



STANDARDS IN PREVENTIVE CONSERVATION: MEANINGS AND APPLICATIONS

Rebeca Alcántara

20th June 2002

The opinions expressed in the present document do not necessarily reflect ICCROM's position
nor that of its Member States.

TABLE OF CONTENTS

Preface	2
1. What are standards?	5
1.1 What is generally meant by standards?	5
1.2 How did the industrial concept of standards develop?	6
1.3 How and when did standards begin to be used in conservation?	7
1.4 What is meant by standards in preventive conservation?	10
2. How are standards used?	12
2.1 What is the purpose of standards in preventive conservation?	12
2.2 What are standards based on?	15
2.3 How are standards presented?	17
3. A brief review of some standards	18
3.1 Are there standards for every topic in preventive conservation?	18
3.2 How do some standards vary with respect to others on the same subject?	19
3.3 How have standards evolved?	22
4. A critical look at standards	23
4.1 What are the real benefits of adhering to standards?	23
4.2 What role do interpretation and context play in the application of standards?	25
4.3 What are standards' main drawbacks?	27
4.4 What is the best way to use standards?	30
Table 1	33
Table 2	35
LIST OF ACRONYMS	38
BIBLIOGRAPHY and ONLINE SOURCES	39

Preface

Mexico, June 2000. A young conservator is analysing the data obtained over a six-month period of monitoring the environmental conditions in a large building housing a priceless archival collection. Drawing up graphs and tables, she extracts information from a mass of numbers. Peak temperature in the month of May, 31°C. Lowest relative humidity in April, 19% RH. Highest daily fluctuation in relative humidity, +10% RH. Piece by piece, a climatic profile of the building emerges.

But what does this profile show? Are these values “normal”? Thanks to her training, the conservator knows that heat and humidity are important factors in the deterioration of paper. So, in an ideal world, all 2,000 m³ of documents would be kept cool and moderately dry. In the real world, though, the conservator’s lack of specialised knowledge in preventive conservation makes itself felt. *How cool, how dry?* How much variation is reasonable? What should she propose?

As the most highly trained conservator in the surrounding 100,000 km², direct consultation with experts is not an option. Articles and books published during the 1980s on the subject have to fill the gap. These tell her that similar institutions in Europe and the US adhere to certain environmental standards. “Ah-ha,” she thinks. “Here it is. Optimum conditions for books: 20-22°C, 40-50% RH. Maximum daily fluctuation, ± 2% RH... Use of air conditioning equipment...”

A half hour later, the picture looks bleak. Behind the conservator’s cubicle, the air conditioning vents collect dust, having broken down one month after installation, two decades ago. Should the archive’s conditions be brought up to international standards? A glance out the window shows how difficult this will be. The rainy season has begun, and destitute children huddle under the public building’s roof. Replacing the air conditioning will entail great expense. But then, isn’t the children’s history worth protecting? How else will they know their rights? This argument tips the scales, and the conservator types, “Installation of modern air conditioning equipment is recommended, if and when its operation follows the strict specifications listed below, and its maintenance is properly assured.” Fortunately, the director is a very progressive man, so the proof of the gap between present conditions and those recommended by European experts should impress him.

Her writing is interrupted by the noise of rickety wheels on the cement floor. One of the archive’s workers waves as he passes with a load of priceless historic newspapers grazing the floor, heaped on Mexico’s traditional tool for transporting heavy items, the *diablito*. The conservator sighs and calls to the worker. “Jaime! How many times have I told you not to use the *diablito*? You must use the special cart instead!” Jaime scoffs. “I would have to make three trips with the cart! Instead of one with the *diablito*. I say, screw the cart. It’s made for women.”

No sense in arguing or trying to explain historical value and deterioration factors to Jaime, it's been tried before. Appeals to "quality", the new internal procedures manual and American standards for handling documents are quite ridiculous in the eyes of a man who barely earns enough to feed his family by working two jobs. He can't be fired either, since he's protected by the union. Only one recourse is left. The conservator decides it's time to try.

"Look, Jaime, I want to show you something." She hands him a heavy tome and points out article 52 of the federal monuments law. "Whosoever damages or destroys a historic object in any way will be subjected to one to ten years' prison and a fine equal to the damages." Jaime remains impassive, but the conservator can tell that the point has been taken at last. "You didn't know this before, so I'm not going to do anything about the diablito today. But next time...!"

The administrator comes along and Jaime vanishes into the stacks. "Bad news," says the administrator. "The building inspectors just came by. It seems that international standards have changed. Halon gas is no longer approved. We have to get rid of our fire extinguishers by next month." This is terrible news indeed. The budget will not allow for new extinguishers to be bought until January. The archive will be unprotected from fire for five months. "And to think of all the trouble and expense we went to scarcely a year and a half ago, to install those extinguishers!"

"By the way," says the conservator, "I just spoke to the fumigating company's manager. He proposed using a newer, less harmful product next week, because the old substances have been linked to cancer in the First World." The administrator looks suspicious and asks how much more this will cost. On being informed of the estimate for the new pesticide, he laughs sardonically. "Forget it. Can you tell the difference between the new product and the old? A bottle with ISO 9000 seals on it is no guarantee. What's to prevent the owner from filling it with the same old pesticide? *If* he really uses pesticides at all. I have my doubts, from the way the cockroaches keep reappearing and the fact that the owner just bought a Mercedes Benz..."

A year later, the conservator returns from studying a programme in preventive conservation abroad. She has learned, to her great chagrin, that environmental standards should never be imposed as absolute optimum values, and that air conditioning's cyclical fluctuations may cause more harm than good. "Thank goodness the air conditioning proposal was far too expensive, anyway," she consoles herself, as she knocks on the director's door. The director welcomes her back with a delighted smile. "Guess what!" he exclaims. "Remember that there were elections right after you left for your course? I presented your proposal to the new mayor and he was very impressed with your appeal to bring the archive up to international standards. He used to be the manager of Hughes-Packard, you know. Anyway, he decided it was high time we had a decent archive, talked to some wealthy society ladies, and gave us the money for the air-conditioning equipment! Had you noticed how cool and moist it is in here, for a change?"

This brief tale may seem like a caricature, but it presents real, common problems in the use of standards in the developing world. People working in museums, libraries, archives, archaeological sites and churches that keep their communities' cultural heritage are increasingly exposed to the concept of "standards". What exactly are these standards, and where did they come from? What are they based on? What are they used for? Are there any advantages to adhering to them? How may we use them for our benefit? How may we avoid their pitfalls?

The following pages were written to provide an initial answer to these questions. Like standards themselves, this document cannot presume to give definitive answers, since it is based on research at a very basic level. In spite of the author's best efforts, the sources examined are limited by practical considerations and heavily slanted toward Anglo-Saxon viewpoints. It is possible that Norwegian or Czech institutions use standards quite differently from British ones. It would be interesting to know if Iraqi or Indian museums use standards, and what their experience has been. Perhaps this paper will stimulate further discussion and analysis on the topic of standards in preventive conservation at a truly international level. Above all, though, it is hoped that it will help the reader to adopt a critical approach, next time someone cites a standard at him.

1. What are standards?

1.1 What is generally meant by standards?

The word **standard** has several definitions in the dictionary, and means different things to different people. This can lead to a surprising degree of confusion, even at high levels. The participants in a seminar on Conservation Standards in South Asia organised by the ICCROM, for instance, had some difficulty in discussing the subject at hand until the dictionary entry was read aloud and the relevant definition was specified.¹ Even when the word is used in a very concrete sense, its multiple nuances may influence its comprehension. It is therefore important to be familiar with its full range of meanings, and, as far as possible, to try to avoid blurring them.

Various definitions of the noun standard (a flag; an upright support; and others) are clearly irrelevant in the present context. For our purposes, a more germane meaning of standard is “the authorised exemplar of a unit of measure or weight”. The standard for a metre, for example, used to be a bar of platinum kept in Paris, whose length all other metres were required to match. At the time, scientists agreed that this would be the unit of reference for all further measurement. This concrete meaning is the basis for the broader sense of the word: “a recognised example or principle to which others conform or should conform or by which the accuracy or quality of others is judged.” A standard can thus signify a criterion, a model, or even a rule.² Notice the range of nuances encompassed by one word: a criterion does not imply forcible compliance, whereas a rule does.

In recent times, a standard has come to mean “a document embodying an official statement of a rule or rules” as well as “a document specifying nationally or internationally agreed principles for manufactured goods, procedures, etc.”³ Thus, a museum’s rules for allowing access to its collections could be considered a standard, as could the specifications for the manufacture of a CD. Again, in the first case, enforceability is a fundamental issue, while in the second (much closer to the example of the platinum metre) the chief concern is practicality.

To further complicate matters, the word standard is frequently synonymous with “a required or specified level of excellence, attainment, wealth, etc.” This usage appears in expressions such as “The conservation workshop should be up to standard.” Unfortunately, the connotation of excellence often clings to the term even when it is used to label a procedure established quite arbitrarily, to manufacture hairpins or whatnot.

¹ SPAFA-ICCROM Seminar on Conservation Standards in South Asia: Final Report, Seameo Regional Centre for Archaeology and Fine Arts (SPAFA) - ICCROM, Bangkok, 1989, pp. 3-8.

² *The New Shorter Oxford English Dictionary*, Vol. 2, Clarendon Press, Oxford, 1993, p. 3028.

³ *Ibid.*

Used as an adjective, “standard” usually means “of prescribed characteristics” or “commonly used, customary”. It may also designate the most correct form of language, which is interesting in view of the fact that one of the fundamental steps of standardisation is the definition of a common terminology.

Finally, “standard” has specific meanings for industry that have permeated the use of the term in other fields. In industry and engineering, a standard is “that which has been selected as a model to which objects or actions may be compared.” Standards can be physical models; devices used to regulate product attributes such as size, weight, or colour; or lists, formulas, or drawings which describe a product’s features or certain procedures.⁴ The International Organisation for Standardisation (ISO) currently defines **standards** as “documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose.”⁵

1.2 How did the industrial concept of standards develop?

It could be argued that standards have been used all over the world since ancient times, especially for construction. Hammurabi set out accepted building practices; artisans in New Spain wrote down guild specifications for the construction of altarpieces; English shipyards followed set guidelines. Early standards helped people to communicate their ideas as well as to ensure the continuity of methods that had proven their effectiveness at a local level. However, it was not until the Industrial Revolution that the use of standards was raised to an unprecedented level.⁶

As machines took over production, strict standards were needed to ensure compatibility between one (interchangeable) part and another. At the same time, the standardisation of weights and measures became more rigorous. Governmental offices, trade associations, and technical organisations began to make their own efforts at standardisation. As commerce increased, export industries began to look for ways to streamline international trade. ISO was founded in 1946 “to promote the development of standards in the world, with a view to facilitating the international exchange of goods and sources, and to developing mutual co-operation in the spheres of intellectual, scientific, technological and economic activity.”⁷

⁴ *The New Encyclopaedia Britannica*, Vol. 11 (Micropaedia), 15th Edition, Chicago, 1987, p. 209.

⁵ <http://www.iso.org/iso/en/aboutiso/introduction/index.html>

⁶ KELLEY, Stephen J. (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, p. 1.

⁷ CROCKER, A. E., “International Standards”, in Dex HARRISON (ed.), *Specification 1978: Building Methods and Products*, Vol. 5, The Architectural Press, London, 1978, pp. 190-1.

Standards in this context respond primarily to the need for greater compatibility, ease in communication, and efficiency, in order to lower costs and increase profits. Of course, on a wider scale, the benefits of standardisation go far beyond monetary gain, but one should remember that the basic incentive that has driven most proposals for standardisation is economic, not an idealistic impulse to improve quality. For instance, the standards governing voltage are different in Europe than in America. Neither is necessarily better than the other; both facilitate the sale and use of machinery and electric appliances over a wide region. It is not surprising that most international standards are produced for fields such as information processing and communications, distribution of goods, energy production and utilization, shipbuilding, or banking and financial services, and that adherence is entirely voluntary. If a standard succeeds in proving its usefulness, it is embraced by industrial and service sectors.

