THE ARCHAEOLOGICAL AND INDUSTRIAL HERITAGE @ RISK: SOME EXAMPLES FROM THE WORLD HERITAGE LIST

Introduction

The title of this paper may perhaps need some explanation. It is written from a personal perspective, the work of someone who spent some twenty years in the iron and steel industry before becoming a full-time archaeologist and who for the past nine years has been coordinating the advisory work of ICOMOS in the field of the 1972 World Heritage Convention. For that reason it concentrates on archaeological and industrial sites and monuments that are inscribed on the World Heritage List. It would be misleading to assume that the List is fully representative of the culture heritage of the entire world: its biases towards certain regions and cultures have been highlighted in recent years and active steps are being undertaken to produce a more representative List. Nonetheless, it contains sufficient examples to illustrate the main threats to which these two facets of heritage are exposed.

Threats to archaeological heritage

In a perceptive paper written some seventeen years ago, Joachim Reichstein identified no fewer than fourteen sources of threats to archaeological heritage, including building operations, civil engineering, raw materials extraction, improvements in agricultural practice, forestry, drainage of wetlands, visitors, pollution, and deliberate destruction

The analysis of the archaeological sites and monuments on the World Heritage List confirms Reichstein's categorization, with one or two additional classes. In this paper the following categories will be considered:

- Tourism;
- Atmospheric pollution and other anthropogenic causes;
- Natural disasters (earthquakes, hurricanes);
- Looting;
- Unsympathetic urban and infrastructural planning;
- Inadequate site management and conservation;
- Over-excavation.

Threats from tourism

Few archaeological heritage managers would dispute the fact that their best friends and their worst enemies are the visitors to their sites and monuments. By their very nature, archaeological sites and monuments are very vulnerable to the adverse physical impact of many thousands of feet passing over delicate marble or mosaic pavements or the adventurous who climb on fragile ancient walls to obtain better photographs or a better view of the ruins.

Over eight hundred thousand people visit the great prehistoric monuments of Stonehenge every year and such has been the pressure within the great stone circle itself that English Heritage reluctantly had to deny access to all except scholars because of the erosion of the bases of the megaliths.

The Acropolis in Athens has more than twice as many visitors, and here it is no longer possible to enter the interior of the Parthenon. The soft marble steps of the Propylaea were being worn await by the feet of the visitors and so they have been protected by a wooden structure for several decades. Interestingly, the same device had to be adopted at Canterbury Cathedral, where the soft Caen stone of the pavement in front of the tomb of St Thomas the Martyr was found to be eroding at an alarming rate.

Other "honeypot sites" of this kind such as the stretch of the Great Wall of China nearest to Beijing, the great Mayan sites of Chichen Itzá and Uxmal in Yucatan, the Pharaonic temples of Memphis and Luxor in Egypt, or the Colosseum in Rome are similarly exposed to enormous numbers of visitors whose mere presence causes incessant erosion of the floors and walls. Given the nature of some of the conservation programmes in force at many monuments around the world, it cannot be denied that visitor erosion works against the principle of authenticity enshrined in the Venice Charter because of the continuous replacement of parts of the monuments that it necessitates.

However, tourism in a wider sense offers another kind of threat to archaeological sites and monuments. Their conservation and maintenance grows more costly every year and visitors are in many cases a major source of income. To accommodate increased visitor numbers and provide them with the facilities that they require, such as restaurants, bookshops, and toilets, management agencies are making inroads into the sites. At Pompeii, in an unprecedented experiment, all the gate revenue is now being retained at the site, instead of disappearing into the coffers of the Ministry of Cultural Properties in Rome in exchange for a miserably small annual grant. In addition, the whole site is now being run on commercial lines, with a foundation supported by local authorities and by business and industry at its heart. A plan is currently being actively implemented to create a very large restaurant within the ancient town itself: significantly a campaign against this project has been launched by a number of the custodians, who are deeply sensitive to the values of Pompeii.

