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Risk management and uncertainty:

How wrong can you get?

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Abstract

This paper traces the author's involvement in the developing field of risk management which started during the last decade of the twentieth century. The author's ideas about risk and uncertainty have continued to evolve up to the present day. The concept of the museum has also evolved as the importance of collections has given ground to the museums' greater association with wider society and global subjects such as sustainability.

Some of the ideas about risk and decision-making in museums that were developed in the book Risk Assessment for Object Conservation are now seen as too narrow and inward-looking. Museum activities may be a better subject for risk assessment than museum collections. The interaction of politics and society with the museum business and the subsequent effect on values is briefly explored.

Keywords

Risk; Uncertainty; Environment; Society; Value.

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Introduction

The title of this collection of papers is “Integrated Risk Management in Museums: Past Lessons, Future Ways”. The obvious interpretation of the title is that the overall subject concerns activities taking place in museums. It is assumed that to achieve certain strategic goals within each institution, these activities must be interlinked and must all incorporate an awareness of risk. The second half of the title suggests that the theory and practice of risk management have changed in the past and will continue to change in the future.

This paper deals with my personal experience with the development of the field. As this account is somewhat personal and anecdotal, it seems reasonable that much of it is presented as a first-person narrative, even though the format of an academic publication will be maintained as far as possible. The paper will be about my past involvement with the study of risk and my current interest in the study of uncertainty. The abstract that I originally supplied to the conference organisers placed ‘risk’ firmly within the area of decision-making. The ideas behind the words “How wrong can you get?” were summarized as my intention “to point out sources of uncertainty in risk management, and to suggest actions that help steer a path through the complex causal network, so that the outcome of your decision is not too wrong to be considered right”.

1. Still going strong

I began to be aware of the subjects of this paper (risk assessment, uncertainty and ‘things going wrong’) during the last decade of the last century. They are still obviously highly relevant today. It is worth noting that there are other aspects of museum activity that have changed over the past few decades. For instance, the currently

common terms ‘collections management’, ‘preventive conservation’ and ‘risk assessment’ were virtually unknown when I started working in a museum in 1973.

At the 1994 IIC (International Institute for Conservation of Historic and Artistic Works) Congress in Ottawa, the conservation world was exposed to the development of ideas about collections risk that had been taking place at the Canadian Museum of Nature and the Canadian Conservation Institute (Waller, 1994; Michalski, 1994). I had just signed a contract with Butterworth-Heinemann to write a book about risk. What I learned in Canada meant that I had to substantially modify the structure of the proposed book. Risk Assessment for Object Conservation was eventually published in 1999 (Ashley-Smith, 1999).

Nearly a quarter of a century later, the subjects of risk management and risk assessment are still going strong. There are currently two papers in the top ten all-time downloads from the UK (United Kingdom) Journal of Conservation website that deal with the topic. The papers are “Collection management using preservation risk assessment” by Anna E. Bülow (Bülow, 2010) and “The Quiskscan – a quick risk scan to identify value and hazards in a collection” by Agnes W. Brokerhof and Anna E. Bülow (Brokerhof & Bülow, 2016). Both have been downloaded several thousand times, and that number continues to rise every week.

The Quiskscan paper contains a discussion of the strengths and weaknesses of the system, saying that it necessarily involves the acceptance of large uncertainties. I wrote a paper with the title “Developing professional uncertainty” for the IIC Congress in Melbourne, in 2000 (Ashley-Smith, 2000). In it, I advanced the idea that members of the conservation profession should recognize and embrace the uncertainties in their work. A fascination with uncertainty is obviously still going strong. In September 2022, the University College London Institute for Sustainable Heritage (UCL ISH, 2022) in London advertised a two-day course to teach leaders in the heritage field how “to act in the face of uncertainty”. Asking how wrong things can get also has a long history. I wrote the paper “Environments for artefacts: How wrong can you get?” in 1995

