and ears (41%). Only one in four respondents (24%) noticed plants growing inside cracks, which is one of the major damage mechanisms for the sculptures. The least observed type of damage was graffiti and other vandalism. In reality the *Dinosaur* ensemble has suffered badly from vandalism including graffiti and physical damage. However, the signs of this are usually removed swiftly to discourage recurrence.

Finally the survey pointed out that sculpture of similar importance to the *Crystal Palace Dinosaurs* would often be in a museum, which is not an option for

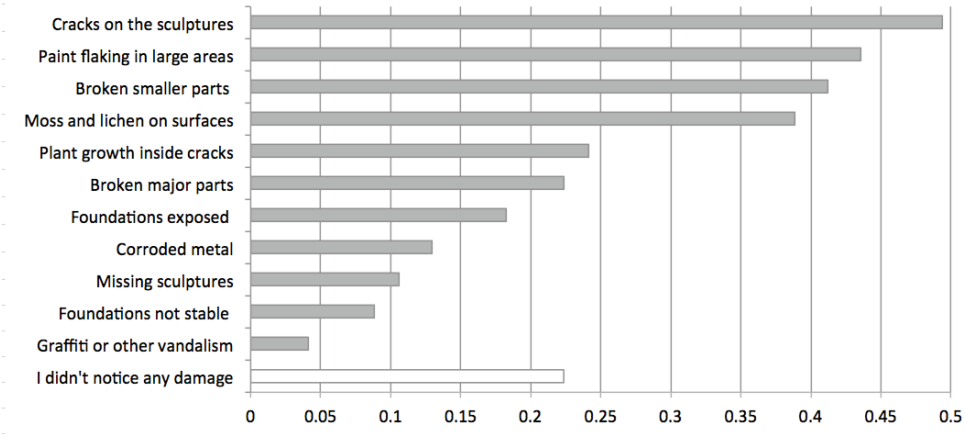

Figure 3 Respondents were asked if they noticed any damage when they last saw the *Crystal Palace Dinosaurs*. A choice of twelve options was provided and multiple ticks were possible.

the ensemble. Figure 4 summarises the answers to the free text question 'What extra challenges do you think outdoor sculptures face?' In the synopsis of all replies the ten agents of deterioration are well covered, however the individual respondents listed on average only three items.

In conclusion the sample group largely consisted of locals that are not only interested, but often feel proud and even passionate about the *Crystal Palace Dinosaurs*. There is already a tangible concern about the condition of the sculptures and many types of damage have been noticed. Few respondents however seem to be aware of the full range, extent and causes of this damage. Ideally the planned film would therefore create a more complete picture of the threats to outdoor sculpture and by doing so further increase the sense of understanding and ownership, particularly within the local community.

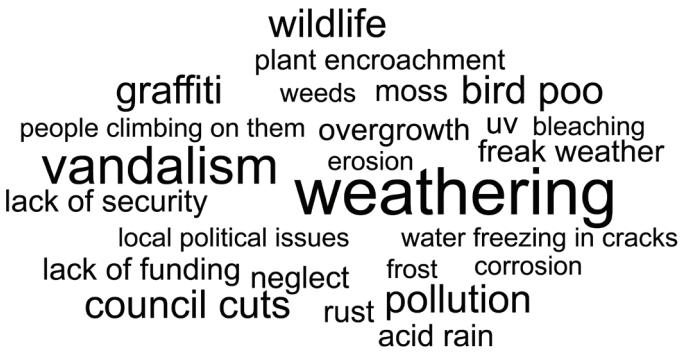

Figure 4 Selected responses to the question 'Sculptures of similar importance would often be in a museum. That's not an option for the *Crystal Palace Dinosaurs*. What extra challenges do you think outdoor sculptures face?'

The making of the film

The necessary talent to create an animation film was found in Anthony Lewis, an established London based film maker, with a growing portfolio of historically accurate, but very funny films about London landmarks such as *Speaking with Statues* and the *Lost Valley of London* YouTube clip series. The film was to be made in Anthony's signature collage-like style, using footage, animated photographs and graphics.

The script was developed between the creative strategist, the film maker and the conservator on the FCPD management board. When developing the character profiles of the Seven Deadly Agents, care was taken to give them strong individual identities whilst preserving the essence of the *Ten Agents of Deterioration*. Reducing the number to seven meant that some threats had to be

combined, e.g., no separate agent was created for physical forces, but this was incorporated into the agent Dick Van Dal, who represents vandalism and also The Creeping Terror, which represents the risk from weeds and pests.

