What key issues does the conservation professional face in the 21st Century?

Explain the opportunities and challenges in context, using specific case studies to illustrate your answer.

Conservation professions exist within a fluctuating series of values and purposes. Such fluctuations can be dictated by those within the wider professions but also place conservation practitioners in problematic scenarios that require necessary attention. Rather like a boat in a storm, there are choices free to the helmsman (person) to dictate the outcome of, yet the boat is still at the will of the swell. Within the professions surrounding Cultural Heritage and its curation are debates and conversation around context, narrative, significance, technical impositions and for whom such actions are catering. De-colonising and 'modernising' collections for communal interest is no doubt worthy of interest, but a focus on global changes in climate and weather systems casts a net over most if not all discourse, including the above, for it is the strongest 'swell' of the 21st Century.

Changes in climate and weather effect the conservation field on both micro scales, for instance the differences between object orientated conservation practices in response to changing storage requirements, and macro-scales such as how migrating populations from rising sea levels might effect changes in values towards areas of specific cultural interests. I'll focus on object orientated responses to changing climates and weather, followed by an evaluation of where object and human meet, met with an analysis of the issue in the context of wider society.

The effect of rises and changes in sea level, in temperature, in precipitation and humidity, and greater fluctuations between the high and low points of each variable cause a set of chaotic variables. A projection for the certain increase in severity of these variables is an amplification of the already great problem we face today as a wider society, but within the conservation professions proves a crucial consideration when dealing with issues now. Degradation and decay to exterior monuments and sites can be greatly increased by the force of these changes.

Environmental degradation is often seen in earthen structures or buildings used natural or rudimentary mortars, the most common example being the degradation of lime mortars. The use of lime as historic fabric can be seen in washes and plasters, but its exposure to the elements as mortar shows its natural decay at a faster rate. Widely, limes are more vapour permeable and elastic than modern cement based mortars, whilst being softer and more sympathetic to the surrounding material (Historic Scotland, 2014). Compressive strength of lime can be high in the case of 'hydraulic' limes and low in the case of 'non-hydraulic' limes, which is the more appropriate for sensitive building scenarios. 'Non-hydraulic' or air limes dry and harden only through exposure to climatic warmth and CO2, and are inappropriate for use in wet or exposed areas which has inhibited its use in wetter climates (Historic Scotland, 8-9) When combined with an aggregate for increased strength and durability, the 'void ratio' must be considered to prevent the strength of the mortar being derived only from the aggregate (Historic Scotland,16-18).

The effect of these characteristics is that it decays faster than the material it bonds, elongating the lifespan of the surrounding material. Traditional practitioners understood the need for a continuing response to buildings with lime mortars, but the use of cementitious mortars from the C20th onwards has changed this understanding to a 'one and done' methodology. The components of a mortar built structure are shown together, especially in the case of traditional fuel-inefficient heating methods such as open hearths, which allowed the walls, mortar and block to respond to the interior temperature and moisture content allowing for a 'breathable' house (STBA). A lack of knowledge creates approaches in the context of historic buildings has created problems of decay and subsidence when new and inappropriate materials are used with old or traditional materials, often seen in when used as an infill replacement of timber framed buildings, in cases such as the Shambles in York. By encouraging teaching practices that are centred on learning through doing, encouraging correct practice through the mutual link of motor skills and reactive thought, practitioners will not only know what is applicable in theory but also in physical terms through practice (Marchand,2010).

There is an obstacle in changing a value system that favours speed and cost efficiency, effecting both technical practitioners and building proprietors, reverting it to a practice involving higher levels of practical skill and knowledge amongst tradespeople and a higher cost outlay for such maintenance to take place. There is a secondary challenge in integrating modern energy systems and retrofit technologies in such a way that allows for the existing materials to maintain their significance, yet the beginnings of change likely start with more frequent conversation around values in energy use, cost, heritage value and skill.