Similar intrusions are beginning to appear elsewhere. The Elephanta Caves are a short distance from Mumbai by boat and are visited by many thousands of visitors, both Indian and foreign. The Indian authorities have used highly inappropriate modern materials in the improvement of landing stages and the teahouses and small businesses that already disfigure the site. Worse by far is the proposal to construct a cable-railway to bring visitors up to the impressive prehispanic site of Machu

Picchu in the Andes of Peru. Whilst this will undoubtedly improve access to the site considerably, the visual impact on the setting of Machu Picchu will be catastrophic.

Tourism is now one of the largest industries in the world and tourists are travelling further in search of new places. As a result, some of the more remote archaeological sites are attracting growing numbers of visitors. Petra is now more accessible with the resolution of some of the political problems in this region and there has been a rash of construction – hotels, restaurants, souvenir shops, and so on – in the past decade (but mercifully outside the site). Nonetheless, these are clearly visible from within the site and their further spread will gravely affect the mysterious environment of this fascinating site. Rapa Nui (Easter Island) is the subject of great increased tourism, to which inscription on the World Heritage List has probably contributed. Efforts to control the building of hotels, a marina, and other essential appurtenances of modern tourism, have so far been successfully resisted, but political pressures are building up in an alarming way.

One final threat from tourism is that constituted by the reconstruction of structures on archaeological sites. The great Neolithic chambered tomb of Newgrange in the Bend of the Boyne (Ireland) was excavated in the 1960s and its entire front was reconstructed. The form that this reconstruction takes was but one of several alternatives proposed by the excavator, the late Professor Michael O'Kelly. It was against his advice that the present scheme was adopted, at the strong prompting of the Irish Tourist Board (Bord na Failté). Happily, no such misleading reconstruction will be applied to the second of the tombs there, Knowth, now being excavated by Professor George Eogan. The Norse settlement of l'Anse aux Meadows on Newfoundland was one of the first sites to be inscribed on the World Heritage List, in 1978. ICOMOS might have had grave reservations about recommending it for inscription were it to be nominated now, in the light of the somewhat questionable nature of the reconstructions there.

Threats from atmospheric pollution and other anthropogenic causes

Conservation professionals visiting archaeological sites in great cities such as Athens or Rome can hardly fail to be shocked by the disastrous attack on great works of art and architecture by the noxious fumes produced by the burning of fossil fuels, particularly in motor cars. Such has been the damage to the caryatids of the Erechtheion on the Athens Acropolis that all save one have been replaced by plastic replicas. To stand on the Acropolis early on a hot summer morning in the sunshine and watch the yellow miasma slowly rising makes one despair for the future of these great monuments.

Some years ago all the major monuments in the heart of Rome, such as Trajan's Column or the Arch of Septimius Severus were cocooned in sheeting to stem the savage erosion of their statuary and ornamentation. The sheeting has now been removed and it is be hoped that the Italian heritage managers have found a solution to this problem. This problem should be greatly reduced if and when the ambitious scheme to close the Via dei Fori Imperiali comes into force.

Indirect human intervention in the natural environment can also pose serious problems for conservators and site managers. Changes in the water table resulting from hydraulic schemes designed to increase urban or agricultural water supplies can lead in some cases to the drying-out of waterlogged sites where organic remains such as wooden houses have survived in anaerobic conditions. In other cases the reverse applies and salts are brought to the surface by capillary action, to cause irremediable harm to fragile structures. The case of the prehistoric Indus Valley city of Moenjodaro is a case in point: international efforts have been concentrated for years on the protection of the fragile mudbrick remains. At Butrint (Albania) the ancient water table has been radically altered, with the result that the Roman theatre remains are now continually under water.

Threats from natural disasters

Damage to sites and monuments is not, of course, all attributable to human actions: nature can have equally devastating effects. Earthquakes cause violent disruption to delicate sites: two recent examples from Latin America illustrate their impact. In 1994 the impressive underground prehispanic decorated tombs at Tierradentro (Colombia) were brought to near-collapse by an earthquake in 1994, which also caused a change in the water-table, resulting in flooding of some of the tombs. The 1998 earthquake in central Mexico created considerable instability and peripheral damage to the impressive monumental remains of the pre-Aztec city of Monte Alban.