ISO, like its national counterparts (for example, the American National Standards Institute, ANSI, the British Standards Institution, BSI, and the Association Française de Normalisation, AFNOR), relies on the work of technical committees to draft standards in particular fields. This appears to be more difficult at an international level, as a wider variety of sometimes-conflicting viewpoints must be reconciled. Since standards often have an arbitrary origin, countries may be reluctant to exchange their own standards for others', especially when this entails expense. For example, British automobiles still put the driver on the right, and American thermometers still measure temperature in Fahrenheit.

1.3 How and when did standards begin to be used in conservation?

One of the fundamental tenets in the conservation of cultural heritage is that, since each object is unique, treatment should always be carried out on a case-by-case basis. Restorers in particular are firmly opposed to the use of "recipes". Nevertheless, the first efforts to establish favourable conditions for the preservation of large collections led authors such as H.J. Plenderleith to recommend certain levels of temperature, relative humidity, and light, from the late 1940s onwards.

During the 1960s these early articles were supplemented with others that began to use the word "standards" in relation to preventive conservation measures. One of the earliest was Robert Feller's "Standards of Exposure to Light", which referred to "material" standards (samples of blue cloth) used in the textile industry to gauge lightfastness. Another was Nathan Stolow's "Standards for the Care of Works of Art in Transit", which was more of a treatise on the principles and practice of transporting works of art than a standards document in the modern sense. However, these articles were not, in themselves, standards.

Meanwhile, as the conservation profession began to develop in Europe and the US during the 1950s and 60s, there was great concern about the lack of control over treatments carried out by poorly trained technicians or artisans. Since conservation was a new profession, unprotected by law,

anyone could offer his services as a conservator. How then could the owners (public or private) of cultural property distinguish the "good" conservators from the "bad"? Thus, in 1963, the IIC's American Group (later the AIC) adopted its first set of guidelines for "standards of practice", known as the Murray Pease Report. This document's purpose was "to provide accepted criteria against which a specific procedure or operation can be measured when a question as to its adequacy has been raised."⁸ It was later supplemented with a code of professional ethics and published as the 1979 *Code of Ethics and Standards of Practice*, which sets forth the general principles guiding a conservator's conduct. It does not deal with specific situations, nor does it recommend any environmental conditions or treatment; it merely explains a conservator's responsibilities toward a given historic or artistic object and toward his/her client.

During these years (1978-9), the ICCROM was equally concerned with this problem. The Standards and Training Committee discussed the drafting of international standards in order to protect the interests of objects against "faulty interventions due to ignorance, arrogance or greed on the part of any self-styled restorer or conservator and, equally importantly, to improve the recognition of properly trained persons."⁹ The committee worried that "Standards may work in developed countries, but how can they be applied elsewhere? The developing world must also be considered."¹⁰ Indeed, the question of the need for standards in developing countries is an interesting one. At this time, for instance, Mexico had already recognised conservation as a legally protected profession, and created various institutions charged with the conservation of all public cultural heritage, relying on a strong central government with a socialist, anthropological vision of cultural heritage instead of depending on standards.

Parallel to these developments in the field of moveable cultural heritage, conservation standards had also begun to be established for buildings and sites. The US Secretary of the Interior developed its Standards for the Treatment of Historic Properties in 1975. This document proved extremely useful over the next decades, and came to be applied not only to historic buildings but also to the collections they housed. Neither technical nor prescriptive, the Standards were only meant to establish a much-needed set of common definitions of terms like preservation, rehabilitation, etc., and to "provide philosophical consistency to the work and help protect the Nation's irreplaceable cultural resources from destructive approaches, techniques, and procedures." In addition, State Historic Preservation officers and the National Park Service have used them "to help ensure

⁸ *Code of Ethics and Standards of Practice*, American Institute for Conservation, Washington DC, 1979, p. 1.

⁹ *Preliminary Notes of the Standards and Training Committee*, ICCROM, Rome, 29 November 1978, p. 2.

¹⁰ *Notes on the Second Meeting of the Standards and Training Committee*, ICCROM, Rome, 19 April 1979, p. 3.

that projects receiving Federal dollars either through grants or tax incentives were reviewed in a consistent manner nationwide."¹¹

Most initial documents labelled as standards, then, were developed by conservators in Europe and the US to provide an ethical framework for treatments and validate the profession. However, the earliest mention (found during the course of this research) of preventive conservation standards in the modern sense is in a Soviet article. After issuing some initial preventive conservation recommendations in 1971, the USSR's Ministry of Culture published its *Recommendations on Projecting Artificial Light in Museums* in 1973. These were nothing less than compulsory standards, based on scientific research projects and on the long-time observations of museum personnel.¹²

The 1980s brought the first prescriptive documents for preventive measures in Anglo-Saxon countries, linked to the increasing pressure on museums to justify their use of public funds. In the US, Congress requested the AAM to carry out a study to determine the country's ability to care for its collections and "provide a statistically valid basis for future funding of this aspect of museum programs." The study, called Collections Management, Maintenance, and Conservation (1984), demonstrated a pressing need to increase support for conservation at a national level. In response, the IMS made general conservation surveys of collections and their environment its primary funding priority. Several years later, the IMS' grant application guidelines were adopted as *de facto* standards for conservation assessments.¹³

In the UK, government reports were equally critical about the auditing and inventory procedures in national museums; the 1973 Wright Report, for instance, called for improvements in museums' documentation and collections management.¹⁴ However, it took some time for concrete responses to take shape. An early example of an environmental standard set by an institution is the UKIC's 1984 Environmental Standards for the Permanent Storage of Excavated Material from Archaeological Sites. The BSI contributed two standards in the mid-1980s: Recommendations for the Storage and Display of Archival Documents (BS 5454) and the Standard on Active Conservation (BS 4971). A 1988 National Audit Report was nonetheless damning, so the MGC together with the Area Museums Councils created incentives to improve collections care, such as the Registration Scheme. This scheme, introduced in 1988, aims to achieve "minimum standards" in management, collections care and public

¹¹ WEEKS, Kay D., and H. Ward JANDL, "The Secretary of the Interior's Standards for the Treatment of Historic Properties: a Philosophical and Ethical Framework for Making Treatment Decisions", in Stephen J. KELLEY (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, p. 8.

¹² CROLLAU, E.K., and G.M. KNORING, "Standards of Artificial Light in Museums of the USSR", in *ICOM Committee for Conservation. 4th Triennial Meeting, Venice, 13-18 October 1975. Preprints*, ICOM, Paris, 1975, pp. 75/19/6-1—5.

¹³ BERRETT, Kory, "Conservation Surveys: Ethical Issues and Standards", in *Journal of the American Institute for Conservation*, Vol. 33, No. 2, summer 1994, pp. 193-4.

¹⁴ RAIKES, Susan, "Is Collection Management an 'Art' or a 'Science'? (Discussed with Reference to Recent Standards Setting Initiatives in the United Kingdom)", in *Journal of Conservation & Museum Studies*, No. 1, May 1996, p. 24.

services, in order to foster confidence in museums and provide them with a shared ethical basis. It sets out basic guidelines that the MGC uses as requirements for funding.

In Canada, a similar concern for demonstrating efficiency and “value for money” gradually led various regional museum associations to adopt standards. The Museums Association of Saskatchewan (MAS), for example, drafted its “models of achievable excellence” in 1988; six years later, the Association of Manitoba Museums (AMM) modified them to suit its own needs.

During the last twelve years, standards dealing with preventive conservation and collections management have become frankly “fashionable”.¹⁵ From Venezuela’s Technical Standards for Museums (1991), to ICOM’s Standards for Documenting African Collections (1996), to Italy’s Standards for the Management and Development of Museums (2001), everyone seems to feel a need to state the “correct” or “optimum” conditions for objects to be stored, exhibited, transported, documented, and studied.

As for truly technical conservation standards, these do not abound, although some do exist. An early example of standards similar to those used in industry is the definition of methods for the scientific study and conservation of stone materials, carried out by the Italian NORMAL Commission since the end of the 1970s. These responded to conservators’ need to standardise analysis procedures, in order to obtain unequivocal, comparable results. They were published as Recommendations until the Italian National Board of Unification (UNI) ratified them, and they became UNI-NORMAL Cultural Property Standards.¹⁶ ISO standards dealing with the production and use of preservation microfilm are another example.

1.4 What is meant by standards in preventive conservation?

Despite the way that the multiple shades of meaning inherent in the word standard colour different authors’ conception of the term, there is a certain consistency in the way it is used in the sources consulted for this study. Some authors use “standards” in its broadest sense to refer to any recommended limits for temperature, relative humidity, and light, but this usage is not very helpful (“recommended environmental values” would be clearer), nor is it the most usual. More frequently, standards are described as a model, a benchmark or “an established point of comparison from

¹⁵ PAINE, Crispin, “Museums & Galleries Commission Standards in the Care of Museums Collections: What Are the Implications?” in *The Geological Curator*, Vol. 6, No. 7, April 1997, p. 267.

¹⁶ ALESSANDRINI, Giovanna, and Marisa LAURENZI TABASSO, “Conservation of Cultural Property in Italy: the UNI-NORMAL Committee for the Definition of Technical Standards”, in Lauren B. SICKELS-TAVES (ed.), *The Use of and Need for Preservation Standards In Architectural Conservation*, American Society for Testing and Materials (ASTM), West Conshohocken, 1999, pp. 25-26.

which to measure change"¹⁷. In general, though, standards are defined simply as a set of core principles or a statement of best practice, arrived at by consensus among appropriately qualified individuals or groups.

The notion of consensus is fundamental to this definition of standards. Time and again, the process of drafting them is described as "inclusive", "democratic", "highly consultative". The Museum Documentation Association (UK), for instance, relied on more than sixty practising museum professionals and sought advice and comment from an even greater number when drafting its standards.¹⁸ Smaller institutions presumably rely on far fewer professional advisors, but the process remains the same: a committee, often consisting of a group of people with different viewpoints or interests in the subject at hand, drafts a set of specifications which are then submitted for comment and vote to various interested parties before final approval.¹⁹ When an ANSI committee attempting to create environmental standards for long-term paper storage was unable to reach consensus, its work was issued as a technical report instead of a standard.²⁰

There is also general agreement on the non-compulsory nature of standards in preventive conservation. Some authors state that standards may be either mandatory or voluntary, but their examples of mandatory standards are health and safety or building regulations, such as fire precautions, not environmental or collections management standards.²¹ The latter are considered to lack legal force, since they are not created by a governmental body. (An interesting exception is the case of Italy's Standards for the Management and Development of Museums, which are legally enforceable.) Referring to recommendations for protection against theft, one author says, "While some use the term 'standard', others may use the term 'guideline' to avoid inferring that there is a legal guarantee of protection afforded."²² (This is not altogether necessary, since non-obligatory specifications are commonly—and correctly—labelled standards.)

In spite of the emphasis on the voluntary nature of most standards, it is important to note that they are increasingly imposed on heritage institutions, not through the threat of fines or legal prosecution, but of being barred from a professional

¹⁷ VAN GIGCH, John P., Jan ROSVALL, and Bosse LAGERQVIST, "Setting a Strategic Framework for Conservation Standards", in Stephen J. KELLEY (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, p. 64.

¹⁸ GRANT, Alice (ed. and comp.), *SPECTRUM: The UK Museum Documentation Standard*, Museum Documentation Association, Cambridge, 1994, p. v.

¹⁹ BANKS, Paul N., "Formal Environmental Standards for Storage of Books and Manuscripts: a Status Report", in *The Book and Paper Group Annual*, Vol. 5, American Institute for Conservation, Washington, DC, 1986, p. 124.

²⁰ HENDERSON, Cathy, "Environmental Standards for Exhibiting Library and Archival Materials: the Work of NISO Committee MM", in Carlo FEDERICI and Paola F. MUNAFÒ (eds.), *International Conference on Conservation and Restoration of Archival and Library Materials, Erice (Italy), CCSEM, 22-29 April 1996*, Vol. I, Palumbo Editore, Rome, 1999, p. 125.

²¹ COX, Helen, *The Application and Use of Standards in the Care and Management of Libraries and Archives*, National Preservation Office, London, 1999, p. 3.

²² LISTON, David, "Developing National and International Standards for Better Cultural Security", in *Study series 4, Committee for Museum Security (ICMS)*, ICOM, 1997, p. 29.

association or of losing financial support. In addition to financial “incentives” for adherence, formal standards can be made legally binding by mutual agreement, when contracts are signed.