(Ashley-Smith, 1995). This was a year after I had given a talk about environments at the 1994 IIC Congress with the title "Let's be honest" (Ashley-Smith et al., 1994) and around the time that the Smithsonian Institute was shocking the conservation world by suggesting that environmental specifications had become unnecessarily strict (Erhardt & Mecklenburg, 1994). So, at that time, "How wrong can you get?" was a question about how relaxed environmental specifications could become without causing damage. The paper ends with the conclusion that if you ask the wrong question, it can lead to the wrong answer. If you ask what is the best or what is the ideal environment, you push people towards strict numerical answers. In this paper, the question has been revived with the suggestion that it may not always be possible to get precise or accurate data to help with decision-making. How far can you diverge from some deceptively certain ideal and still be able to make a decision with confidence?

2. My life of pie

My life and work to date can be divided into three chunks of time. I was born in 1946, and 27 years later, I joined the conservation department at the V&A (Victoria and Albert) Museum. About 26 years later, my book on risk was published, and my most cited paper on uncertainty was published the following year. At the time of writing, I am 76 years old. You could show this division of my life and career as a pie chart (Fig. 1). Here, we have a clear representation of my life. It is easy to see at once the relative distribution of years between the three major sections of my life. This visual clarity is why the pie chart has found a role in risk assessment.

During my study of uncertainty, I have developed several simple guiding principles. One is that generalizations can be misleading. Another is that things are never just black and white. There are at least 49 shades of grey. These principles can be summarized in the slogan, "It's never that simple".

The pie chart in Fig. 1 appears so simple and straightforward because a huge amount of important detail is missing. For instance, my role as a manager; I was head of the conservation department from 1977 to 2002, overlapping with both the 'conservation' and the 'risk and uncertainty' sectors. Take the stream of events, starting with my first chemistry set, my degrees and post-doctoral work in chemistry, through to my involvement with the Climate for Culture research project which ended in 2014. I have worked as a scientist in several chunks of time, which overlap all three sectors. The pie chart looks less clear now (Fig. 2). If it included other important activities, such as my intermittent ventures into conservation ethics between 1982 and 2020 or my concerns about the loss of practical skills from 2016-2019, it would not be at all easy to interpret.

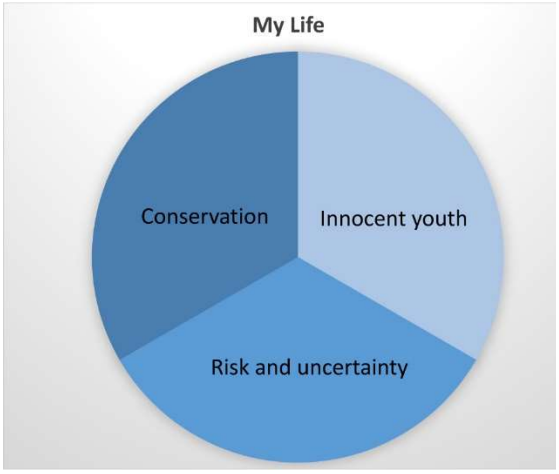

Fig. 1 - Dominant interests and activities during the author's life.

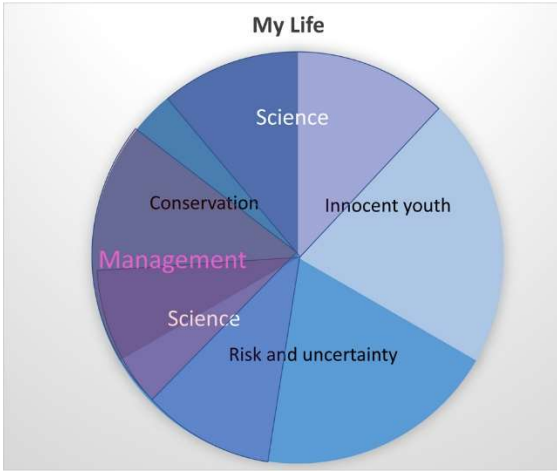

Fig. 2 - Further interests and activities, such as science and management, overlaid on Fig. 1.