Exposure of a site, an elevation or monument, is unavoidable if it is of a great significance to the public but is an increasingly contentious issue when the wider environment it is exposed to becomes increasingly more damaging. This damage can be seen in the case of the Great Kyz Kala of Merv, Turkmenistan. Great Kyz Kala is a 'Köshk', an earthen built complex raised on significant earthwork pedestals, originally formed of abutting angular columns surrounding a courtyard oriented interior. The site was examined as part of a UCL project on Ancient Merv between 2015 and 2017, linked to the equal significance of other Köshks and their previous excavation in the period of Soviet occupation (Williams et al,2018). Turkmenistan is largely extreme desert in a zone with insufficient humidity and a wildly fluctuating baseline climate. Summer temperatures often breach 40C and touch 50C on occasion, with winter temperatures dropping as far as -36C. There is little rain, an annual mean of 76 to 380mm depending on the location, which enabled an historic building method without focus on water damage. Over the past sixty years, an average air temperature increase of 2C allows for a projection of likely climate damage to 2100. The effects of such projection anticipate less predictable and stable weather patterns, with an increase of prolonged periods of drought and high temperature, met with heavier rain, flooding and storms when such conditions finally arrive (Turk. UNFCCC, unknown)

Figure 1 and 2:

The Great Kyz Kala, Merv, Turkmenistan: shown in the early C20th and early C21st.

This fluctuation between extreme heat and cold, damp and high speed wind damages the matrix of the compacted earth through changes in water content of the material. The expansion of water when frozen and change of water content in extreme heat produces cracks and fissures that become eroded, especially quickly when exposed to increasingly high wind carrying abrasive sand. The change in the condition of the building over the past century can be seen through comparison of two plates (Fig. 1 and 2). The first, taken in the early C20th, shows a complete front elevation with structural detail upon the corrugated columns. The columns display chamfered edges and retain some degree of accuracy in the aesthetic craftwork of the original form (T/UNFCCC,p158) There is clear erosion, especially around the base of the pedestal, but pitting and some collapse can be seen on the elevations. When compared with the second slide, the issues surrounding the conservation of natural materials in the face of a changing climate are embodied in the current structural form. Loss of detail is clear, with the rounding of edges and loss of structure atop the columns, and the collapse of a large proportion of the front elevation is particularly prominent. The more recent image shows recent intervention in the reconstruction of the pedestal. The structural integrity of the building is paramount for the conservation of the wider site, but an intervention so clearly interacting with the original fabric diminishes collective values surrounding original fabric. Is this site less significant for this intervention? Would the site have significance if all the material was changed for the same reason over time? A classic yacht must retain 5% of the original fabric to remain in class: is there a similar methodology that would be suitable for the historic environment?

In a similar case, under a project titled the 'Heart of Neolithic Orkney' (HONO), the Climate Vulnerability Index (CVI) from the 4th Assessment Report from the IPCC is applied to Skara-Brae, an exposed late-Neolithic site in the Orkney Isles. From a list of 13 determined climate variables, the evaluation concluded that the site was most at risk from Precipitation and Sea Level change, and Storm Intensity and Frequency (Day et al,2014,p45). The site lies exposed to the to the sea from the north-west, only metres into the sand dunes from the beach and approximately forty metres from mean high water (fig 1). Changes in climate in the Met Office North of Scotland Area between 1961-2004 show an average air temperature increase of 1.03C and an increase in average precipitation of 21%, with a 68.9% increase in winter months. These variables correlate with an 8.2% increase in the number of days with heavy rain (p31-33). From the perspective of materials care greater rainfall and a higher average temperature are likely to increase surface erosion to the stone through wetting and drying, but also as a vessel for airborne pollutants in the form of increasingly acidic rain. Increased damp to exposed stone can result in blistering, rounding of edges, loss of stone matrix resulting in uneven surface, pitting, efflorescence and discolouration (ISCS). A long list of changes grows smaller when materials are narrowed down i.e. stone types, but in this case and in surrounding sites, several stone types are used (OrkneyJar, 2021).