The content of standards is usually conceived in very broad terms. The principles and practices described are far more likely to be general than specific, with the notable exception of environmental conditions, which are often defined quite precisely. Thus, where an industrial standard will state, “Place approximately 240 cm³ of polyurethane foam in each test tube”, a collections management standard may state, “Appropriate training must be undertaken by those responsible for the day-to-day care of the collections.” Only a few authors feel that the elements specified in standards should be measurable, so that when various parties have agreed to abide by them, compliance or lack of it can be determined with a certain degree of objectivity.²³

The original meaning of “standard” as a kind of measuring stick is therefore quite diluted in many documents dealing with preventive conservation. It is not surprising that the word “guideline” is often used interchangeably with “standard” in this context. **Guideline**, a simpler noun lacking the subtleties of standard, can be defined as “a directing principle laid down as a guide to procedure, policy, etc.” It does not connote measurement or enforcement of any kind, nor is it so closely associated with a quest for excellence. The term **recommendation** is also used synonymously with standard on occasion. This noun is, even more simply, “that which has been mentioned or suggested as desirable or advisable”.

2. How are standards used?

2.1 What is the purpose of standards in preventive conservation?

The main purpose of standards in this field is, of course, to improve the preservation of collections and facilitate their use. However, this fundamental purpose is often closely linked to other, more mundane objectives. The following excerpt is quite revealing: “The motivation behind developing minimum security standards and guidelines is the preservation of collections... The movement is strongly endorsed by insurance underwriters, loss prevention companies, and law enforcement agencies.”²⁴ Furthermore, the use of standards to demonstrate institutions’ ability to provide “value for money” is far from the only purpose stated in official documents. Judging by what has been written, standards would appear to be almost a panacea, the solution to myriad

²³ BANKS, *op cit*, p. 124.

²⁴ LISTON, *op cit*, p. 29.

problems facing the conservation of cultural heritage and the daily work carried out by its custodians.

To begin with, there is the widespread claim that standards justify funding (as well as the use of other resources such as time) by setting a goal that must be reached. Thus, a standard stating that collections must be regularly inspected for damage and reported on, for instance, may serve to justify hiring a conservator, or to justify the conservator's apparent wandering around in the storage area instead of sticking to treatments in his/her workshop. (Presumably, the head of the institution or the grant-giving body trusts this generic guideline more than the conservator's professional opinion on its own.)

Equally prevalent is the idea that standards help set objectives and performance indicators, thereby allowing internal or external audits to measure achievement more dispassionately. This is closely related to the first purpose, and to the ever-increasing popularity of "total quality" management. Rather than viewing work as a permanent activity centred on general, fixed objectives, the "quality planning" trend is based on "managing change". An institution is supposed to evolve continually, through the achievement of an endless stream of projects, each with specific aims and objectives, each improving on the last. A museum director with this vision will probably feel more confident about a conservation project if it has measurable objectives such as "place all objects at least 150 mm above the floor."

Still along the same lines is the common desire for standards to be used in drafting institutional policies. For instance, if an archive has decided to increase efficiency and consistency by specifying its *modus operandi* in writing, it can simplify the task by consulting existing standards and integrating those that seem most relevant.

All of these aims are often described as serving a wider purpose, which is to demonstrate accountability and professionalism. While this is unquestionably a worthy goal, the idea that it can be achieved through the use of standards is peculiarly Anglo-Saxon. It responds to a culture in which efficiency, common sense, and an entrepreneurial democracy are highly valued. Just as stockholders expect reports on their investments, so museum trustees expect to be shown, in terms that they understand, how funds have benefited the institution. In other cultures with a greater tolerance for subjectivity and a more philosophical view of the benefits of caring for cultural heritage, the idea of putting a price on a sculpture or of measuring professional achievement by the number of standards met may seem faintly absurd. Phrases such as "by meeting a set standard it becomes quite easy to separate the collection of curiosities from the true museum collections"²⁵ may seem naïve at best. In any case, it is wise to

²⁵ *Standards for Manitoba Museums*, Association of Manitoba Museums, Winnipeg, 1995, p. 5.

take statements encouraging the use of standards in order to “be the best we can be” and “reach full potential”²⁶ with a generous pinch of salt.

Standards are also considered to serve more prosaic purposes. Many documents state that they are meant to be used as sources of information, especially by curators or others without formal training in preventive conservation or collections management. For example, an archaeologist adapting a storeroom for his recently excavated material might cast an eye over a standards document and decide to separate the bone and leather from the ceramics, and put blinds over the windows. Some documents emphasise their adaptability, purporting to provide no more than helpful advice and a framework (the “acceptable minimum” and the “optimum” levels) around which an institution can plan its own conditions and procedures.

Standards may also be used as educational material for staff or volunteers receiving training. Since standards generally contain very concise information in relatively simple language, they are considered good reference material for people with limited time or interest. Similarly, they are sometimes proposed as a convenient tool to explain certain needs and specifications to suppliers, workmen, or even engineers.

This need to communicate clearly is not limited to specialist-layman exchanges. In large part, standards are meant to respond to the need for clear communication between the specialists themselves. This is especially true for documenting collections and recording conservation conditions. To take a simple example, if the person who carried out an inspection has a different idea of “needs restoration” than the person who must restore the collection, there will be trouble. Sharing a common terminology also fosters collaboration between institutions and the exchange of information. This may be a very specific objective, as is the case for ICOM’s standards for documenting African collections, drawn up in part to facilitate exchange between museums and the development of common projects on a regional scale.²⁷

Another interesting use for documentation standards in particular is to protect objects against illicit traffic. By standardising records and eventually forming a computerised international database, there is a better chance that stolen material may be identified as such and recuperated.²⁸

Outside the Anglo-Saxon world, standards may have other purposes, especially if they are given legal weight. For example, one of the aims of the Italian Standards for the Management and Development of Museums

²⁶ *Standards for Saskatchewan museums 1991*, Museums Association of Saskatchewan, Regina, 1991, p. 4.

²⁷ *Documenting African Collections: Handbook of Standards*, ICOM, Paris, 1996, p. 7.

²⁸ *Ibid*, p. 5.

is to enforce the adherence to ethical principles and the involvement of specialists in each area of collections management and conservation.²⁹

2.2 What are standards based on?

We have discussed the manner in which committees draft standards for preventive conservation, and for what purpose. But what do committee members base their statements of "optimum practice" on?

The main foundation for standards seems to be, overwhelmingly, past experience and current knowledge. Bearing in mind that committees are supposed to represent "the communities most likely to be affected by the standard"³⁰, they are far more likely to include "practitioners" (administrators, conservators, curators, archivists, etc.) than researchers. These practitioners draw on their expertise in their particular field as well as their first-hand understanding of daily life problems when drawing up suggestions.

Some standards are literally no more than a description of existing practices and procedures in a specific place. Others do try to include a certain degree of research, generally bibliographic. For example, the AMM first analysed all the available information previously prepared by other museum associations. It then decided to refine this information to suit the Manitoba museum community instead of "re-inventing" a new standards document.³¹ The ICMS Working Group on Security and Protection Standards distributed a questionnaire made up of existing standards to over 400 institutions in Brazil. It thus obtained a statistical base of "working realities" from which the final standards were synthesised.³²

In some cases, proposed standards are not only sent out for comments but actually put into practice for a trial period. ICOM's Handbook of Standards for documenting African collections, for instance, "is the fruit of four years of thought and discussion, as well as practical application of the standards proposed." Six museums participated in a project to test the standards on their collections over three years. Once the standards had proven their effectiveness, they were approved and published.³³

Many standards are therefore based on empirical observations. The heavy reliance on trial and error is also evident in the universal phrase, "these standards will be reviewed periodically". Feedback from users is another important source. Nonetheless, some authors see a trend toward the adoption of a more systematic, scientific approach toward even the most

²⁹ "Decreto 10 maggio 2001: Atto di indirizzo sui criteri tecnico-scientifici e sugli standard di funzionamento e sviluppo dei musei", in *Gazzetta Ufficiale della Repubblica Italiana*, Ministero della Giustizia, Rome, 19 October 2001, p. 129.

³⁰ HENDERSON, *op cit*, p. 125.

³¹ *Standards for Manitoba Museums*, *op cit*, p. 2.

³² LISTON, *op cit*, p. 29.

³³ *Documenting African Collections: Handbook of Standards*, *op cit*, pp. 6-7.

general standards. Certainly there has been increased scientific research on preventive conservation issues in the past years, and in some instances it is a very useful foundation for standards, especially those dealing with modern materials for treatment and storage. Standards for the manufacture of lignin-free paper and board, for instance, have proven quite successful. However, there is scant evidence that many committees have the means to arrange for research to be done in areas that they identify as necessary, as the Archival Storage Committee of the National Information Standards Organization (NISO) apparently intends to do.³⁴

As for the technical literature available to conservators or others interested in the subject of optimum environmental conditions for collections, it has evolved from a reflexive repetition of values empirically established during the 1950s for British paintings collections to sophisticated scientific studies of materials' behaviour under very specific conditions.³⁵ However, the relevance of existing research has been the subject of serious debate over the past decade or so. In 1987, the practice of setting fixed standards for temperature and relative humidity was criticised on the grounds that insufficient research on physical deterioration mechanisms had been done and that the few studies available, carried out in industrial or military contexts, were not necessarily applicable to composite objects subjected to aging and/or decay.³⁶ Since then, several conservators have questioned the wisdom of basing standards for cultural heritage on such limited scientific data. When a group of scientists at the Smithsonian Institution's Conservation Analytical Laboratory (US) concluded in 1994 that wide fluctuations in temperature and relative humidity would not cause permanent physical damage to museum collections, the predominant response was one of caution. Research on the effects of light has been more fruitful, but has its limits for standard-setting nonetheless. Since light damage is cumulative and it is often impossible to establish an object's past exposure, recommendations tend to be made "more or less arbitrarily" rather than following a reliable formula.³⁷

In spite of this, differing recommendations for environmental conditions have continued to appear in professional publications, and some have inevitably been incorporated into standards. It would seem that practitioners, in order to improve their service, are "likely to interpret and apply research findings beyond their limits of reliability and validity", only to be disillusioned when they change. For of course, a true scientist "can live indefinitely with the tentative and the hypothetical" and is unlikely to be much bothered by the administrator's need for a prescription.³⁸ In

³⁴ HENDERSON, *op cit*, p. 126.

³⁵ AN TOMARCHI, Catherine, and Gaël DE GUICHEN, "Pour une nouvelle approche des normes climatiques dans les musées", in Kirsten GRIMSTAD (ed.), *ICOM Committee for Conservation: 8th Triennial Meeting, Sydney, Australia, 6-11 September, 1987. Preprints*, Getty Conservation Institute, Marina del Rey, 1987, p. 847.

³⁶ *Ibid.*

³⁷ LAVEDRINE, Bertrand, Martine GILLET, and Chantal GARNIER, "Mise au point d'un actinomètre pour le contrôle de l'exposition des photographies et des objets sensibles à la lumière", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: Preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, p. 66.

³⁸ MCCRADY, *op cit*, p. 97.

addition, not all questions in conservation *can* be answered through scientific research, or at least not through a research project “of thinkable size and cost”. All this leads one author to decide that the large body of empirical evidence that has been amassed by conservators “must be heavily relied upon *until* relevant and reliable laboratory experimental work is available.”³⁹

One final basis for standards in societies that depend on technology is, perhaps not surprisingly, technology itself. A trend toward the use of “best available technology” appears to be making itself felt in standards, as seen in the following statement: “Though no studies reporting damage at these low pollutant levels appear in the literature, the lower standard [i.e., more stringent] is justified by the observation that readily available technology permits the attainment of the more stringent standard.”⁴⁰ Similarly, the introduction to a standards document points out, “Due to the rapidly changing technologies that we face, this subject [building preservation standards] remains dynamic and will need to be updated in the years ahead.”⁴¹

To conclude, the words of T. Padfield seem quite apt.