It is possible that the pie chart is not always an appropriate tool for describing dynamic multilayered properties. In the excellently comprehensive guide to risk assessment, "The ABC method", Michalski and Pedersoli Jr. take 16 pages to explain how simple and straightforward the pie chart is for representing values (Michalski & Pedersoli Jr, 2016). In the uncertain use of the language used in conservation discourse, the word

'value' is one that is difficult to define and is used by different speakers to mean different things at different times.

3. Nothing stays the same

Risk assessments ask that you make predictions over long periods. You must predict the behaviour of one object or one collection over decades, assuming that everything else remains unchanged. Yet, nothing ever remains unchanged.

The main building of the V&A Museum, where I worked for 31 years, is a very solid permanent-looking building. But it wasn't there two centuries ago. It is likely to be underwater by 2080. During my time there, I worked for five different directors. The UK was governed by six different prime ministers. The museum stopped being part of a government department and became independent. The departments concerned with fundraising, publicity and public outreach grew dramatically. By the time I was made redundant in 2004, the post of the head of conservation had been downgraded, and I was no longer a part of the museum's senior management team. The building that seemed so very solid did not house a stable organization.

Even the concept of what a museum is seems to be changing. 15 years ago, the ICOM (International Council of Museums) definition of a museum described something familiar:

> A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment (Lehmannová, 2020).

This describes a place where collections risk management can happily find a home. A new definition was proposed in 2019, which stressed the relationship of the museum to society and its social and political role:

> Museums are democratising, inclusive and polyphonic spaces for critical dialogue about the pasts and the futures. Acknowledging and addressing the conflicts and challenges of the present, they hold artefacts and specimens in trust for society, safeguard diverse memories for future generations and guarantee equal rights and equal access to heritage for all people.
>
> Museums are not for profit. They are participatory and transparent, and work in active partnership with and for diverse communities to collect, preserve, research, interpret, exhibit, and enhance understandings of the world, aiming to contribute to human dignity and social justice, global equality and planetary wellbeing (ICOM, 2019).

Collecting and preserving are still in there. But the active role in righting social wrongs is greatly emphasized. But if you put more effort into a new direction, you can no longer put effort where you used to. Although it was rejected at that time and a new definition was adopted in 2022 (ICOM, 2022), the 2019 proposal reflects what a number of people who work in museums actually feel. These views were expressed in the book "The participatory museum" by Nina Simon (Simon, 2010), which presents museums as spaces for relationship-building and dialogue, not just storage and display.

In July 2022, the views of three museum professionals were presented in a recent discussion in the online newsletter of the UK Museums Association. Typical of the comments are: "A museum isn't a building, it's a community. It is not about objects, but stories"; "Imagine a space for truth and healing that we call a museum"; "A museum listens to and responds to the needs of the communities it serves".

The conception of a collection as something to be conserved is changing. In mid-September 2022, Tate organised a conference to mark the finish of a three-year

project. Looking in particular at time-based media, performative, live and digital art, the research focussed on "works that unfold over time, that question the boundaries between the artwork, the archive and the record, and that have complex social or technological dependencies within networks outside the museum" (Tate, 2022).

Public views on what constitutes a museum also put less stress on historic collections. Lonely Planet's list of top 12 museums in Europe gave some examples where the emphasis was on hands-on learning or splendid modern architecture, or a spectacular scenic environment (Naylor, 2022). The Museum of the Future (MOTF, 2022) in Dubai does not feature collections at all but promises a journey through possible futures. It's all electronic and computer-driven, but you have to visit this specific location to get the experience.

4. Risk assessment for object conservation

The focus is on risk management. Risk assessment is only one part of that. The book I wrote about risk assessment was published in 1999. The book is still available on Amazon, now in three different formats (hardback, paperback, and Kindle). It still fetches ludicrous prices in the second-hand market. You can get useful insights about value from this range of prices. The 'thing' that is 'the book' doesn't exist physically; it is instantiated in a range of physical forms that have a range of values judged by a willingness to pay. So, a book has some of the elements of performance or conceptual art where the ideas are what need to be preserved rather than the physicality.