Hurricanes also exact their toll on archaeological sites. The extraordinary site of Joya de Ceren in El Salvador, a small rural prehispanic settlement that was engulfed by a volcanic eruption around AD 6000, was ravaged by the torrential rains of Hurricane Mitch in 1998 (as, indeed, was Monte Alban, along with many other archaeological sites in central America). This immensely fragile site was buried in mud, and required what was in effect re-excavation.

Threats from looting

The international black market in antiquities shows no signs of declining. The UNESCO and UNIDROIT Conventions have received little support from those countries in which the looted objects are marketed, despite frequent appeals, and the impact on archaeological monuments can be great. The most flagrant example is that of Angkor, where decorative elements of the more than four hundred temples are still regularly being broken off and sold through Thailand into an eager collectors' market. Many of the great Mayan sites in central America, such as Copan and Tikal, are still being raided, and the damage to lesser known and more remote sites is continuous: entire stone stelae weighing a tonne or more are cut off using sophisticated stone-cutting equipment, and archaeologists, custodians, and police are regularly shot at, and occasionally lose their lives at the hands of these cultural pirates. The Mediterranean lands are still major targets: Italy's *tombaroli* are still racing archaeologists to the wonderful Etruscan tombs and the flow of antiquities from Turkey is ever-increasing.

Threats from unsympathetic urban and infrastructural planning

Mention has already been made of the building of tourist facilities around, and even inside, major archaeological sites and monuments. Weak planning control at urban sites can result in similar disfigurement. The steady advance of urban sprawl

from Cairo towards the Pyramids at Gizeh has been halted, but their setting has been irretrievably destroyed beyond the main road that runs within a few hundred metres from the Sphinx. At Paphos holiday accommodation has been built up against the perimeter of the site, and the situation has been made worse by the fact that visitors seeking a short route to the beach have broken down the perimeter fence and made a path across part of the site. Their persistence seems to have defeated the Cyprus Department of Antiquities, which has excluded this path from the protected area, even though it certainly runs across archaeologically sensitive layers.

Virtually the entire area of ancient Agrigento now lies beneath arable land, only the great Doric temples still standing above ground. When the site was nominated for the World Heritage List it included a stretch of the coastline, where the port of the ancient city was located. The map supplied showed this area as being without any structures, but a site visit revealed that the whole coastline, although within the designated National Park, was occupied by luxurious villas. This is no doubt attributable to the well known Sicilian attitude towards regulations, but the result was that the coastal strip was excluded from the eventual World Heritage site.

Numerous other examples of poor planning control in and around World Heritage sites can be cited. Just two more will suffice. At Byblos there is a proposal to build a luxury holiday village in close proximity to this important prehistoric and classical site. This project is opposed by the municipality of Byblos, but seems to have been given central government approval and it seems doubtful whether it will be possible to halt it. The scientifically important fossil hominid sites in Gauteng, near Johannesburg, the most famous of which is probably Sterkfontein, were inscribed on the World Heritage List in 1999. It was only as a result of firm action by the South African Government that a project to construct a flamboyant casino on the edges of the site was aborted.

Most of the cases referred to above are attributable to weak planning control at municipal or regional level. However, central governments are not exempt from criticism. Infrastructural developments are usually central government projects and these may on occasion constitute grave threats to the archaeological heritage.

The construction of trunk roads can be especially menacing. The most sensational example was probably the project to drive a major highway across the Gizeh plateau behind the Pyramids, so as to relieve the admittedly appalling traffic conditions in this part of greater Cairo. The new highway had reached either side of the plateau without comment when it became known to the international conservation community. It was only as a result of direct intervention by the then Director General of UNESCO, Dr Federico Mayor, with President Mubarak of Egypt, that this project, which would have ruined the setting of the monuments, was finally halted.

There was a happier outcome in Portugal some years ago. Archaeological prospecting in the area to be flooded in advance of work to dam the Côa, one of the tributaries of the Douro, so as to create a vast reservoir, revealed a wealth of exceptionally important Palaeolithic rock engravings, of a type not known in such quantity or of such quality anywhere else in the world. A sustained campaign by conservationists succeeded in persuading the Portuguese Government to call a halt to the project. Like the approach roads to the aborted Gizeh highway, several small dams can still be seen abandoned in the Côa valley.