Some conservation standards have evolved like industrial standards, after the convening of a committee, the completion of tests and the presentation of a draft standard for discussion. The standards for archives and for storage of photographs are good examples of this deliberate process. Other standards, some of the really important ones, have evolved from pronouncements by respected experts and have fossilized into dogma through repetition in review articles and keynote speeches to conferences.⁴²

2.3 How are standards presented?

Standards documents tend to follow a certain format according to the uses they will be given. The simplest ones list proposed conditions or procedures without further details about implementation. For example, the UKIC’s succinct standards for storage of archaeological material state that implementation will depend on factors such as location and finance, and will require consultation between architect, curator, and others, especially the conservator, whose advice is essential.⁴³

³⁹ BANKS, *op cit*, pp. 127-128.

⁴⁰ BAER, Norbert S., and Paul N. BANKS, “Conservation Notes: Environmental Standards”, in *The International Journal of Museum Management and Curatorship*, Vol. 6, No. 2, June 1987, p. 209.

⁴¹ KELLEY, *op cit*, p. 3.

⁴² PADFIELD, T., “The Role of Standards and Guidelines: Are They a Substitute for Understanding a Problem or a Protection against the Consequences of Ignorance?” in *Durability and Change: the Science, Responsibility, and Cost of Sustaining Cultural Heritage, Report of the Dahlem Workshop on Durability and Change, Dec. 6-11, 1992*, John Wiley & Sons, Chichester, 1994, p. 192.

⁴³ *Environmental Standards for the Permanent Storage of Excavated Material from Archaeological Sites*, United Kingdom Institute for Conservation, Archaeology section, London, 1984, p. 1.

Other documents provide some explanation of the context, the theory, the objectives and/or the method pertaining to each standard. Some also list sources of advice and technical assistance. Terminology and vocabulary definitions may be an integral component of the standards, especially in those concerned with documentation.

Standards are often divided into categories, not just by subject (management, protection against theft, handling procedures...) but also by level of requirement. The usual division is between "basic" and "specialised", or "minimum" and "optimal", but some institutions propose several levels. The MAS, for instance, sets forth an "essential" category for the most important and easily attainable standards, a "basic" category for "general goals to work toward", and an "advanced" category for specialised and sophisticated procedures.⁴⁴

The idea behind these levels is that all institutions can apply the standards according to their needs and possibilities. In the spirit of non-compulsory standards, "the presumption is not that all standards are relevant to every institution. It is left to each museum and gallery to determine, according to its own aspirations and resources, which standards apply in its case."⁴⁵ Sometimes standards are presented in such a way that each section may be used independently or strung together in a modular fashion adapted to the way each institution works.⁴⁶

Nearly every standards document is presented as a "continuing project", either a replacement of earlier standards or a precursor to the next new, improved version scheduled for a few years' time. The transitory nature of standards is emphasised again and again, and users are often invited to submit suggestions and comments.

Some standards provide "self-evaluation" checklists or tests, to make it easier for the institution to identify standards that are and are not being met. However, hardly any provide recommendations for monitoring exhibits or storage areas to ensure compliance with precise technical standards, such as those that establish permissible levels of gaseous pollutants.

3. A brief review of some standards

3.1 Are there standards for every topic in preventive conservation?

Every key aspect of preventive conservation seems to have been touched upon in some standard or other. Approved procedures and conditions

⁴⁴ *Standards for Saskatchewan museums 1991, op cit*, p. 5.

⁴⁵ *Ibid*, p. 4.

⁴⁶ GRANT, *op cit*, pp. 2, 4.

have been established by numerous institutions for storage, exhibition, maintenance and handling, pest control, packing and transport, protection from theft, vandalism, fire and natural disasters, as well as for the more specific topics of climate control, air quality and lighting. (In addition to these, many standards dealing with such aspects of collections management as documentation or access and loan policies also have a bearing on preventive conservation.)

Most preventive conservation standards deal with collections kept in museums, archives/libraries, or historic buildings, in that order. It is hard to find standards directed specifically at cultural heritage kept in universities or other academic institutions, government offices, archaeological sites, community centres, or religious centres.

3.2 How do some standards vary with respect to others on the same subject?

A brief review of several standards documents substantiates, to a certain degree, assertions about the existence of "a real professional consensus" on how to look after museum collections, such "the standards... do not differ substantially in content or priority from what is considered good museum practice in the museum community at large, in Canada and elsewhere in the world."⁴⁷ Since so many standards are general and most people involved in collections management rely on the same sources of information, some principles are bound to appear repeatedly, even over a wide geographical area. The validity of scientific and empirical knowledge is also borne out by the uniformity of many recommendations. There do not seem to be standards recommending that an object be handled by its weakest part, or that collections be regularly washed with soap and water, for example. Nevertheless, differences in context, objectives, and even in communication abilities ensure that no two standards are identical.

In order to illustrate the degree of variability between standards dealing with the same subject, the recommendations for pest control found in three comparable, contemporaneous documents are very briefly presented in the following paragraphs.

Standards for Saskatchewan Museums, 1991 (Canada)

This document falls into the "succinct" category (no additional explanations provided). It lists five "Essential" standards and two "Basic" ones. To meet essential requirements, a museum must: (i) train staff and volunteers in recognising infestation signs; (ii) isolate all incoming material, check for infestation, and follow a professional conservator's advice for treatment if found; (iii) record all indications of past or present active infestation, as well as any treatment; (iv) carry out periodic checks for signs of infestation on all collections and areas containing collections; (v) inform staff and take recommended precautions when dealing with toxic pest control substances. A museum in the basic category must

⁴⁷ *Standards for Saskatchewan Museums 1991, op cit, p. 4.*

comply with all of the above, as well as: (i) be able to seal off/isolate storage and display areas; (ii) limit and mark areas for food/beverage preparation, storage and consumption.⁴⁸

Technical Standards for Museums (Venezuela, 1991)

This document is more in the style of a handbook, with humorous illustrations and considerable explanation of the need for each standard. It begins the section on pest control by explaining that organic materials are subject to attack by insects and micro-organisms. It states that pests appear when temperatures rise above 24°C and relative humidity exceeds 60% RH, as well as when “dust, dirt, sweets, grease, and other atmospheric impurities” accumulate. Therefore, the recommendations are: (i) maintain strict control over environmental conditions: “average temperature should oscillate between 18 and 22 degrees centigrade, while humidity must be kept between 50 and 60%”; (ii) clean objects periodically with dusters, soft-bristle brushes and dry cloths, “which must be clean before being used”; (iii) keep areas housing objects (storerooms, shelves, exhibit cases, packing boxes, etc.) immaculate; (iv) avoid sudden changes in temperature and relative humidity while transporting objects; (v) keep inorganic materials clean and in adequate environmental conditions, in order to avoid proliferation of pests that feed on inorganic compounds and soluble salts; (vi) avoid the application of fungicides directly on objects; “in the event of an infestation of insects, the recommended treatment is periodic fumigation, preferably with methyl bromide gas”; (vii) carry out periodic revisions; isolate any contaminated object from the rest of the collection, until its correct fumigation; (viii) detect the source of the infestation or the origin of the attack, in order to eliminate it permanently; (ix) use respirators with carbon filters and protective vinyl gloves when fumigating, to avoid harmful effects on the operator.⁴⁹

Standards in the Museum Care of Archaeological Collections 1992 (UK)

More detailed than the Canadian standards, but much briefer than the Venezuelan ones, this document provides explanatory “guidelines and notes” to its standards. Here, the subject of pest control is dealt with in five points, complemented by a note and a guideline. The standards are: (i) all harmful biologically active agents must be eliminated from the collections, storage areas, buildings and plant; (ii) a programme for regular monitoring of collections, buildings and plant for pests, etc. must be instituted; (iii) all incoming objects and their packaging materials must be inspected for the presence of biologically active agents before being introduced to the main storage or display areas; (iv) all pest control or related work must be undertaken, or supervised, by fully trained and experienced personnel; (v) any use of pesticides must comply with the Health and Safety Commission’s Approved Code of Practice. “Biologically

⁴⁸ *Ibid*, pp. 28-29.

⁴⁹ TOLEDO, María Ismenia *et al*, *Normativas técnicas para museos*, Dirección General Sectorial de Museos del Consejo Nacional de la Cultura, Caracas, 1991, pp. 64-65. [Trans. by R.A.]

active agents" are defined in a separate point as "rats, mice, birds, insects, fungi, algae, bacteria, etc." Another note reminds the reader of government regulations controlling the storage and use of pesticides, and states that "good housekeeping" should be emphasised. Should this fail to prevent or control infestation, "local treatment of affected items using *approved* pesticides" is recommended. The reader is told that non-toxic methods of pest control such as freezing and anoxia "are becoming more widely used". In any case, "Remedial treatments... should be minimal, in order to reduce potential risk of damage to specimens, to the environment and to staff and visitors. [...] A suitable Control of Substances Hazardous to Health (COSHH) Regulations assessment must be made."⁵⁰

It is quite clear that all three sets of standards address similar concerns: the need for periodic revision, "good housekeeping", adequate treatment, and protection from harmful pesticides. However, each one tackles these subjects in ways that are strongly influenced by the cultural context and the particular problems faced by institutions in the different countries. Whereas the Canadian standards emphasise the importance of training staff and of registering infestations and treatments, the Venezuelan standards stress the role of environmental conditions and explain cleaning methods in detail; meanwhile, the British standards find it useful to define pests and mention non-toxic control methods. To a dispassionate international observer, all three documents have their particular strengths and weaknesses. Of course, in the end, the most useful judgements will be those from the institutions for which the standards were originally written. One vital observation may nonetheless be made: the standards will be far less useful outside their original context. One can imagine the Venezuelan museum worker dutifully inspecting infested material before introducing it directly to the storage area, according to "British standards"; or a British curator failing to follow regulations for pesticide use because "Canadian standards" did not remind him to check them.

More "technical" standards concerning illumination and environmental conditions are equally subject to slight but sometimes significant variations. In order to examine these more closely, various institution's specifications for paintings and works on paper (both artistic and archival) are summarised in Tables 1 and 2. (Details on recommended light sources, etc. have been omitted for clarity.) As we can see, there seems to be fairly strong consensus as to acceptable illumination levels: most documents classify paintings as "moderately sensitive", and recommend a maximum value of 150 lux for visible light and 75 $\mu\text{W}/\text{lumen}$ for UV radiation. Paper is generally considered more sensitive, so values of between 50 and 150 lux (depending on the medium) and 75 $\mu\text{W}/\text{lumen}$ are recommended. For temperature and relative humidity, however, the discrepancies are greater. There is a maddening lack of uniformity in format, and the range of recommended set points is 18-25°C, 35-65% RH for both paintings and paper. Elsewhere, studies confirm that recommendations for permitted fluctuations around these set points vary

⁵⁰ *Standards in the Museum Care of Archaeological Collections 1992*, Museums and Galleries Commission, London, 1992, pp. 45-46.

significantly.⁵¹ This is due to the fact that it is easier to control illumination than it is to control temperature and relative humidity, as well as to the dearth of conclusive research on the subject of physical deterioration factors.

3.3 How have standards evolved?

Given the differences between one standards document and another, it is difficult to obtain a clear image of the way they have all evolved over time. The task would undoubtedly be simpler if one had access to all the different versions of one same document. Lacking this, only a couple of general trends may be identified.

The most noticeable development is a move away from specific standards establishing “optimum” environmental conditions. Although most documents have been cautiously worded from the beginning, stipulating that the recommended values were not meant to be absolute, the most recent British and Canadian standards avoid simple prescriptions altogether. There is a clear shift in focus, for instance, in the MGC series of Standards for the Museum Care of Collections. Whereas the first document in the series (devoted to archaeological collections, 1992) sets out a table of Relative Humidity and Temperature for Display and Storage—albeit with notes that the table is only a guide and should be used with caution—the fifth document (devoted to musical instruments, 1995) states that it is “pointless to specify too tightly ‘ideal’ conditions of relative humidity or temperature. These Standards aim to promote environmental stability (reducing to a minimum the frequency and amplitude of fluctuations) rather than ‘ideal’ conditions.”⁵² The latest document, dealing with costume and textile collections (1998), omits tables of recommended values altogether, and states that a preventive conservation programme must be drawn up with the assistance of conservators or collections care specialists.

In North America, the Canadian Conservation Institute has moved from “defining a single, simplistic standard” to “identifying degrees of correctness or, more precisely, degrees of incorrectness.”⁵³ Although there is still a certain reluctance to abandon environmental standards entirely, the CCI now prefers to “describe potential risks and let the client decide how this information fits into the total collections management picture”,⁵⁴ considering that large expenditures to control conditions tightly might bring only modest benefits in practice.