The contents of the book have been criticized, most recently by Stefan Michalski (Michalski, 2018), for not outlining a specific methodology for risk assessment. In reply to these critics, I would say that I merely wanted the reader to be able to think about the subject, which is why I included the New Yorker cartoon on the last page of the text. A young boy says to his teacher, "I don't have an answer, but you've surely given me a lot to think about".

Between 2003 and 2008, I gave a series of 2-day courses around Europe on risk assessment. Some of these were graced with the title 'masterclass'. I used the same approach of stimulating thought, encouraging investigation rather than imposing a direction. I wanted the students to use their eyes and ears. To look for weaknesses and barriers in the physical building and the institutional protocols. The students seemed happy and attentive. The feedback was good except where anyone had also been on a course run by Rob Waller or Stefan Michalski. Those students wanted to know why I was not teaching a specific methodology, why I didn't teach the authorized version.

5. Relationships

One thing in my book, that I was very proud of at the time was a relationship diagram, outlining inputs and outputs of the museum. In this scheme, resources such as people and money are inputs which can be allocated to actions such as modifying the environment of the object, treating the object, and using the object. All these things might have an effect on the state of the object, which in turn may affect its value as a museum object. The use of the object is what generates a benefit outside the museum. But how wrong can you get? Given the current view of museums and the relevance of collections, it can be seen that this model is rather limited.

The complexity of the system can be seen in Fig. 3. The red box in the bottom right-hand corner shows what goes on within the museum, where different activities can affect the state and value of objects. This box delineates the museum where the objects spend time and decisions are made. But the museum does not exist in splendid isolation. It is subject to politics, on a global, national, and local scale. It has an increasingly important role in relation to society.

This may look complicated, but that's because 'it's never that simple'. All of these entities involve people and their decisions to some extent. But global politics and global climate are affected by things that are really beyond human control. For

example, the Sun's radiation, the Earth's orbit, and spin affect present and future climate patterns. The Earth's current seismic state, the distribution of elements in the Earth's crust, the composition of the atmosphere and the rate of population growth all affect the ambitions and activities of politicians on a global scale.

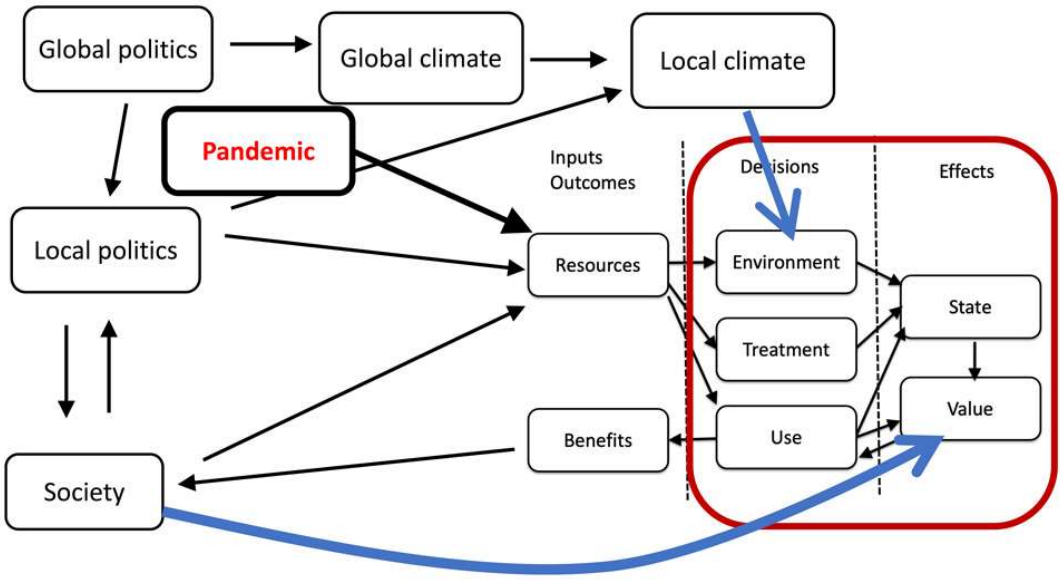

Fig. 3 - How events outside the museum can affect decision-making within the museum walls. Most of these external factors cannot be directly influenced by individuals working in the museum.