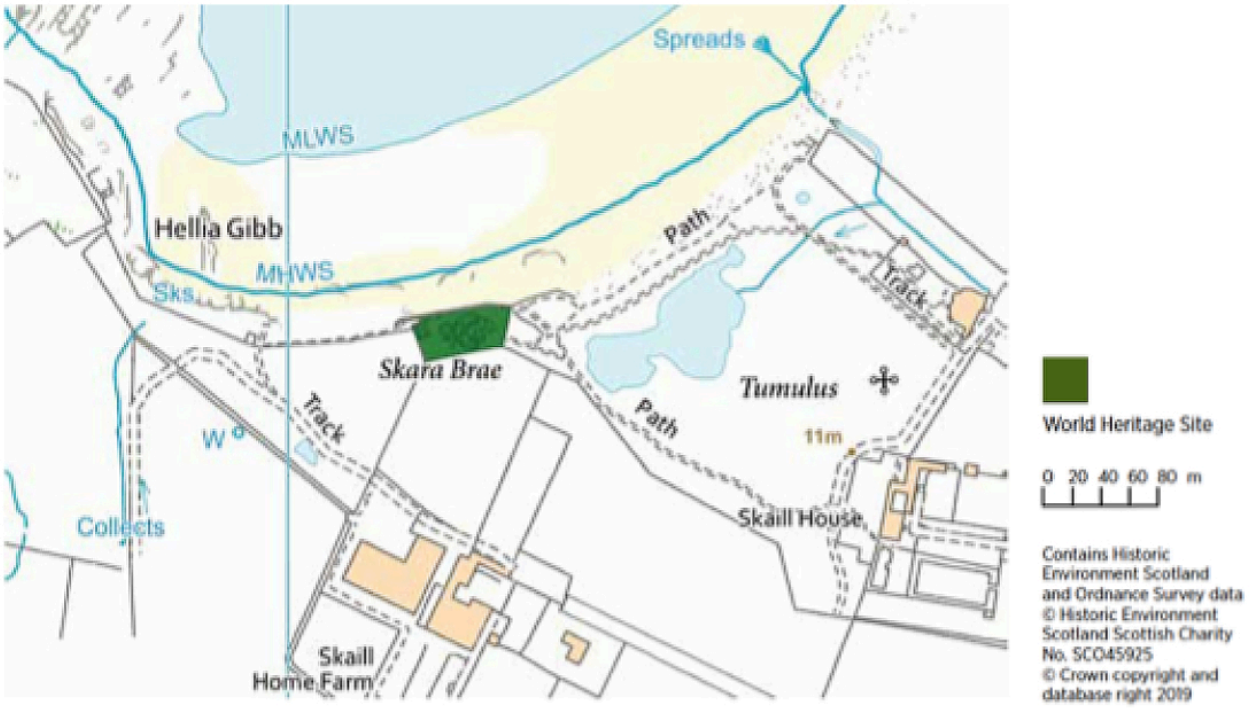

Fig.3) **Skara Brae W.H.S. shown within the wider context. Mean High Water is marked in light blue.**