⁵¹ BAER and BANKS, *op cit*, p. 209.

⁵² *Standards in the Museum Care of Musical Instruments 1995*, Museums and Galleries Commission, London, 1995, p. 50.

⁵³ http://www.cci-icc.gc.ca/document-manager/view-document_e.cfm?Document_ID=118&ref=co

⁵⁴ O'CONNELL, Millie, “The New Museum Climate: Standards & Technologies. Northeast Document Conservation Center's Conference at the Museum of Fine Arts, Boston, April 25-26, 1996”, in *The Abbey newsletter*, Vol. 20, Nos. 4-5, September 1996, p. 58.

Another trend seems to be towards greater detail and explanation. Instead of presenting cut-and-dried “benchmarks”, the most recent standards seem closer to handbooks or even textbooks, discussing theoretical issues at greater length. The MGC’s 1994 Standards in the Museum Care of Larger and Working Objects even goes so far as to recommend an approach to assessing the importance of an object.⁵⁵ In addition, they tend to incorporate references to complementary standards such as Health and Safety or ecological guidelines.

4. A critical look at standards

4.1 What are the real benefits of adhering to standards?

One of the most important benefits of adhering to standards is the improved capacity to communicate with other institutions. For example, if two museums wish to organise an exhibit together, the planning process will be much smoother if they share a common terminology and certain basic procedures. Suppose one museum agrees to lend a collection on condition that “adequate handling precautions” are taken. The precise meaning of this term may require several hours of discussion, and may remain subject to misinterpretation. If both museums follow the same standards, this point may only take a few minutes to settle. Even if only one of the museums follows written standards, or if each follows different standards, communication may be improved by the ability to negotiate in terms of specific documents that can be exchanged via mail or fax. To a certain degree, this benefit may also be felt simply by writing policies or rules at an institutional or regional level, bearing in mind that the wider their application, the greater the benefit in terms of communication and consistency.

If a particular institution, let us say, a small archive in Panama, cannot form a committee to ruminate on what its “best practice” is, existing standards documents from similar institutions may help a hired conservator to write a useful and appropriate preventive conservation policy. The conservator may use the standards as a source of information, to supplement his own knowledge and avoid much unnecessary effort “rethinking” what others have already written. For instance, if he knows that keeping storage areas clean is a fundamental priority, he might find the Venezuelan standards’ directions for housekeeping clear and relevant, and decide to integrate them almost *verbatim*, rather than spend hours struggling to put his thoughts on paper. In the US, it seems that the IMS’ standard conservation survey has been widely used as a template because it presents the relevant issues in a thorough and logical manner.⁵⁶ In this sense, standards for preservation can be a useful method of transferring

⁵⁵ *Standards in the Museum Care of Larger and Working Objects: Social and Industrial History Collections 1994*, Museums and Galleries Commission, London, 1994, pp. 5-6.

⁵⁶ BERRETT, *op cit*, p. 194.

lessons learned.⁵⁷ (It is important to stress that standards should be *one* source, not *the only* source of information, and that they should never be copied without due reflection by someone trained in preventive conservation.)

When, and only when, a standards document is well suited to a particular institution, it may prove a useful tool in the preservation of its collections. For example, if a storehouse of excavated material is supervised by different archaeologists each season, the standards may serve as an important reminder of what its conditions should be. In addition, the standards may be more willingly followed by the archaeologists if they participated in the democratic process of drawing them up. A straightforward conservation policy or set of rules written by a conservator might not go down so well in this context. In theory, at least, the more people who actually use or care for a collection are involved in the process of defining goals, the better the chances that they will voluntarily follow established guidelines.

A properly applied standards document may also be beneficial for planning and control purposes, at the level of management. It must be emphasised that the simple fact of adhering to standards, in and of itself, will not improve an institution's efficiency or ability to care for its collection adequately. As one author puts it, "a bungler with British Standard 4971 is still a bungler."⁵⁸ However, if the recommendations are truly beneficial *for the collection*, the processes needed to meet them may become clearer and simpler when formulated as standards. In other words, good intentions are often easier to carry out when they are listed in writing and jotted into agendas. This is especially the case if conservation is not the exclusive responsibility of one or several specialists, but one of many responsibilities of staff without training in the field. Standards may therefore help people to set unambiguous objectives and then attain them within a specified period.

Unfortunately, another of the vaunted benefits of adhering to standards is also a sorry commentary on the increasing dominance of corporate culture and on the state of the museum and conservation professions in some countries. Many authors state that adhering to standards increases their credibility as professionals. This seems incongruous given that a profession is, by definition, an occupation requiring a high level of academic training. The point of a high level of academic training is to produce an individual capable of exploring complex problems and contributing to existing knowledge, not someone who merely follows technical specifications. And yet, enthusiastic comments like "modern collections management has a distinctly 'scientific' element to it, with particular rules to be followed in many areas"⁵⁹ abound. "Having a benchmark against which performance can be measured helps to

⁵⁷ KELLEY, *op cit*, p. 3.

⁵⁸ BAYNES-COPE, Arthur David, "British Standards for Conservation: Problems and Possibilities", in James BLACK (comp.), *Recent Advances In the Conservation and Analysis of Artifacts. Jubilee Conservation Conference, London 6-10 July 1987*, University of London (Institute of Archaeology), Summer Schools Press, London, 1987, p. 342.

⁵⁹ RAIKES, *op cit*, p. 28.

demonstrate professionalism, accountability and efficiency to staff, user groups and funding bodies. Adherence to standards builds confidence in the professions, [and] helps to ensure customer satisfaction,"⁶⁰ says another fan. These positions do a huge disservice to conservation, a discipline based on both the social and the natural sciences. It is true that conservators apply their knowledge to achieve practical results, but so do engineers, and no engineer would state that he is a professional because he follows standards.

Nevertheless, it must be admitted that in contexts dominated by market forces, the veneer of "manager's jargon" may be necessary for survival, and may indeed be an advantage of using standards. It is also sadly true that institutions in developing countries may be taken more seriously by those in developed countries if they proclaim their adherence to "international" standards, just as many a director or politician is more easily impressed by the argument that "international" standards require a certain action to be taken, than by a scientific explanation of the underlying need. This kind of credibility must be handled with caution, however, and only as a last recourse.

It should be noted that truly technical standards have improved conservators' ability to compare results, hence their capacity to make meaningful scientific progress. The use of certain very precise, standardised procedures is vital to the development of diagnostic and analytic techniques in conservation, such as the measurement of harmful gas emissions in exhibit cases. Thus, the activities of the Italian NORMAL Commission have influenced conservators all over the world, creating new collaboration opportunities and stimulating reciprocal understanding among specialists of different cultural background.⁶¹

One last benefit is worth mentioning, because it appears frequently in the literature. Many authors feel that the consistency of procedures required by standards is a virtue in itself. For example, it may be highly reassuring to think that every rare book that enters any library in a given region will systematically be shelved in a conservation-grade board box. However, consistency has its pitfalls, particularly if the person carrying out the recommendations lacks sufficient knowledge to be able to interpret and adjust them when necessary. For example, if the standard stating that "average temperature should oscillate between 18 and 22 degrees centigrade"⁶² were taken too literally, the consequences for a particularly sensitive collection might be detrimental.

4.2 What role do interpretation and context play in the application of standards?

Since most standards documents are written primarily to improve a wide range of collections management procedures, they are stated in simple

⁶⁰ COX, *op cit*, p. 3.

⁶¹ ALESSANDRINI, *op cit*, p. 27.

⁶² TOLEDO, *op cit*, pp. 64-65. [Trans. by R.A.]

language that the average curator or librarian can understand. However, mere comprehension of the general idea does not necessarily imply a true understanding of the principles underpinning a given standard. Some documents provide more detailed explanation than others, and some standards are more easily “measured” than others, as we have seen. All the same, there is very often room for interpretation. A few examples should suffice to show the relative nature of many common recommendations.

*Monitoring devices must receive periodic calibration or verification.*⁶³ A curator with no technical training may wonder if the electronic thermometer counts as a monitoring device, or only the thermohygrometer. And how often is calibration necessary? Once a month? Once a year?

*Great care should be taken to avoid introducing pests through fresh or dried flower displays, Christmas trees, etc.*⁶⁴ Imagine the controversy this guideline could cause. Two curators might be convinced that the annual Christmas tree should be fumigated, another might believe that it should only be checked before being set up, like incoming collections, and the director might decide to ban Christmas trees altogether, just to be safe.

*Access to keys must be controlled.*⁶⁵ This seems fairly obvious, but what exactly constitutes “control”? Does it mean that one person is responsible for them? That all keys should be kept in one place? That their whereabouts should be known at all times? That their usage should be registered in writing?

Many standards are open to interpretation on purpose, because they are meant to be adapted to each institution’s particular needs. The question then arises: who will adapt them, and following what criteria? Some documents stipulate clearly that the relevant specialists must be consulted, e.g. the fire department for disaster prevention measures, a professional conservator for environmental measures, etc. Others include a considerable amount of information that is presumably meant to provide the non-expert reader with certain basic criteria. This information may be very complete, but it cannot substitute a real understanding of cause and effect in the deterioration of collections. The risk that a certain standard may be misinterpreted or applied in a way that does more harm than good may be slight, but it exists nevertheless. Human nature being what it is, there is also a risk that someone who lacks training will feel emboldened by the new knowledge gained through the standards, and take the initiative when some unforeseen circumstance arises. (This is another reason why the argument that standards demonstrate professionalism is a dangerous one.)

The success and usefulness of standards depend heavily on the context as well. As we have seen, all standards are drawn up with a specific context

⁶³ *Standards for Saskatchewan Museums 1991, op cit, p. 24.*

⁶⁴ *Standards in the Museum Care of Costume and Textile Collections 1998, op cit, p. 49.*

⁶⁵ *Standards for Saskatchewan Museums 1991, op cit, p. 23.*

in mind, and should not be applied directly in a different one without due reflection. (The Association of Manitoba Museums did not *adopt* neighbouring Saskatchewan's standards; they had to be *adapted*.) Socio-economic and cultural factors determine many things besides the way that standards are interpreted or applied. For example, voluntary standards will be far more successful in a context that provides the necessary conditions for honesty to be valued and rewarded. In societies beset by poverty, corruption, and/or injustice, voluntary standards are likely to be next to useless, and imposed standards may be resented.

4.3 What are standards' main drawbacks?

Over the years, several criticisms of specific standards for preventive conservation have been formulated by the people who have used them. One of the principal criticisms has already been mentioned: the fact that many standards (particularly environmental ones) are often presented as having a strong scientific basis when in fact they do not. To begin with, the lack of "productive communication between researchers and practitioners" makes useful applied research all too rare.⁶⁶ This is exacerbated by the fact that many people working in collections management have no background in academic or scientific disciplines, and therefore tend to confuse science with "something systematic and formulated"⁶⁷, and professionalism with "following rules". Something as banal as the use of computers and certain software has been said to lend a "scientific" aura to collections management⁶⁸; this is precisely the same tactic that astrologists now use to inspire greater confidence in their predictions. The confusing habit of juggling semi-understood terms is not confined to lower echelons: in the US, NISO normally distinguishes technical standards from descriptive ones, but its committee on archival storage conditions "is attempting to create a combination technical and descriptive standard because it thinks the subject lends itself well to that kind of treatment."⁶⁹

Many conservators have decried the practice of borrowing "half-relevant standards developed by big industries", which leads institutions to set values for light, temperature and humidity that are inadequate or downright "dangerous".⁷⁰ The harmful effects of imposing inadequate climatic conditions, as well as the need to study each object's "curriculum vitae" and its equilibrium moisture content were solidly presented over a decade ago.⁷¹ Since then, the view that "there should not be a standard value but rather a sensible method for arriving at a value"⁷² has become more widespread and has even been incorporated into the most recent standards documents, as we have seen.

⁶⁶ MCCRADY, *op cit*, p. 96.

⁶⁷ RAIKES, *op cit*, p. 24.

⁶⁸ *Ibid*, p. 27.

⁶⁹ HENDERSON, *op cit*, p. 125.

⁷⁰ PADFIELD, *op cit*, pp. 192, 198.