6. Decisions

Another thing I was very happy with in my book was my exploration of decision-making, especially with my new knowledge of the decision tree. A simple decision can be modelled as a choice between doing something and doing nothing (Fig. 4). For both courses of action, there may be external factors that, with different probabilities, may affect the outcome. What seemed a simple decision could have, at least, four possible results, some of which are not what you had hoped for. Decisions made will necessitate further decisions to bring the business forward (Fig. 5).

Each decision may, in fact, have more than two options and more than four possible outcomes. The final outcome of one decision chain may be identical to that from

another chain. Thus, the model of multiple consecutive decisions may resemble the 'complex causal network' mentioned in the introduction.

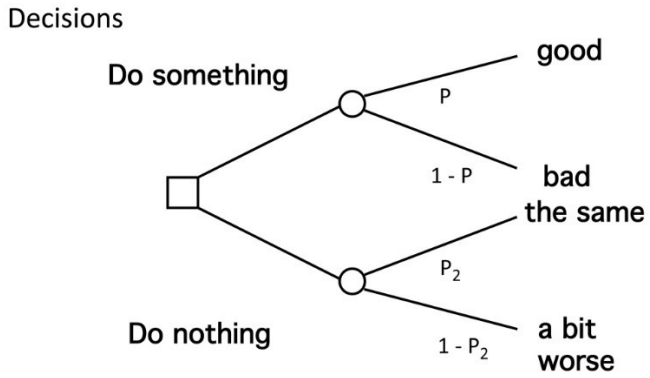

Fig. 4 - Four different possible outcomes from the decision to do something or do nothing.

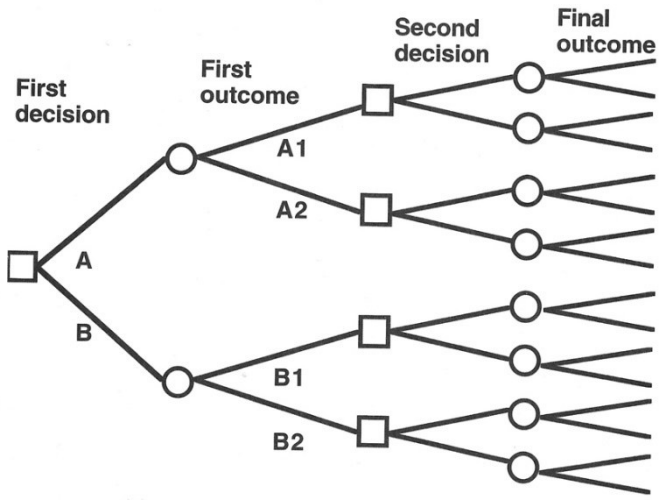

Fig. 5 - The sixteen possible outcomes from two successive decisions. The outcome following one branch may be very different from the outcome following another. The two outcomes may be vastly different, or they may be identical.

7. Stuff *versus* activity

Risk assessment in museums has usually been concerned with risks to physical collections rather than museum activities. But as collections lose their supreme position, it is the actions of staff and stakeholders that should be the focus. This can be summed up as 'risks to business'. If you ask what you need to run a museum business,

then collections still figure, but so do buildings and hardware such as showcases, computers and HVAC (Heating, Ventilating and Air Conditioning) systems. Staff are necessary, as is their specialist knowledge and the protocols to organize them. The humans need collection-related and administrative data on paper and electronic carriers. The institution needs a range of communities; physical and virtual audiences. There must be means of access for physical visitors and for information seekers on the Internet. Above all, there must be income streams from the audiences and, hopefully, local, and national governments. This can be summarised in a list of things (Tab. 1) essential to running a museum business that are at risk but need to be protected and sustained.