The character profiles developed by the authors were then translated into pulp comic book villains by the New Jersey based artist Sadie Rothenberg and finally superimposed onto photographs of the *Crystal Palace Dinosaurs*. Adobe Photoshop was used to prepare most animation assets and Adobe After Effects used to animate the characters and add voice-over.

The opening sequence briefly sets the scene and conveys the message that the *Dinosaurs* are under threat from a gang of mystery agents. Startled and distressed looking dinosaur sculptures fill the screen. In the main part of the film the agents appear one after the other and explain their strategies. Finally there is a call to action, which directs viewers to relevant websites and social media pages.

Dick Van Dal

What the filmmaker says: 'A gritty East London gangster, Dal specialises in defacing and destroying priceless works of art. With his considerable cockney charm he gives people outrageous ideas: amassing a huge gang of fellow vandals and troublemakers.'

Vandalism is a major threat for the *Crystal Palace Dinosaurs*. It is likely that Benjamin Waterhouse Hawkins decided to put most of his prehistoric animals onto artificial islands to keep them out of public reach, as well as to communicate concepts of geologic time scales. Nevertheless, vandals have repeatedly gained access to the island via weirs or by just crossing through the shallow water. Damage recorded in the past two decades alone included smashing up of two teleosaur models, the total destruction of two replica pterodactyls, beheading of a paleotherium, the theft of part of the *Geological Illustrations* and the appearance of disfiguring graffiti.

Several factors contribute to the high risk of vandalism. The sculptures are situated in a park that cannot realistically be locked up at night and has no permanent site supervision or CCTV in place. It is also understood that the risk of vandalism increases if there are pre-existing signs of neglect and a lack of awareness of the importance of the assets (Historic England 2003). The Friends of Crystal Palace Dinosaurs actively work towards improving both of these two aspects. The website of the Friends further gives clear advice to report vandalism and discourage any behaviour that could endanger the ensemble, such as climbing of statues.

For the film a very simple sequence was chosen, as vandalism is a rather well understood phenomenon and there was no desire to 'give people ideas' such as

using explosives or fire. The focus was put on showing the nonsensical nature of damaging well-loved public assets. 'DINOSAURS GO HOME' graffiti appears on the statues (Figure 5) and the character Van Dal is overheard saying: 'I work by speaking in people's minds. I give them outrageous ideas. My best time is when no-one else is looking.'

Figure 5 Dick Van Dal defacing the two *Iguanodon* models.

The Creeping Terror

What the filmmaker says: 'The dark side of nature: this mysterious entity has supernatural control over noxious weeds, parasitic flora and poisonous plants of all kinds.'

The *Dinosaurs* and *Geological Illustrations* are based within a park with thriving wildlife. Landscaping was part of the original Paxton and Waterhouse Hawkins scheme and without any question adds a lot of drama and life to the ensemble. The 'Creeping Terror' summarises the threats resulting from the proximity of all this flora and fauna. The relationship is clearly of ambivalent nature and the film character is fully aware of that: 'You like me, you know you do! I bring you flowers and birdsong … but I won't stop there. I want the whole island back! Who cares about dinosaurs?'

The imagery used draws on beautiful scenes turning into suffocating ones. Lichen spread over sculptures like a disease, moss bulges inside cracks and shrubs successively cover up even the largest sculptures such as the giant ground sloth and the iguanodons. Apart from covering and obscuring the sculptures, plants can also exert direct physical force, for example in the form of falling branches or when growing inside cracks. Plants that prefer habitats rich in bird manure have been found to grow on the statues. The film shows a sequence of a magpie landing on a plesiosaur and leaving droppings behind, out of which a buddleia grows (Figure 6).

Figure 6 Physical damage caused by wildlife.

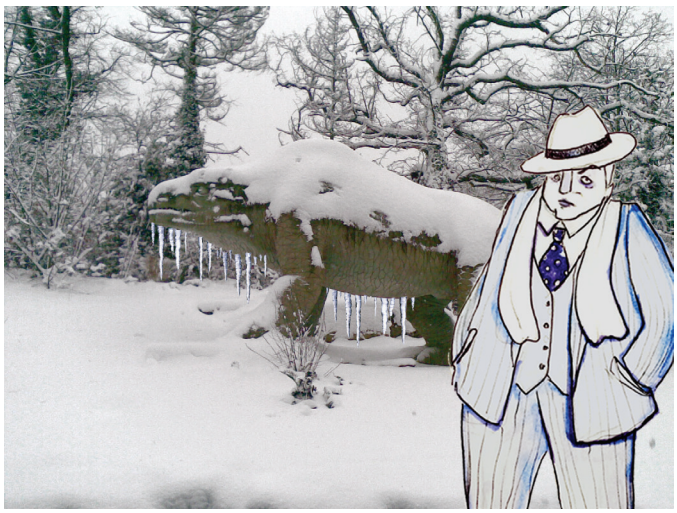

Figure 7 Captain Cold and the *Megalosaurus* model.