⁷¹ AN TOMARCHI and DE GUICHEN, *op cit*, pp. 848-850.

⁷² PADFIELD, *op cit*, p. 192.

This undoubtedly positive development highlights another serious drawback to the way standards are employed in preventive conservation. The initial use of standards as “extremely valuable ammunition” allowing conservators to “demonstrate to their administrations that there is an agreed-upon body of environmental specifications for the protection of collections”⁷³ has backfired badly in the face of this reversal of policy. The controversy in the US surrounding the 1994 announcement of “scientific evidence” that museums did not need to maintain such strict control over temperature and relative humidity as was previously thought [see section 2.2] is symptomatic of this. One author reports that some conservators interviewed about the study’s results “were reluctant to relax RH guidelines because they remember how hard it was initially to convince directors, trustees, and professional staff of the importance of a nearly unfluctuating environment.”⁷⁴ So entrenched have the old recommendations become that conservators in Portugal reported very recently that

It is usually difficult to have curators accept that not all collections should be kept at 20° C and 50% relative humidity. Even when such values are almost impossible to achieve, they remain a mystical target they believe we should try to reach in spite of the data that have been gathered proving the difficulties, and the dangers, of their use.⁷⁵

The inbuilt variability of standards is a strong disincentive for their use as goals. Why bother striving to meet requirements that will in all likelihood be replaced by new ones in a few years’ time? Of course, common-sense standards such as “all storage areas must be kept clean at all times” are unlikely to be reversed, so further developments should in theory represent improvements. Nevertheless, it may not always be easy to tell which standards are most reliable, and continual adaptation comes at a steep price in terms of psychological comfort as well as economic investment. Not all individuals nor all societies are suited to “the management of change”, and the cultural heritage preservation sector has no inherent need to follow client’s whims or come up with novel ideas to remain “competitive”.

Besides the possible changes in a single set of standards from one year to the next, the potential confusion of having several overlapping, occasionally contradictory standards has also been pointed out. Some authors wonder how the MGC Standards, for example, fit in with others drawn up by different organisations for similar collections.⁷⁶

Sometimes, it would seem that preventive conservation standards, by trying to reconcile opposing needs and trying to please everybody, only end up being “too subjective” for officials and “too inflexible” for

⁷³ BANKS, *op cit*, p. 125.

⁷⁴ CHRISTENSEN, Carol, “Environmental Standards: Looking Beyond Flatlining?” in *AIC News*, Vol. 20, No. 5, September 1995, p. 2.

⁷⁵ ELIAS CASANOVAS, Luis E., and Ana Isabel SERUYA, “Climate Control in a 16th –Century Building in the South of Portugal”, in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, p. 27.

⁷⁶ PAINE, *op cit*, p. 268.

conservators.⁷⁷ There is concern over the difficulty of producing documents that are “broad and simple enough to be both inclusive now and flexible in the future”, without asking the conservator to “cover too many issues or to reach beyond his or her expertise.” At the same time, “To cite textbook environmental standards for the care of a particular collection or objects and then leave the practical aspects of implementation to others may not fulfill the conservator’s responsibilities as a participant in collections care.”⁷⁸

The risk of over-generalisation is also significant, as illustrated by statements such as “Anybody who is concerned with any form of museum, library or archival material, except perhaps panel paintings, will find BS 5454 useful... It is true that the air conditioning conditions prescribed are those for documents, but that is not a bother.”⁷⁹

Several conservators report practical difficulties in attempting to reconcile certain standards with a particular institution’s needs. For example, the National Trust seems to believe that it is “essential” to adapt museum standards to the context of historic houses, but does not find it easy to do so because its collections cannot be considered separately from the buildings that contain them.⁸⁰

Economic considerations are also problematic, and the questions of affordability and cost-effectiveness have been brought up by institutions that feel that existing standards are too far out of reach. Once again, the issue of climate control is at the forefront, since it is very expensive and is often perceived to be biased in favour of “rich art museums” with the means to invest in air-conditioning equipment and maintenance.⁸¹ Nowadays, however, with rising energy costs and declining economies, even well-to-do museums have pressed for the “relaxing” of recommended values, precisely on the grounds that it is more advantageous in a cost-benefit analysis. Other common recommendations, such as the use of archival-quality paper and board to store large collections, are very expensive too, although less frequently challenged.

Aside from the cost of meeting a given requirement, the cost of drawing up standards to begin with might be significant. It would be interesting to carry out a cost-benefit analysis of the time and effort spent discussing preservation issues every few years, not to explore new alternatives or

⁷⁷ KAPLAN, Marilyn E., “The Impact of Building Regulations and Standards on Preservation and Conservation: an International Perspective”, in *ICOMOS 8th General Assembly and International Symposium “Old Cultures in New Worlds”, Washington, D.C. Oct. 10-15, 1987. Symposium Papers*, Vol. 1, ICOMOS United States Committee, Washington, D. C., 1987, p. 342.

⁷⁸ BERRETT, *op cit*, pp. 195, 197.

⁷⁹ BAYNES-COPE, *op cit*, p. 341.

⁸⁰ STANIFORTH, Sarah, “Preventive Conservation In National Trust Houses”, in *International Symposium on the Conservation and Restoration of Cultural Property: Cultural Property and its Environment, 11-13 October 1990*, Tokyo National Research Institute of Cultural Properties, Tokyo, 1995, pp. 145, 160, 164.

⁸¹ PADFIELD, *op cit*, p. 199.

study problems in depth, but merely to agree on feasible improvements to the *status quo*.

Another common complaint is that many standards are used as a condition to obtain government grants, both in the US and the UK. If an institution is too impoverished to meet rigorous standards, is it logical to “punish” it by depriving it of the funds needed to progress towards them? The usual response to this accusation is that adherence to standards is voluntary and that “if you read carefully, you will find lots of let-out clauses and weasel-word escape hatches.”⁸² This renders the whole idea of using standards as requirements for funding rather senseless; if the standards can be manipulated to suit anyone’s needs, why ask institutions to comply with them? Furthermore, in some cases standards are used as legally binding specifications in loan contracts.

Last, but not least, there is a worrying tendency to make standards an end in themselves, instead of a means to improve the preservation of collections. This is illustrated by the language used to refer to standards. Instead of saying that *appropriate climatic conditions* will contribute to a collection’s preservation, or that *careful handling* will reduce the risk of damage, many authors say that this will be achieved thanks to *standards*. The insistence on standards as the basis for any improvement is dangerous, because the best method of improvement would be one based on the continuous study of each individual collection, not on the sporadic application of external recipes. The idea that the National Museum System in Venezuela is working well because it has instituted a programme of technical standards is a politically useful but utterly hollow one.⁸³ As one wise author pointed out fifty years ago, one can buy a house but not a home, no matter how many real estate agents say otherwise.⁸⁴

The “rule of standards” has reached a point where, according to some, craftsmen and architects who build exhibition cases will not accept advice that is not backed by a quoted ISO standard.⁸⁵ In the US, the fear of lawsuits aggravates this institutionalised mediocrity. However, in other countries too, people who do not understand the issues at stake tend to shelter behind standards so that they cannot be blamed or held responsible if things go wrong.⁸⁶

4.4 What is the best way to use standards?

The most important pitfall to avoid when dealing with standards is to confuse the means with the end. Standards in preventive conservation are neither more nor less than “official recommendations”, put together by a group of people with a certain interest and/or expertise in the subject, to suit their own specific ends. They must therefore be taken as such, never

⁸² PAINE, *op cit*, p. 268.

⁸³ TOLEDO, *op cit*, p. 3.

⁸⁴ SWINTON, William Elgin, “Museum Standards”, in *Curator*, Vol. I, No. 1, January 1958, p. 63.

⁸⁵ PADFIELD, *op cit*, p. 199.

⁸⁶ *Ibid*, p. 197.

as a measure of excellence nor a source of universally valid truths. The first step when consulting any standard is to examine the source and the objectives. Who wrote the standard and what was their stated purpose? This will allow the recommendations to be placed in their proper context.

Next, the references should be analysed, if any are provided. What bibliographic sources were consulted? Are they recent? What background do the authors have? Was any new research carried out? This will give some indication of the relevance of the information that the standards were based on.

Finally, the standards themselves should be read with a critical eye by someone trained in preventive conservation. How useful are they? How necessary? What concrete benefits will they provide for cultural heritage collections? Do they state the obvious? Are they applicable to the present context? Will they work for a given situation? What problems might arise if they were carried out?

Existing standards, analysed in such a way, may prove quite useful as sources of information or as frameworks for drafting new policies or standards. Standards regarding collections management procedures, protection against disaster and theft are generally more useful than those regarding protection against physical or environmental damage. A broad rule of thumb is, the closer one gets to the object, the less standards are likely to help. A consistent approach to fire drills in all the archives in a given region is a good idea; a consistent approach to cleaning all documents may be a terrible one. However, each decision must be made individually, and as long as it is solidly justified in terms of proven benefit *to the collection*, any standard may be considered.

As for the usefulness of *adhering* to existing standards or creating new ones, it does not appear to be very great in general. It seems best to explore alternative ways to improve conditions, unless there is a clearly demonstrated need to embrace standards in a particular setting. In particular, one should remember that standards do not substitute knowledge. In the final analysis, it is preferable to inform and train staff (and draw up a handbook if necessary, possibly based on certain standards) than to provide them with standards to be followed. In fact, training should be a prerequisite to using standards, which then become merely an administrative tool designed specifically for one or several institutions.

To conclude, one might say that standards are good servants but bad masters. Some authors believe that "If we continue on our anarchic way without our own codes, standards, and guidelines, we will continue to be controlled, without realizing it, by modern industrial standards."⁸⁷ They summon conservators to "take the opportunity, the initiative, and the responsibility for determining the professional standards and ethical principles that shape this field of endeavour."⁸⁸ However, one may also

⁸⁷ *Ibid*, p. 199.

⁸⁸ BERRETT, *op cit*, p. 197.

ask why we should join in this game of follow the leader at all. Especially when the leader is only interested in his pocketbook, and not in our cultural heritage. Shouldn't we resist the attempt to blur the distinction between professional ethics and standardised procedures? Perhaps it's high time to lead our own game, on our own terms.

Table 1: ENVIRONMENTAL STANDARDS FOR PAINTINGS

YEAR	SOURCE	INSTITUTION	LIGHT	TEMPERATURE	RELATIVE HUMIDITY
1973	<i>Recommendations on Projecting Artificial Light in Museums</i>	Ministry of Culture, USSR	<ul style="list-style-type: none"> Moderate stability: max. 100-150 lux 	--	--
1991	<i>Standards for Saskatchewan Museums</i>	Museums Association of Saskatchewan (Canada)	<p>Essential standards:</p> <ul style="list-style-type: none"> UV radiation max. 75 μW/lumen Storage areas: max. 150 lux Display areas: light levels kept at levels recommended by CCI 	<p>Essential standards:</p> <ul style="list-style-type: none"> One person responsible for monitoring & recording environmental levels and making recommendations for improvements or changes <p>Basic standards:</p> <ul style="list-style-type: none"> Optimum = 21°C \pm 1.5°C daily Range = 20-25°C \pm 1.5°C daily <p>Advanced standards:</p> <ul style="list-style-type: none"> Temperature automatically monitored & adjusted to meet published CCI specifications by air conditioning system 	<p>Essential standards:</p> <ul style="list-style-type: none"> One person responsible for monitoring & recording environmental levels and making recommendations for improvements or changes <p>Basic standards:</p> <ul style="list-style-type: none"> Optimum = 47-53% RH \pm 2% RH daily Range = 38-55% RH \pm 2% RH daily, 5% RH monthly <p>Advanced standards:</p> <ul style="list-style-type: none"> Relative humidity automatically monitored & adjusted to meet published CCI specifications by air conditioning system