Tab. 1 - Essential things to run a museum, at risk and in need to be protected and sustained.

Collections	Community	Documentation
Buildings	Income streams	Means of communication
Staff	Hardware	Means of physical access
Specialist knowledge	Systems	

8. Scientific certainty

Risk management begins with risk assessment, that is the identification and quantification of events and circumstances that might harm your business. To assess risks, you need to predict future events and assess their impact. It is generally assumed that using a scientific approach, using scientific knowledge, numbers, and equations will add to the certainty of the prediction. It will also give ways of estimating the uncertainty of your guesses.

Science is not obsessed with certainty. The journal Scientific American recently celebrated 175 years of production. To make an assessment of progress over that period, it analysed the frequency of particular words appearing in the journal, year by year. The word 'certainty' appeared twice as often in 1850 as in 2019. The word 'uncertainty' did not make much of a showing until the 1950s. The uncertainty principle, formulated in the 1930s, does not appear to have had any effect on word frequency. In 2019 'uncertainty' reached the same frequency as 'certainty' had shown in 1850 (Stefaner et al., 2020).

Published uncertainties to do with environmental monitoring and damage functions (equations that link rates of change in objects with levels of humidity, temperature, and pollutants) can shake one's faith in the certainty of current measurements and predictions of future states. For instance, if the relative humidity in a conditioned exhibition space can vary between 55% and 65% in different parts of one gallery, and the temperature varies by 2°C (Camuffo & Bertolin, 2016), what can we say about the rate of degradation? The conditions are likely to be reported as single numbers for each gallery, but that hides rates of deterioration that vary by 50 -100%.

But how wrong can you get? Risk assessment scores are generally logarithmic. A risk score of 4, using the Michalski ABC method, indicates rates of damage ten times higher than a score of 3. In the example above, the worst case was only twice as bad. There is a whole range of bad behaviour that can be tolerated without moving from one risk score to a higher or lower one.

9. Society and value

It is difficult to talk about risk without introducing value. As mentioned previously, value is a very uncertain concept, difficult to define or quantify. In Fig. 3, the use of objects within the museum (through display, handling by visitors and scholarly examination) provides benefits to society outside the museum. It is also possible for

events in society to influence the value of objects safe inside the museum building (indicated by the long blue arrow). For instance, the Black Lives Matter movement gave extra publicity and emphasis to the ongoing decolonization of collections. By understanding that there are different histories and value systems that need to be recognized, when they may have been ignored or suppressed before, the relative worth of different collections and individual objects can be changed, sometimes dramatically.

Public statues of prominent historic figures can suffer radical changes of value in the estimation of some vocal members of society. One recent example was the case of the statue of Edward Colston, 1636-1721, in Bristol. He had a statue in his honour as he was a local member of parliament and philanthropist who endowed a number of public buildings and schools. He was a merchant specializing in fruits, wines, and textiles from the Iberian Peninsula. Sadly, he also successfully dabbled in transporting humans from Africa to America (Edward Colston, 2022). A group of 21st-century white people thought that the wrongs of the slave trade could be righted by toppling the sculpture, daubing it with paint, rolling it through the streets and throwing it into Bristol harbour. No one was prosecuted for this act of vandalism. Presumably, 'Society' deemed that no damage (loss in value) had taken place, since the branding of Colston as a slave trader had already reduced the statue's worth to zero. The sculpture is now in a museum where the conservators must ponder which parts of the history of the object are sufficiently valuable to be conserved.

10. Condition and value

We can see from the previous section that value can be altered without any intervention or physical change to an object. Yet, where there is a measurable change in state, there may be an acknowledged change in value. It is necessary to make a prediction of future changes of state, and hence value, in order to carry out a risk evaluation.