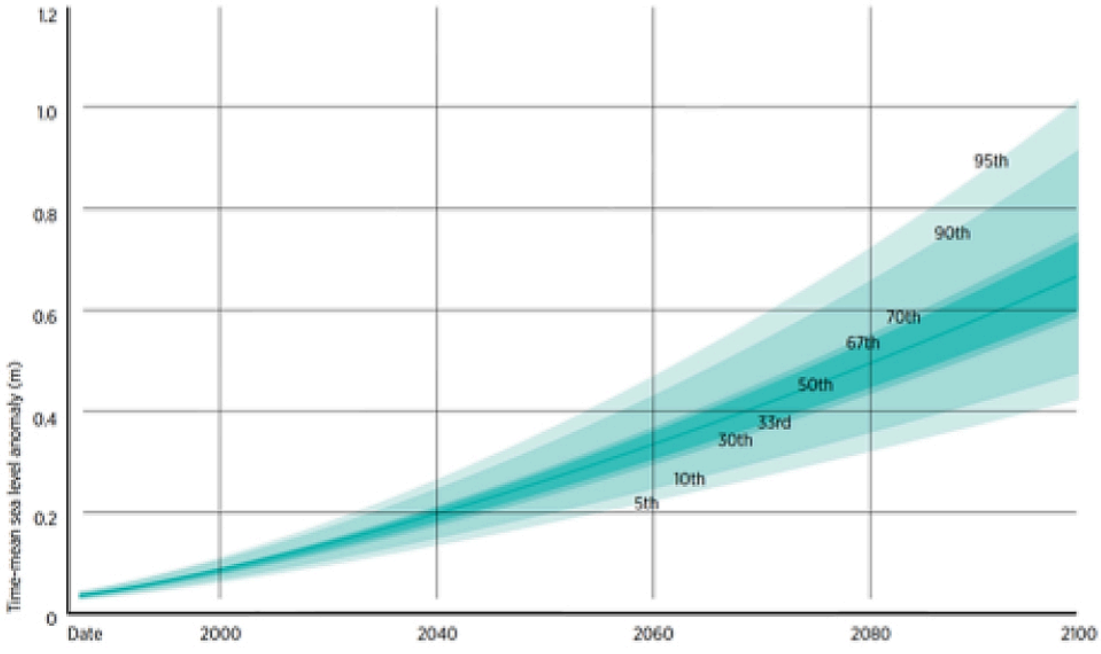

Fig.4) **Representative Concentration Pathway (RCP) 8.5 was outlined in IPCC's Fifth Assessment Report and represents the effects of the unbridled approach of economy on climate change. With no change in values or actions towards our collective CO2 output the sea level rise of the 50th percentile is an approximate 0.66m rise in UK sea level.**

Sea level rise is the most prominent risk to Skara-Brae. Coastal erosion caused by rising and falling tides are amplified when combined with a higher mean water line. When these mean average changes are combined with extreme conditions, storm surges in this case, the threat of irreversible loss is salient. With a projected 0.66m sea level rise by 2100 the site is likely to be swallowed by the sea before that date, as the exponential speed of decay is aided by the continual worsening of conditions. In other words, the change of conditions will not wait until 2021 (IPCC,2014).

Unlike collections care, the archaeological conservation professional or those of the built environment must contend with permanent variable changes. Solutions that mitigate the issues entirely are often too overbearing on site or monument values, placing assets of this type in a position of controlled degradation management. Built sea defences at Skara Brae would heavily effect the significance of a late-Neolithic site situated in relative wilderness, and would be to the detriment of the values that enable the site to be considered a World Heritage Site, which enables a great deal of funding through donations and the interest generated through tourism. This puts the conservation professional in a position with limited potential to exercise any action prohibiting decay, giving greater impetus on methods that decrease the likelihood of fundamental change to the ecosystem surrounding the site. Altering behaviours in visitor travel and site energy consumption, biodiversity and sustainable economies are central changes (HE Scotland,2019). Perhaps the need for conservation professionals facing such challenges is an understanding that the greatest change will come about from discussions of this sort in the political sphere?

The case studies of Merv and Skara Brae show sites that are effected by the consequences of their surrounding environments, in which climate change is the derivative of human action and function, yet there is a more direct level of interaction between people and historic sites. The conservationist is shown to be required to answer highly subjective questions at an ethical level; whether interaction with historic sites is in any way appropriate is an entirely legitimate question, but the decisions made must be in favour of integrating people with differing values, backgrounds and approaches to conservation. If sites are to maintain relevance in a turbulent world, then the significance of an historic asset is likely going to have to exist outside of purely academic interpretation and systems of care.