Another highway project that still threatens a World Heritage site is to be found in Sweden. There is an impressive concentration of engraved stones around Tanum, in Bohuslän, through which an important road runs. There are plans to upgrade this, as part of the international E6 road, but this is being actively opposed by ICOMOS and other conservation groups because of the adverse impact that it will have on the setting of these monuments and the ancient landscape in which they are set. Discussions are still in progress on the feasibility of alternative routes that will reduce this impact.

Inadequate site management and conservation

There is no disguising the fact that site managers and conservators can also constitute threats to archaeological sites. In some places traditional management practices have not kept pace with developments in tourism, with the result that the managers have been unprepared for very large increases in visitor numbers. The recent changes at Pompeii may point the way to a more dynamic and proactive management style at the great Italian sites. Similarly, the Moroccan authorities have recognized the potential of the classical city of Volubilis, which had been minimally managed for many decades, with the result that its condition was steadily deteriorating. Active steps are now being taken to provide the appropriate visitor infrastructure and to carry out research to enable this very important site to be better presented and interpreted.

One of the most famous archaeological sites in the world, that of Troy, has for long years been a sad spectacle. Interpretation and conservation have been minimal, with the result that visitors came away deeply disappointed with the site of Schliemann's great discoveries and professionals with grave misgivings about its security and future stability. Belatedly the Turkish authorities, with expert German scientific help, have taken action. The site is better protected and has been tidied up so as to make it easier to understand. Research is in progress to provide answers to some of the many problems that it poses and, most important of all, perhaps, there is a proper management plan in the course of implementation.

Approaches to the conservation of archaeological sites vary considerably. Some countries, such as Greece, favour the minimum of intervention, whilst others are more radical in their practices. There are certain cases, however, where the conservation measures that have been taken pose positive threats to the sites they have been designed to protect. This accusation might be levelled at the cover building over the extraordinary late Roman mosaics at the Imperial Villa Romana di Casale near Piazza Armerina in Sicily. This is an impressive structure resembling nothing so much as a greenhouse. The temperatures within the structure in high summer are very high indeed, despite attempts to ensure a free flow of air. As a result the mosaics are continually under attack, and there is a permanent team of restorers working there. This well meaning attempt to protect this exciting monument has, in the opinion of many experts, had directly the opposite effect.

Over-excavation

To correct any impression from the foregoing that archaeologists are entirely blameless, it should be recorded that they stand accused of creating one particular threat to the archaeological

heritage. There are few archaeologists who do not enjoy working in the field on excavations. However, it may be argued that some of them concentrate on excavation without heed for the future of the site in terms of understanding and conservation. Two examples may suffice to illustrate this point.

What has so far been excavated at Joya de Ceren, referred to above, represents on a small part of what is known to have been a sizeable settlement. The remains are fragile in the extreme and require extensive and complicated conservation. The enthusiasm of the excavator to continue his work without ensuring that all the conditions for eventual permanent conservation were in place was checked by two events: inscription on the World Heritage List and the impact of Hurricane Mitch. Excavations will certainly continue in the future, but only when an effective management and conservation plan is up and running.

The ancient capital of Sri Lanka, Anuradhapura, is one of the main features of that country's Cultural Triangle. For some twenty years excavations were carried out there, systematically revealing the foundations of the many Buddhist monasteries (*viharas*) that had been built there. The gain in knowledge gradually reduced as more and more repetitive information emerged from the excavations. This work has now been brought to an end, with many monuments not yet excavated. These will remain as reserves for excavations in the future, when techniques will have improved and the corpus of information from the earlier excavations has been properly analysed and assimilated.

Threats to industrial heritage

Awareness of the significance of industrial heritage in commemorating human achievement has only surfaced in the UNESCO World Heritage Committee in the past decade. However, thanks to close collaboration between ICOMOS and TICCIH (The International Committee for the Conservation of the Industrial Heritage), the diversity of that heritage is being codified and classified and criteria are being developed for its evaluation within the World Heritage context.