Doctor Drip

What the filmmaker says: 'A sickly, nerdy kid at school: teased by his peers. Danny Drip retired from social life to devote his life to science. Emerging decades later with superhuman control over water, Dr Drip is now a major super villain, but still hopeless with the ladies.'

The Dinosaurs and Geological Illustrations cannot escape Doctor Drip. Ten of the statues are permanently based within a lake of varying water levels and all of them are exposed to the weather conditions of the British Isles. The film character Doctor Drip dreams of flooding and submerging the whole island. In reality his influence is restricted to soil erosion around the statues' foundations. However, his real power is to team up with the other agents of destruction. For examples he helps Captain Cold to form icicles, he allows plants, moss and lichen to grow on and around the sculptures, and he enables the Smog Monster to cause corrosion of metal parts.

Captain Cold

What the filmmaker says: 'With the power to lower the temperature to sub-zero levels, the Captain guarantees a frosty reception. His super-cool exterior hides a heart of pure ICE.'

Frost action has caused considerable damage, in particular on sculptures of aquatic animals that have their foundations submerged in water. We have noted a step-change in deterioration at the end of winter and only a small fraction of the areas in contact with water are still original. Captain Cold (Figure 7)

illustrates the threat of frost to the concrete matrix exposed to water. In the film the effect of expanding micro-icicles in the concrete pores is illustrated with a sequence of images whilst the Captain is heard saying:

> *Now here comes my favourite trick. I lower the temperature below zero and water turns into ice. By doing so it expands by circa 9%. If there is nowhere for it to go, a nice little micro-crack can start which soon grows into a large one. Before you know it those plesiosaur flippers are gone. You can count on me, every winter.*

Ray D Ation

What the filmmaker says: 'A radioactive supervillian. A monologuing masked maniac in the old comic book tradition. Harnessing the power of the sun itself, Ray blasts monuments with beams of thermonuclear energy.'

The villain Ray D Ation stands for damage caused by light and ultraviolet radiation as defined by the Canadian Conservation Institute. In the film he also stands for high temperatures resulting from infrared radiation.

Exposure to light and ultraviolet radiation can lead to fading and colour changes of paint finishes over long periods of time. However, as the original paint scheme has long been lost and very stable mineral paints have been applied instead, this is not considered a major threat to the sculptures in Crystal Palace Park. Thermal changes on the other hand play a more important role in the deterioration of the ensemble. The Ray D Ation sequence visualises the effect of temperature changes to material combinations with different expansion coefficients (Figure 8). This is illustrated by a layer of paint on concrete that alternately expands and shrinks under the influence of Ray D Ation and Captain Cold and ultimately cracks and falls off.

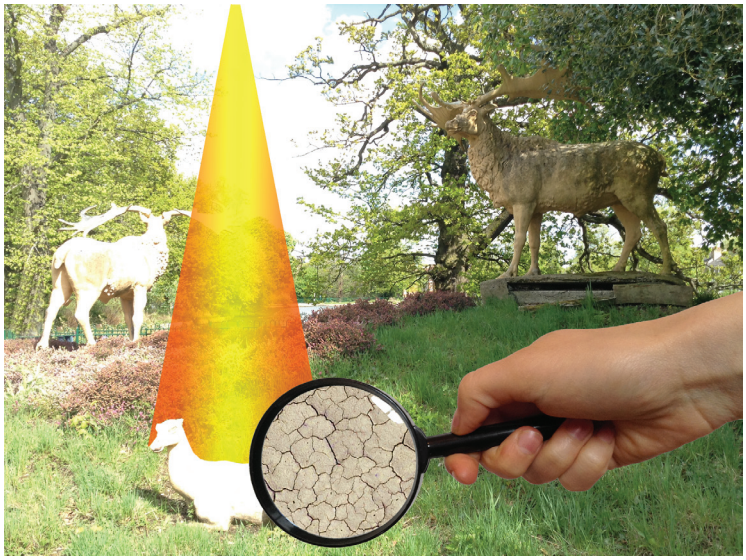

Figure 8 The villain Ray D Ation is specialised in destroying paint finishes.