1991	<i>Normativas técnicas para museos</i>	Consejo Nacional de la Cultura (Venezuela)	<ul style="list-style-type: none"> • Max. 150 lux 	<ul style="list-style-type: none"> • Fluctuation must not exceed 1°C per month • Set point: 18-22°C 	<ul style="list-style-type: none"> • Set point: 55-65% RH • Sharp variations should be avoided
1995	<i>Standards for Manitoba Museums</i>	Association of Manitoba Museums (Canada)	<p>Basic standards:</p> <ul style="list-style-type: none"> • Light in display areas must be kept within recommended levels <p>Specialized standards:</p> <ul style="list-style-type: none"> • Moderately sensitive materials: 150 lux, 75 $\mu\text{W}/\text{lumen}$ 	<p>Basic standards:</p> <ul style="list-style-type: none"> • Ideal temperature = 20°C • Temperature must be kept constant with minimum fluctuations <p>Specialized standards:</p> <ul style="list-style-type: none"> • Temperature must achieve the national standards (published by the CCI) through use of environmental control systems 	<p>Basic standards:</p> <ul style="list-style-type: none"> • Set point between 35 and 65% RH • Daily fluctuations kept to a minimum <p>Specialized standards:</p> <ul style="list-style-type: none"> • Relative humidity must achieve the national standards (published by the CCI) through use of environmental control systems
2001	<i>Standard di qualità dei musei</i>	Ministero per i Beni e le Attività Culturali (Italy)	<ul style="list-style-type: none"> • Moderately sensitive objects: max. 150 lux, 75 $\mu\text{W}/\text{lumen}$, < 1.2 $\mu\text{W}/\text{cm}^2$, 10 W/m^2 	<ul style="list-style-type: none"> • Set point: 19-24 °C 	<ul style="list-style-type: none"> • Set point: 50-65% RH

Table 2: ENVIRONMENTAL STANDARDS FOR PAPER

YEAR	SOURCE	INSTITUTION	LIGHT	TEMPERATURE	RELATIVE HUMIDITY
1973	<i>Recommendations on Projecting Artificial Light in Museums</i>	Ministry of Culture, USSR	<ul style="list-style-type: none"> • Low stability: max. 50 lux 	--	--
1986	<i>Preservation of Historical Records</i>	National Research Council (US)	--	<ul style="list-style-type: none"> • 20-22°C 	<ul style="list-style-type: none"> • 40-50% RH
1991	<i>Standards for Saskatchewan Museums</i>	Museums Association of Saskatchewan (Canada)	<p>Essential standards:</p> <ul style="list-style-type: none"> • UV radiation max. 75 $\mu\text{W}/\text{lumen}$ • Storage areas: max. 150 lux • Display areas: light levels kept at levels recommended by CCI 	<p>Essential standards:</p> <ul style="list-style-type: none"> • One person responsible for monitoring & recording environmental levels and making recommendations for improvements or changes <p>Basic standards:</p> <ul style="list-style-type: none"> • Optimum = 21°C \pm 1.5°C daily • Range = 20-25°C \pm 1.5°C daily <p>Advanced standards:</p> <ul style="list-style-type: none"> • Temperature 	<p>Essential standards:</p> <ul style="list-style-type: none"> • One person responsible for monitoring & recording environmental levels and making recommendations for improvements or changes <p>Basic standards:</p> <ul style="list-style-type: none"> • Optimum = 47-53% RH \pm 2% RH daily • Range = 38-55% RH \pm 2% RH daily, 5% monthly <p>Advanced standards:</p> <ul style="list-style-type: none"> • Relative humidity

				& adjusted to meet published CCI specifications by air conditioning system	automatically monitored & adjusted to meet published CCI specifications by air conditioning system
1991	<i>Normativas técnicas para museos</i>	Consejo Nacional de la Cultura (Venezuela)	<ul style="list-style-type: none"> • Max. 50 lux 	<ul style="list-style-type: none"> • Fluctuation must not exceed 1°C per month • Set point: 18-22°C 	<ul style="list-style-type: none"> • Set point: 50-60% RH • Sharp variations should be avoided
1995	Draft of <i>Environmental Standards for Exhibiting Library & Archival Materials</i>	National Information Standards Organization (US)	<ul style="list-style-type: none"> • Visible light levels should be as low as possible for adequate viewing, max. 150 lux • Level of less than 100 lux recommended • UV radiation max. 75 µW/lumen • Exposure max. 100,000 lux hours/year for sensitive materials; 50,000 lux hours/year for extremely sensitive materials • Cumulative light exposure max. 200,000 lux hours/year for moderately stable materials, 50,000 lux hours/year for extremely sensitive materials 	<ul style="list-style-type: none"> • Set point max. 21°C • Max. daily temperature fluctuation ± 3°C in 24 hours • Max. total temperature variation ± 3°C 	<ul style="list-style-type: none"> • Set point between 35 to 50% RH, inclusive • Max. daily variation ± 5% RH in 24 hours • Max. total variation ± 5% RH • Sensitive materials will require stricter controls, e.g. ± 2% RH

materials

1995	<i>Standards for Manitoba Museums</i>	Association of Manitoba Museums (Canada)	<p>Basic standards:</p> <ul style="list-style-type: none"> • Light in display areas must be kept within recommended levels <p>Specialized standards:</p> <ul style="list-style-type: none"> • Moderately sensitive materials (paper): 150 lux, 75 μW/lumen • Highly sensitive materials (watercolours, colour prints, felt-tip pen drawings): 50 lux, 75 μW/lumen 	<p>Basic standards:</p> <ul style="list-style-type: none"> • Ideal temperature = 20°C • Temperature must be kept constant with minimum fluctuations <p>Specialized standards:</p> <ul style="list-style-type: none"> • Temperature must achieve the national standards (published by the CCI) through use of environmental control systems 	<p>Basic standards:</p> <ul style="list-style-type: none"> • Set point between 35 and 65% RH • Daily fluctuations kept to a minimum <p>Specialized standards:</p> <ul style="list-style-type: none"> • Relative humidity must achieve the national standards (published by the CCI) through use of environmental control systems
2001	<i>Standard di qualità dei musei</i>	Ministero per i Beni e le Attività Culturali (Italy)	<ul style="list-style-type: none"> • Highly sensitive objects: max 50 lux, 150,000 lux hours/year, 75 μW/lumen, < 0.4 μW/cm², 3 W/m² 	<ul style="list-style-type: none"> • Set point: 19-24°C 	<ul style="list-style-type: none"> • Set point: 50-60% RH
2001?	<i>CD-ROM on preventive measures for library collections and archival documents</i>	IFLA-PAC, UNESCO	<ul style="list-style-type: none"> • Parchment, paper & leather: 50-100 lux, max. 720 hours/year • Papyrus: 50 lux, max. 720 hours/year 	<ul style="list-style-type: none"> • Parchment, papyrus, paper & leather: 18°C, \pm 2°C 	<ul style="list-style-type: none"> • Parchment, papyrus, & leather: 50-60% RH, \pm 5% RH • Paper: 45-55% RH, \pm 5% RH

LIST OF ACRONYMS

- AAM: American Association of Museums
- AFNOR: Association Française de Normalisation (France)
- AIC: American Institute for Conservation
- AMM: Association of Manitoba Museums (Canada)
- ANSI: American National Standards Institute
- BSI: British Standards Institution
- CCI: Canadian Conservation Institute
- ICCROM: International Centre for the Study of the Preservation and
Restoration of Cultural Property
- ICOM: International Council of Museums
- ICMS: ICOM Committee for Museum Security
- IIC: International Institute for Conservation
- IMS: Institute of Museum Services (US)
- ISO: International Organisation for Standardisation
- MAS: Museums Association of Saskatchewan (Canada)
- MGC: Museums & Galleries Commission (UK)
- NISO: National Information Standards Organization (US)
- UKIC: United Kingdom Institute for Conservation
- UNI: Ente Nazionale Italiano di Unificazione (Italy)

BIBLIOGRAPHY

- A Guide to the Project Management Body of Knowledge*, Project Management Institute Standards Committee, Upper Darby, 1996.
- ALESSANDRINI, Giovanna, and Marisa LAURENZI TABASSO, "Conservation of Cultural Property in Italy: the UNI-NORMAL Committee for the Definition of Technical Standards", in Lauren B. SICKELS-TAVES (ed.), *The Use of and Need for Preservation Standards In Architectural Conservation*, American Society for Testing and Materials (ASTM), West Conshohocken, 1999, pp. 24-30.
- ALEXIOU, George, *A comparison of the International Standards to the Microclimatic Environmental Conditions of the Museums and Art Galleries in Athens*, (paper), 1984.
- ALTIERI SANCHEZ, Juan, and Josefina MOLINA GARCIA, "Conservación preventiva en el Museo Nacional de Arte Romano", in *XI Congreso de Conservación y Restauración de Bienes Culturales, Castellón 3-6 octubre de 1996*, Diputación de Castelló, Castelló, 1996, pp. 43-50.
- Annual Book of ASTM Standards 2000*, Vol. 11.03, American Society for Testing and Materials, West Conshohocken, 2000.
- ANTOMARCHI, Catherine, and Gaël DE GUICHEN, "Pour une nouvelle approche des normes climatiques dans les musées", in Kirsten GRIMSTAD (ed.), *ICOM Committee for Conservation: 8th Triennial Meeting, Sydney, Australia, 6-11 September, 1987. Preprints*, Getty Conservation Institute, Marina del Rey, 1987, pp. 847-51.
- AVEDON, M., "International Standards for Microforms", in Merrily A. SMITH (ed.), *Preservation of Library Materials. Conference held at the National Library of Austria, Vienna, April 7-10, 1986*, Vol.1, K.G. Saur, Munich, 1987, pp. 68-70.
- BAER, Norbert S., and Paul N. BANKS, "Conservation Notes: Environmental Standards", in *The International Journal of Museum Management and Curatorship*, Vol. 6, No. 2, June 1987, pp. 207-9.
- BALLESTREM, Agnes, "The Restorer: a Definition of the Profession", paper for the Standards and Training Committee, ICCROM, Rome, 29 November, 1978.
- BANKS, Paul N., "Formal Environmental Standards for Storage of Books and Manuscripts: a Status Report", in *The Book and Paper Group Annual*, Vol. 5, American Institute for Conservation, Washington, DC, 1986, pp. 124-8.
- BAYNES-COPE, Arthur David, "British Standards for Conservation: Problems and Possibilities", in James BLACK (comp.), *Recent Advances In the Conservation and Analysis of Artifacts. Jubilee Conservation Conference, London 6-10 July 1987*, University of London (Institute of Archaeology), Summer Schools Press, London, 1987, pp. 341-2.

- BERRETT, Kory, "Conservation Surveys: Ethical Issues and Standards", in *Journal of the American Institute for Conservation*, Vol. 33, No. 2, summer 1994, pp. 193-8.
- BRONSKI, Matthew B., and Brent A. GABBY, "A Comparison of Principles in Several Architectural Conservation Standards", in Lauren B. SICKELS-TAVES (ed.), *The Use of and Need for Preservation Standards In Architectural Conservation*, American Society for Testing and Materials (ASTM), West Conshohocken, 1999, pp. 12-23.
- BUCK, Richard D., "Formal Procedures: Their Effect on Performance Standards In Conservation", in *Preservation and Conservation: Principles and Practices. Proceedings of the North American International Regional Conference, Williamsburg... and Philadelphia, September 10 - 16 1972*, IIC-The Preservation Press, Washington D.C., 1976, pp. 403-419.
- BULLOCK, Linda, and David SAUNDERS, "Measurement of Cumulative Exposure Using Blue Wool Standards", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 21-26.
- CHIARI, Giacomo, Giorgio TORRACA, and Maria Laura SANTARELLI, "Recommendations for Systematic Instrumental Analysis of Ancient Mortars: the Italian Experience", in Stephen J. KELLEY (ed.), *Standards for preservation and rehabilitation*, ASTM, West Conshohocken, 1996, pp. 275-283.
- CHRISTENSEN, Carol, "Environmental Standards: Looking Beyond Flatlining?" in *AIC News*, Vol. 20, No. 5, September 1995, pp. 1-2, 4-8.
- CROCKER, A. E., "International Standards", in Dex HARRISON (ed.), *Specification 1978: Building Methods and Products*, Vol. 5, The Architectural Press, London, 1978, pp. 190-3.
- CROLLAU, E.K., and G.M. KNORING, "Standards of Artificial Light in Museums of the USSR", in *ICOM Committee for Conservation. 4th Triennial Meeting, Venice, 13-18 October 1975. Preprints*, ICOM, Paris, 1975, pp. 75/19/6-1—5.
- Code of Ethics and Standards of Practice*, American Institute for Conservation, Washington DC, 1979.
- COX, Helen, *The Application and Use of Standards in the Care and Management of Libraries and Archives*, National Preservation Office, London, 1999.
- DAVIES, John, *A study of the basic standards and methods in preservation and restoration workshops applicable to developing countries*, International Council on Archives/UNESCO, Brussels, 1973.
- "Decreto 10 maggio 2001: Atto di indirizzo sui criteri tecnico-scientifici e sugli standard di funzionamento e sviluppo dei musei (Art. 150, comma 6, D.L. n. 112/1998)", in *Gazzetta Ufficiale della Repubblica Italiana*, Ministero della Giustizia-Ufficio pubblicazione leggi e decreti, Rome, 19 October 2001
- DERBYSHIRE, Alan, and Jonathan ASHLEY-SMITH, "A Proposed Practical Lighting Policy for Works of Art on Paper at the V&A", in *Preprints of the ICOM*

Committee for Conservation 12th Triennial Meeting, Lyon 29 August-3 September 1999, Vol. I, James & James, London, 1999, pp. 38-41.