At Skara Brae, the effect of conservation practice in response to the changing climate we create is visible over a relatively long time frame. The actions we take that alter the climate are far more immediate. As of 2018, Skara Brae recorded 111,921 visitors, a two percent increase on the previous year (the Orcadian,2019). The Orkneys are an area of relatively low economic productivity, with high percentages of fuel poverty and limited infrastructure. Around 40% of visitors to Orkney come primarily for the archaeological sites, so the financial benefits from an increasing powerful tourist economy are central to developing the community (Day et al,p27). The use of an historic asset as the central attraction fails to acknowledge the potential damage that is caused to the site.

The visitor framework fulfils requirements for 'The Green Tourism Business Scheme' that awarded the Skara Brae site Gold Certification, yet amongst the more obvious criteria for limited energy usage, the correct recycling provisions and the use of environmentally safe hygiene products, there is criteria for bicycle hire (GTBS,2013). The standard set is excellent and the scheme important, but it is hardly appropriate to provide alternate attractions to a 5,500-year-old World Heritage site when such damage from increased use of paths has resulted in a multiyear program to resurface the upper levels of the excavated area. If the number of visitors is actively detrimental to the condition of any historic asset, damaging original fabric or authenticity of material, it seems that there should be greater provisions towards protecting the object/s that are central to *any* future plans.

It is important to remember that an inference to this line of thought is that everyone shares the mind-set and values of a conservation practitioner. The focus on authenticity as something of paramount importance is rooted in Western Conservation ideals, derived from connoisseurship. It is hard to describe 'Eastern' approaches to authenticity without being highly specific to regions, for instance Wabi-Sabi ideals in Japan (although many with an interest in antiques will approach age in a similar fashion) differing from necessary approaches of nomadic peoples in Tibet. A general reflection of differing approaches can be seen in the Nara Document on Authenticity was born of a conference with an intent to redefine what constituted such a value with consideration to intangible heritage (UNESCO,1994). The conference proposed that this understanding is a decision for those "within the cultural contexts to which the [heritage] belong[s]." In a period with shifting cultures, amalgamating with other viewpoints in shared space, the role of the expert pre-determining the conditions for interactions with heritage needs appraisal and conversation (Deacon/Smeets,2013).

The effect of climate change on human life on the widest scale will produce issues for the conservation professional that go beyond object conservation, care and theory. Addressing severe and complex futures with philosophies that address issues directly are often too radical to accommodate general values towards human rights and everyday life. Deep ecological theory can produce outcomes that argue for population control or quasi-fascism, at least through the maxim that humans are subordinate to the general health of the planet (Schwarz,2009). Shallow ecological theory, that sets out to produce ecologically sensitive solutions within the general capitalist framework, still raises questions around the value of human life when compared to the cost borne of other species (Singer,1975). It is certain that human lives are to be protected, and this inevitability is like to produce human responses to climate change that challenge the values of tangible heritage.

Climate change and climate events are likely to reduce the 'carrying capacity' of large parts of the world, mostly in areas aligning with the equator where responses to heat increase and water loss most drastically effect conditions for human habitation (Brown,2008) (IPCC,2014). In areas with populations centred in coastal location, rising sea levels and increased danger from climate events will force mass migration. Two-thirds of Bangladesh is within 5m of mean sea level, with 28% of the