The Smog Monster

What the filmmaker says: 'A mysterious ghostlike entity formed from pollution and fumes. Has mastery over all forms of toxic gas (and a wicked smoker's cough).'

The Smog Monster personifies pollutant attack. In perspective, pollutants are only a minor risk factor for the sculptures. However, the sequence is used to convey that the statues are not just made from concrete but frequently have internal metal armatures. These armatures are made from the Victorian equivalent of steel and advanced corrosion has been observed during previous conservation campaigns. The critical elements triggering this corrosion are water and oxygen. However, pollutants and contaminants such as sulphur dioxide and chlorides are known to accelerate and aggravate the process considerably. Problems resulting from iron corrosion can range from some minor spalling of overlaying concrete to structural failure of large parts. The Smog Monster therefore is heard saying: 'Metal is my speciality … I eat them from the inside.' (Figure 9).

Waterhouse Hawkins also used lead to realise some of his more detailed designs, in particular dinosaur teeth as well as legs and ears of the Giant Irish Elk. Corrosion of these parts has been observed as well. Although the lead used in these sculptures is not commercially resalable, we decided to not draw attention to its presence for security reasons.

Figure 9 The Smog Monster is heard saying: 'Metal is my speciality ... I eat them from the inside.'.

Mis(s) Treatment

What the filmmaker says:

'The head of the organisation: this femme fatale lives by the mantra "be mean, keep 'em keen". Leading through a combination of stifling micro-management and ruthless efficiency.'

Views on what comprises appropriate treatment and acceptable decisions change through time and with social context, and often it is only with the distance of several decades that ill-advised ideas become apparent.

Mis(s) Treatment stands for misguided decisions made by people trusted with looking after the *Dinosaurs*. She causes controversy and confusion. There is no direct equivalent in the Canadian Conservation Institute's framework though there is resemblance with the agent of 'custodial neglect'. There was no desire to finger point at the current custodians of the *Crystal Palace Dinosaurs* and examples used in the film were either fictional or historical, such as the planned partial demolition of a limestone cliff and lead mine to allow for landscaping around an adjacent stadium in 1962. Other illustrations used in the film are concerned with applying personal taste to decision making process and bad conservation choices such as using 'superglue' (Figure 10).

Figure 10 Mis(s) Treatment stands for misguided decisions made by people trusted with looking after the *Dinosaurs*.

Conclusion

Public support is the key to raising the often substantial funds and supporting momentum needed to conserve and maintain outdoor sculptures. The Friends of Crystal Palace Dinosaurs actively build this support by raising awareness of the sculpture park's cultural importance and deteriorating condition. The creation of the film *The Seven Deadly Agents of Destruction* is an attempt to explain the reasons behind the poor condition in a light-hearted way, avoiding finger-pointing as far as possible. Preliminary audience research confirmed that there is considerable and often very personal appreciation for the *Crystal Palace Dinosaurs* and *Geological Illustrations* and that the current poor state of the ensemble has not gone unnoticed. It also showed that there is some understanding for the reasons behind the deterioration but there are certainly also gaps to be filled. The script of the film was developed accordingly. Care was taken to make the film as timeless and re-watchable as possible. The target audience for the film is specifically one of non-specialists but it will also be interesting to see how the conservation community reacts to the use of pulp comic book villains to explain fairly rigorous science.

The film was released on YouTube in September 2015 and attracted over 500 views in the subsequent six weeks. The Friends of Crystal Palace Dinosaurs plan to further promote the film via social media, the conservaton blog on the website and also via other professional organisatons, such as Historic England, which have already been in touch with positive feedback and the offer to spread the word about the film using their social media chanels.

There was no budget for the project and the time input of all involved is substantial. Apart from Anthony Lewis and Chris Aldhous, none of the authors has been involved in the making of an animation film before and this alone made it a worthwhile learning process.

The film and its linked educational elements will form part of a wider strategy of community engagement by the Friends of Crystal Palace Dinosaurs, designed to encourage local people to not only understand more deeply the significance of these sculptures on their doorstep, but also to creatively engage with and draw inspiration from them. Artists, writers and theatre groups have all been invited to interact with the story of the *Crystal Palace Dinosaurs*. This will create fresh installations and events that will explore the rich narratives surrounding the sculptures. In turn, this will attract more active visitors to the Park and support the ongoing battle being fought on behalf of the sculptures to defeat the 'Seven Deadly Agents of Destruction'.

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