Documenting African Collections: Handbook of Standards, ICOM, Paris, 1996.

DOEBLEY, Carl E., and Donald S. SPITZER, "Guidelines and Standards for Testing Historic Mortars", in Stephen J. KELLEY (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, pp. 285-293.

DRYSDALE, Laura, "The Language of Conservation: Applying Critical Linguistic Analysis to Three Conservation Papers", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 161-165.

ELIAS CASANOVAS, Luis E., and Ana Isabel SERUYA, "Climate Control in a 16th – Century Building in the South of Portugal", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 27-30.

Environmental Standards for the Permanent Storage of Excavated Material from Archaeological Sites, United Kingdom Institute for Conservation, Archaeology section, London, 1984.

EREMIN, Katherine, and James TATE, "The Museum of Scotland: Environment During Object Installations", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 46-51.

FELLER, Robert L., "Standards of Exposure to Light", in *Bulletin of the American Group – IIC*, Vol. 4, No. 1, October 1963, pp. 10-12.

-----, "Standards of Exposure to Light II", in *Bulletin of the IIC American Group*, Vol. 7, No. 2, 1967, pp. 8, 32.

-----, and Ruth M. JOHNSTON-FELLER, "The International Standards Organization's Blue-Wool Fading Standards (ISO R105)", in *Textiles and museum lighting*, Harper's Ferry Regional Textiles Group, Washington DC, 1985, pp. 41-57.

GRANT, Alice (ed. and comp.), *SPECTRUM: The UK Museum Documentation Standard*, Museum Documentation Association, Cambridge, 1994.

HENDERSON, Cathy, "Environmental Standards for Exhibiting Library and Archival Materials: the Work of NISO Committee MM", in Carlo FEDERICI and Paola F. MUNAFÒ (eds.), *International Conference on Conservation and Restoration of Archival and Library Materials, Erice (Italy), CCSEM, 22-29 April 1996*, Vol. I, Palumbo Editore, Rome, 1999, pp. 125-131.

HUGHES, Janet, *et al*, "Monitoring of Environmental Conditions in a Severe Climate: How Can This Assist in Development of Conservation Strategies for Historic Buildings and Artefacts in Antarctica", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 57-64.

KAPLAN, Marilyn E., "The Impact of Building Regulations and Standards on Preservation and Conservation: an International Perspective", in *ICOMOS 8th General Assembly and International Symposium "Old Cultures in New*

- Worlds*", Washington, D.C. Oct. 10-15, 1987. *Symposium Papers*, Vol. 1, ICOMOS United States Committee, Washington, D. C., 1987, pp. 339-45.
- KELLEY, Stephen J. (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996.
- KENNEDY, Adrian, *Standards for Treasures in Transit*, (draft for publication), 1983.
- LAVEDRINE, Bertrand, Martine GILLET, and Chantal GARNIER, "Mise au point d'un actinomètre pour le contrôle de l'exposition des photographies et des objets sensibles à la lumière", in *12th Triennial meeting, Lyon, 29 August-3 September 1999: Preprints*, Vol. 1, ICOM Committee for Conservation-James & James, London, 1999, pp. 65-68.
- LISTON, David, "Developing National and International Standards for Better Cultural Security", in *Study series 4, Committee for Museum Security (ICMS)*, ICOM, 1997, pp. 29-30.
- MANZANO MACIAS, Inmaculada, "Tratamiento contra insectos en museos y bienes culturales", in *XI Congreso de Conservación y Restauración de Bienes Culturales, Castellón 3-6 octubre de 1996*, Diputación de Castelló, Castelló, 1996, pp. 113-116.
- MCCRADY, Ellen, "Indoor Environment Standards: A Report on the NYU Symposium", in *The Abbey newsletter*, Vol. 19, Nos. 6-7, December 1995, pp. 93-97.
- MICHALSKI, Stefan, "Setting Standards for Conservation: New Temperature and Relative Humidity Guidelines Are Now Published", in *ICC Bulletin* No. 24, November 1999.
- Museofiches*, Direction de Musées de France, Paris, 1993-1999.
- Notes on the Second Meeting of the Standards and Training Committee*, ICCROM, Rome, 19 April 1979.
- O'CONNELL, Millie, "The New Museum Climate: Standards & Technologies. Northeast Document Conservation Center's Conference at the Museum of Fine Arts, Boston, April 25-26, 1996", in *The Abbey newsletter*, Vol. 20, Nos. 4-5, September 1996, pp. 58-60.
- OTTAVINO, Kate Burns, "Building Preservation Standards—Can They Be Made to Be Independent of Interpretive and/or Aesthetic Criteria?", in *ICOMOS Scientific Journal 6: Ethics, Principles and Methodology*, ICOMOS, 1995, pp. 48-52.
- PADFIELD, T., "The Role of Standards and Guidelines: Are They a Substitute for Understanding a Problem or a Protection against the Consequences of Ignorance?" in *Durability and Change: the Science, Responsibility, and Cost of Sustaining Cultural Heritage, Report of the Dahlem Workshop on Durability and Change, Dec. 6-11, 1992*, John Wiley & Sons, Chichester, 1994, pp. 191-9.
- PAINE, Crispin, "Museums & Galleries Commission Standards in the Care of Museums Collections: What Are the Implications?" in *The Geological Curator*, Vol. 6, No. 7, April 1997, pp. 267-8.

Preliminary Notes of the Standards and Training Committee, ICCROM, Rome, 29 November 1978.

RAIKES, Susan, "Is Collection Management an 'Art' Or a 'Science'? (Discussed with Reference to Recent Standards Setting Initiatives in the United Kingdom)", in *Journal of Conservation & Museum Studies*, No. 1, May 1996, pp. 23-30.

READING, Alfred, "Building Services", in *Papers from the PSA-ICCROM Seminar on Preventive Conservation in Museums and Galleries, London 4-6 April 1984*, ICCROM, Rome, 1984.

Recueil de normes françaises: préservation du bois, Association Française de Normalisation, Paris, 1982.

SHYLLON, Folarin, "International Standards for Cultural Heritage: an African Perspective", in *Art Antiquity and Law*, Vol. V, Issue 2, June 2000, pp. 159-175.

SIMISON, Gouhar, "Canadian Government Policies, Are They Promoting Conservation Principles and Standards?" in *ICOMOS 8th General Assembly and International Symposium "Old Cultures in New Worlds", Washington, D.C., Oct. 10-15, 1987. Symposium Papers, Vol. 2*, International Council on Monuments and Sites (ICOMOS) United States Committee, Washington, DC, 1987, pp. 1041-8.

SLOAN, Julie L., "Stained Glass Conservation: Condition Analyses and Specifications" in Stephen J. KELLEY (ed.), *Standards for preservation and rehabilitation*, ASTM, West Conshohocken, 1996, pp. 264-272.

SOCIETY FOR THE PRESERVATION OF NATURAL HISTORY COLLECTIONS, "Guidelines for the Care of Natural History Collections", in *Collection Forum*, Vol. 10, No. 1, 1994, pp. 32-40.

SPAFA-ICCROM Seminar on Conservation Standards in South Asia: Final Report, Seameo Regional Centre for Archaeology and Fine Arts (SPAFA) - ICCROM, Bangkok, 1989.

Standards for Manitoba Museums, Association of Manitoba Museums, Winnipeg, 1995.

Standards for Saskatchewan museums 1991, Museums Association of Saskatchewan, Regina, 1991.

Standards for Touring Exhibitions, Museums and Galleries Commission, London, 1995.

Standards in the Museum Care of Archaeological Collections 1992, Museums and Galleries Commission, London, 1992.

Standards in the Museum Care of Biological Collections 1992, Museums and Galleries Commission, London, 1992.

Standards in the Museum Care of Costume and Textile Collections 1998, Museums and Galleries Commission, London, 1998.

- Standards in the Museum Care of Geological Collections 1993*, Museums and Galleries Commission, London, 1993.
- Standards in the Museum Care of Larger and Working Objects: Social and Industrial History Collections 1994*, Museums and Galleries Commission, London, 1994.
- Standards in the Museum Care of Musical Instruments 1995*, Museums and Galleries Commission, London, 1995.
- Standards in the Museum Care of Photographic Collections 1996*, Museums and Galleries Commission, London, 1996.
- STANIFORTH, Sarah, "Preventive Conservation In National Trust Houses", in *International Symposium on the Conservation and Restoration of Cultural Property: Cultural Property and its Environment, 11-13 October 1990*, Tokyo National Research Institute of Cultural Properties, Tokyo, 1995, pp. 145-165.
- STOLOW, Nathan, "Standards for the Care of Works of Art in Transit", in *IIC Conference on Museum Climatology, London, 19 September 1967*, IIC, London, 1967.
- , *Procedures and Conservation Standards for Museum Collections in Transit and on Exhibition*, UNESCO, Paris, 1981.
- Suggested Guidelines in Museum Security*, American Society for Industrial Security Standing Committee on Museum, Library and Archive Security (ASIS), Arlington, n.d.
- SWINTON, William Elgin, "Museum Standards", in *Curator*, Vol. I, No. 1, January 1958, pp. 61-65.
- THORNES, Robin, *Protecting Cultural Objects Through International Documentation Standards: a Preliminary Survey*, Getty Art History Information Program, Santa Monica, 1995.
- TOLEDO, María Ismenia *et al*, *Normativas técnicas para museos*, Dirección General Sectorial de Museos del Consejo Nacional de la Cultura, Caracas, 1991.
- TORRES-MURA, J.C., "Estándares para la mantención [sic] de colecciones de vertebrados en Chile", in *Museos*, No. 8, 1990, p. 11.
- VAN GIGCH, John P., Jan ROSVALL, and Bosse LAGERQVIST, "Setting a Strategic Framework for Conservation Standards", in Stephen J. KELLEY (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, pp. 64-71.
- VIÑAS, Vicente, "Criterios de conservación de los bienes culturales", in *Centro nacional de restauración de libros y documentos*, Madrid, 1977, pp. 10-19.
- WADDINGTON, Janet B., "Conservation Guidelines for Invertebrate Paleontology Collections" in Russel D. WHITE and Warren D. ALLMON (eds.), *Guidelines for the management and curation of invertebrate fossils collections including a data and standards for computerization: a National Science Foundation workshop at the North American Paleontological Conference*,

Washington, DC, June 7-14, 1996, North American Paleontological Society, New Haven, 2000, pp. 93-103.

WEEKS, Kay D., and H. Ward JANDL, "The Secretary of the Interior's Standards for the Treatment of Historic Properties: a Philosophical and Ethical Framework for Making Treatment Decisions", in Stephen J. KELLEY (ed.), *Standards for Preservation and Rehabilitation*, ASTM, West Conshohocken, 1996, pp. 7-22.

WHITE, Russel D., "Guidelines for the Documentation and Care of Invertebrate Fossil Collections" in Russel D. WHITE and Warren D. ALLMON (eds.), *Guidelines for the management and curation of invertebrate fossils collections including a data and standards for computerization: a National Science Foundation workshop at the North American Paleontological Conference, Washington, DC, June 7-14, 1996*, North American Paleontological Society, New Haven, 2000, pp. 51-63.

WITTEBORG, Lothar P., "Design Standards in Museum Exhibits", in *Curator*, Vol. I, no. 1, January 1958, pp. 29-41.