There are numerous models that link the effects of time to change in value (Waller, 2003). One that I favour for its logic and simplicity is shown in the graph in Fig. 6.

Fig. 6 – Idealised curve derived from the change in published book value predicted for different condition ratings of plastic action figures.

I derived this from the quoted book values of plastic action figures in various states from pristine to 'only good for spare parts'. A small amount of damage has little effect on the asking price. Then there is a range where the value drops steeply with increased damage. Finally, there is a flat region where further damage has no effect on the very low value. The same shape of curve was derived by Agnes Brokerhof using a tomato as an example. Slight changes in appearance do not affect the desire to eat it, but after much deterioration, it looks inedible. The desire to eat the tomato does not change further, yet the rotten fruit still continues to degrade.

When I discussed the relationship of condition and value with Dr Martin Pracher, expert in art appraisal and damage assessment (Martin Pracher, n.d.), he said that during his extensive work on values, he had never come across any evidence of this form of relationship.

11. When stuff is not stuff

If risk assessment can consider the activities of the museum business rather than the contents of the museum, it can surely be applied to other activities that have cultural significance. For instance, things like theatre, dance, video installations and web-hosted artworks that exist as concepts but have no unique, permanent, or stable physical instantiations. Considering such phenomena, Joel Taylor and Hélia Marçal have proposed a challenging new approach to risk assessment (Taylor & Marçal, 2022). They reappraise the role of value in the calculation of risk. They maintain that when considering how to sustain values, the emphasis must move beyond merely putting value into an equation but must make provision for the dynamic and complex nature of values. They argue that risk management has developed techniques that are focused on sustaining something desirable. However, these precious items may change or evolve as part of their nature or role, for instance, time-based media artworks. In all forms of cultural heritage, change is what may need to be sustained. The prediction of the future changes inevitably involves an acceptance of uncertainty.

Final considerations

I wrote Risk Assessment for Object Conservation in the late 1990s. Around that time, the question “How wrong can you get?” would have related to how far one could deviate from an accepted norm without causing damage to physical objects. Since then, intangible heritage has attained greater importance, and museums have adopted a stronger political role, engaging more directly with society and issues such as sustainability. Now that uncertainty plays a greater role in my current thinking, the question needs to be considered in a different light. Given incomplete knowledge of the current situation, given the uncertainties about future developments, how comfortable can you be that you will make sensible decisions? You can remain happy if

you choose an adaptive management style, staying alert and altering tactics and strategy as events unfold (Care, 2020).

Risk assessment is intended to provide a sense of priority and a sense of proportion. It is meant to prevent rather than promote a sense of panic. Risk assessment is not a once-only adventure, nor should it become a boring, repetitive chore. Constantly appraising anew what is important and what can be tolerated allows adaptive risk management to be carried out in a calm, considered fashion, a natural part of the structure and strategy of the museum enterprise.

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Notes on the author

Jonathan Ashley-Smith studied chemistry to post-doctoral level at the Universities of Bristol and Cambridge. He worked as a metalwork conservator and analytical scientist from 1973-1977 at the Victoria and Albert Museum (V&A) London. Between 1977 and 2002, he was Head of Conservation at the V&A.

In 1994 he was awarded a Leverhulme Fellowship to study risk methodologies, resulting in the book Risk Assessment for Object Conservation, published in 1999. In 2000, he was awarded the Plowden Medal for his contribution to the conservation profession.

Jonathan Ashley-Smith was Secretary-General of the International Institute for Conservation (IIC) 2003-2006. He was Visiting Professor in the Conservation Department of the Royal College of Art, London from 2000-2010. Between 2009 and 2014, he was project leader for the damage and risk assessment module of the EC research project “Climate for Culture”, looking at risks to collections and interior decoration arising from climate change.

In 2020 he helped organise a conference on philosophy and ethics with David Scott. His presentation was about his concept of ‘bespoke codes of ethics’ and the publication by the Institute of Conservation of the document Guidelines for creating a personal statement of ethical practice.