population living in coastal locations. Agricultural land that relies on access to fresh water irrigation is damaged by salination of water supply, and coastal reserves of fresh drinking water face the same issues. With a 50cm rise in sea water levels, around 15million people will be affected by the loss of 11% percent of the nation's acreage (EJ Foundation). Migration of peoples away from uninhabitable land doesn't leave problems behind, but carries further issues forward. Farmland elsewhere, crucial for the sustenance of life will have to and should be used for housing those in need, although this only increases the number of people affected by a chain of events. Eventually this chain will affect the values of the world's economic superpowers in a visceral manner outside an economic context and every doubt for preparatory meaningful change is a rational one as we are inclined to expect less danger in the immediate future than we have prepared ourselves for in an elongated timeframe (Pahl at al,2014). Such migration will carry different approaches to heritage, largely intangible values due to the impossibility of maintaining material goods when in limbo, which raises questions about the means in which we should/could be approaching our seemingly unaffected assets. Interpretations of how to place such values have been approached (UNESCO,2003) (De La Torre/Avrami,2000) within the framework of the dynamics of developing space and the association felt towards built heritage. Values and perceptions of the built environment as 'totem' often revolves around shared values, religious theory for example, but the progression from one dominating viewpoint creates opportunities for the loss of heritage fabric as the sites grow less exalted. (Serageldin,2000). Article 3 in the UNESCO document on Safeguarding Intangible Heritage, titled "Relationship to other International Instruments" places intangible heritage, even when closely linked to the significance of tangible assets, second to the needs and plans for the tangible assets. Approaching such ideas without reconceptualising previous documents that enabled unilateral approaches to heritage will only create a larger fissure between both forms of heritage. (Jones/Yarrow,p11)

Funding for sites like Skara Brae allows the embrace of a totemic site for the local community and the maintenance of a World Heritage Site, important on national and international levels, yet could this funding be better placed in areas with greater resilience to climate events? This thinking produces a new criterion for geographical favouritism, that is likely to go against local interest and will potentially damage economies that are already ignored, yet the force and certainty of climate change will wait for no-one and it is possible that the communities situated in UK coastal towns will be made environmental migrants too. (Farrar and Vaze,2000) (BBC,2020)

The locations and projects that receive funding embody the values that are collectively felt towards heritage; this is not to say that intangible heritage is considered unimportant, only of lesser importance, so would a shift in funding for work that accommodates a certain future not be of more use? Information of this sort is best transmitted through conversation and documentation (O'Bryan,1993) which might produce funding outcomes that rarely engage with heritage space. Funding community space and integrative programs for *all* falls outside the remit of our largest conservation body, The National Trust, and challenges the function of most of their assets. It is unlikely that radical suggestions of realigning the aims of the National Trust entirely to climate change mitigation will find their feet in the current context, but that does not stop sites from being used

in increasingly experimental ways. Knepp Castle Estate has enabled better funding for its tangible assets by integrating intangible values into their past practice. The estate was actively and efficiently farmed until 2001, when a change to wild farming practice occurred. The 144 Hectare estate provides space for nature to prosper without forced interaction of the human hand, removing the detrimental use of pesticides and fertilisers, aiding the flourishing of native species and providing a platform for people to engage with traditional mixed farming methods (Barkham,2018). Knepp Castle remains, yet the intangible heritage feeds the maintenance of the built fabric and provides a contemporary context for the assets to exist in. Engaging with activity enables conversation and the transfer of information in a way that static information cannot.

If the conservation professional is faced with such a variety of challenges to a field that is widely considered to be static, steady and traditionalist, there is an absolute need to embrace new methods of interaction that fit with increasingly diverse values and attitudes to heritage. As values change what has been considered correct attitude becomes increasingly obsolete. Correct practice fluctuates rather more freely as the rediscovery of traditional methods and materials meets the benefits of technological innovation, but the results of such work in the built environment produces an outcome that can be evaluated in terms of a controlled methodology. Intangible heritage lacks such an outcome and evaluation of the success or failure in decision making and practice can be harder to quantify, yet the guaranteed effects of a changing climate will generate discussion on the significance of traditional heritage assets. It is paramount that the work undertaken in all forms of heritage; interactive or static, tangible or intangible, produces a setting appropriate for such dialogue.

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Figures:

Figure 1) c/o Dr. Louise Cooke

Figure 2) c/o Dr. Louise Cooke

Figure 3) Day JC, Heron SF, Markham A, Downes J, Gibson J, Hyslop E, Jones RH, Lyall A. (2019). *CLIMATE RISK ASSESSMENT FOR HEART OF NEOLITHIC ORKNEY WORLD HERITAGE PROPERTY: AN APPLICATION OF THE CLIMATE VULNERABILITY INDEX*. Historic Environment Scotland, Edinburgh.

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