From the relatively small number of industrial heritage places so far on the World Heritage List it is possible to derive some general categories of threat to which it is exposed:

- Modernization;
- Planning and infrastructural development;
- Problems of conservation.

Threats from modernization

One of the most potent threats to the industrial heritage comes from the fact that in certain fields World Heritage monuments are still being used for their original purposes. The best example is probably that of railway heritage.

The first historic railway to be inscribed on the List was the Semmeringbahn, that extraordinary feat of civil engineering which opened the link between Vienna and the Adriatic. The route designed by von Gegha in the first half of the 19th century is still traversed today by modern trains, using the entire permanent way from that period. However, in the interests of contemporary transportation requirements, the Austrian Railways (ÖBB) wishes to shorten the route by driving tunnels at several points so as to avoid using the extensive loops that the original layout included. The arguments for doing so in present-day terms are irrefutable; however, it is hoped that the stretches of track that will become obsolete will be retained, so as to ensure that the original conception is fully retained.

The Semmeringbahn was followed on the World Heritage List by the Darjeeling Himalayan Railway (DHR) in northern India, fondly known as the Toy Train. This astonishing narrow-gauge railway of the late 19th century is also fully operational, still using steam locomotives to take its passengers up from the plains of northern India to the cool hill-station of Darjeeling, as well as to transport the produce of the famous tea-gardens of the region. There is currently a proposal to replace the steam locomotives with diesel-engined stock, and this is being vigorously attacked by traditionalists. It is arguable whether the character and World Heritage qualities of the DHR will be seriously damaged by this necessary change.

The magnificent Canal du Midi in southern France is also now deservedly on the World Heritage List. Like the two railways mentioned above, it is still fully operational. In this case the necessary widening of part of the system to accept the larger barges of today was accommodated without too much fuss, since these represent only part of the entire network.

Planning and infrastructural development

The Canal du Midi is at risk from infrastructural development, most notably from the construction of high-tension electrical systems that traverse it and from sewage and garbage disposal facilities. Again, this is the case where the integrity of the whole monument, which runs all the way from Toulouse down to the coast, is not seriously threatened. However, a point may well be reached here, and on other comparable linear industrial monuments, when that integrity is put in jeopardy and a stand must be taken.

The only industrial monument to be dealt with in this paper that is not on the World Heritage List is one that deserved to figure on it until a misguided planning decision was taken that effectively destroyed its integrity and qualities. The Tour-et-Taxis terminal in Brussels consists of a series of outstanding structures built towards the end of the 19th century to house a remarkable nexus of road, rail, and canal transportation links. It has been out of use for some years and much of it has become derelict. When a proposal was made to convert one of its most imposing buildings into a modern music centre, this was approved by the urban planning authority. Despite objections from national and international bodies, this project is going ahead. As a result the ambience of this monument to 19th century enterprise and industry will be completely destroyed. In its train will inevitably come the demolition of elements of the complex and conversion of what remains for inappropriate uses. Tour-et-Taxis is a paradigm for undesirable adaptive reuse of the industrial heritage.

Threats arising from conservation problems

The iron and steel industry is notoriously unsentimental about its heritage. As soon as a plant goes out of operation it is usually demolished quickly and sold for scrap. Prompt action in the Saarland saw the Völklingerhütte, an ironworks where some of the most important technical innovations that took place in the late 19th and early 20th centuries were first developed, saved from this fate. The six blast-furnaces, the imposing blowing-en-

gine house, and the massive coke-oven batteries survived intact and were nominated for inscription on the World Heritage List. Strong ICOMOS and TICCIH support resulted in inscription on the List in 1994.

However, the problems at the ironworks were only beginning at that time. The main problem is how to conserve the six blast-furnaces, towering steel structures that had been exposed to very high temperatures for many years, since this presented technical problems that had never confronted conservation specialists before. Work is still in progress in search of a solution, which it is devoutly to be hoped will be discovered, since the future not only of the Völklingen blast-furnaces but of many other industrial monuments rests on this work.

Conclusion

This has been a rapid and in some ways partial survey of the threats to which archaeological and industrial monuments are exposed. It is hoped, however, that it will have given some indication of the problems in these fields and will have hinted at how they might best be avoided or resolved.

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