Historical Collections

D. Hutchison

Introduction

Being late on the programme has some difficulties; much of what I had prepared to say has now been said. However, some of the previous papers have also underscored some of my remarks in advance while leaving scope for amplification.

Previous speakers have specified ideal environmental requirements and controls for all the hazards. There is little scope in a short paper to consider all those hazards in relation to historical collections. I propose to outline some of the problems common to such collections, and to give illustrations from my own experience.

In Australia 'historical collections' have developed as collections of relics of any non-Aboriginal human acitvity: social and political as well as economic and technological. In some ways it is a pity that there is usually a rigid separation of Aboriginal and 'historical' collections. This rather narrow view of history is itself a product of history. The majority of the major State museums began as natural science museums. Ethnographic artifacts were also collected early: sometimes as items of curiosity rather than as items for scholarly study. However, anthropologists were appointed to most of the Museums before historians, so that scholarly treatment of ethnographic collections came before serious work on historical collections. In general, then, museum departments of history have been late additions to museums which were predominately devoted to natural science and ethnography.

The two principal exceptions to this are the Science Museum of Victoria and the Museum of Applied Arts and Sciences in Sydney. At foundation, and for some time after, these museums tended to reflect the strong nineteenth century interest, which reached a peak at the 1851 Exhibition, in the progress of technology.

Social history has become academically respectable relatively late in Australia. There has also been too little good research into the history of science and technology in Australia. Developments in both these fields are heartening, but curators of historical collections in this country, still have to work with a theoretical foundation which is not as sound as that available to natural science and ethnographic curators.

This preamble seems necessary because conservation of any museum collection is not just a matter of scientific study of the environment and of the processes of decay. Conservation begins with collecting policies and should be in the forefront of the curator's mind at every stage of his work. If curators are inadequately trained, and if there are too few curators, the work of conservators will be made almost impossible.

Dr Ling has properly emphasized the need for sound collecting policies. Sound policies for our historical collections still need to be developed. The inadequate theoretical base, already alluded to, is a serious limitation. This is aggravated in practice because there are too few curators for Australia's historical collections. It is possible that the historical collections held by private collectors and in amateur local museums exceed the collections now in the care of trained curators. The trained curators have little opportunity to specialise; their responsibilities usually range over very diverse collections. Almost without exception these collections are in sub-standard and crowded stores. These inadequacies are critical at a time when the community has become concerned with the accelerating loss of its heritage. Collection of historical artifacts, by many individuals and groups, has become a frenetic and poorly-controlled pursuit.

To sum up: the proper conservation of historical collections is not just a matter of improving storage environment. There will have to be developments on many fronts: more and better research, both in universities and museums, into social and technological

history; more opportunities for education and re-education of curators; more staff so that curators can specialise. All these developments will lead to better collecting policies, better research, better curating – and better conservation. So much for generalities; let me turn to specifics.

Characteristics of history collections

Standards for environmental control and storage design must be based on analyses of the collections. Broadly the characteristics of historical collections include:

1. The need to display original, often unique and highly susceptible specimens,
2. The wide range of materials in such collections,
3. The wide range of materials which may occur in an individual specimen,
4. The wide range of bulk and mass of specimens, and
5. An increasing need to preserve items *in situ.*

1. Natural history "type specimens" are rarely, if ever, displayed. However, many specimens in historical collections, of a rarity and significance approaching that of a "type", have to be displayed. Such specimens are usually highly susceptible to one or more of the environmental hazards. We cannot cheat the public by displaying replicas, and we would like to display such specimens for as long as possible. On display they are obviously at much greater risk than they would be in a good, secure store. In short, many of our most valuable items are, in effect, stored in display cases.

2. Historical collections usually include every kind of material, natural and synthetic. Some factors in the environment may be safe, or even favourable, for some materials while hazardous for others.

Even when a curator is fortunate, as I am, to have the support of a strong conservation department, it is necessary for him/her to have some knowledge of the conservation requirements of all these materials.

3. In particular there may be a wide range of materials in a single specimen. For example we have a suit of mediaeval Japanese armour which includes silk, steel plates and lacquerwork. (This item hardly lies within the ambit of historical collections as I defined them. We all have some "maverick" items). The armour needed extensive restoration. The varying materials had to be analysed and treated by several people. Now that it is restored what environment will be the best compromise for conserving the various materials?

Interfaces between materials are particularly critical areas in items made of mixtures of materials. Water tends to condense, and pollutants tend to concentrate at interfaces. The conservation of vintage cars is especially complex for this reason. The metals would survive best in a very dry atmosphere which would be very harmful for wood, leather and other organic materials.

Garry Thomson said that one way to simplify conservation problems is to separate items according to their materials. It is only possible to do this for a limited range of historical items because of the variety of materials in many specimens.

4. The wide range of bulk and mass of historical items makes storage inefficient, necessitates very large storage areas, and makes it difficult to standardise storage structures. It is very costly to maintain even barely adequate environmental standards in large stores. My own collections range from a farthing to a twenty head stamp battery, and include costume, documents and many kinds of implements and machinery.

Some techniques for using space more efficiently, such as mobile shelving, can be hazardous for fragile items. Mobile shelving (such as "compactus") also makes it more difficult to control the environment within the storage spaces. Optimum use of storage volume requires high shelving and mechanical handling devices. These are costly and also increase the risk of damage during movement. Routine inspection becomes more difficult. Governments are usually unwilling to provide stores which allow for expansion of collections in the long-term. This can mean periodic movement of entire collections. I have moved the bulk of my collections three times in the past six years. The prospect of moving again is the one nightmare that occasionally disturbs my usually sound sleep!

5. Principles and philosophies of industrial and historical archaeology have led to more emphasis on preservation of large structures and machines *in situ.* Since the erection of a protective shield may be contrary to those principles it is usually impossible to control the environment for open-air displays. It took us sometime to convince a municipal gardens department that a bright bed of annuals was not an appropriate setting for an old iron-hulled pilot boat. Sprinklers no longer play on the hull throughout the summer, but you can imagine the problems of maintaining it in good condition even without that unwarranted humidification.

These characteristics are shared I know by anthropological and fine-art collections, but I believe that the range of problems is rather wider for historical collections.

I support Dr. Ling's proposal that the ICCM prepare a manual on museum storage. No curator has the broad training and experience necessary to design efficient storage for the entire range of a history collection. Expert advice on ways to optimise storage space is needed.

Artificially created hazards

We are too often unaware of artificially created hazards within our galleries, stores, or display cases. These hazards are of two kinds: microclimates and pollutants.

Microclimates. We are often complacent if a thermo-hygrograph, placed somewhere near the middle of a gallery or store, records appropriate and stable temperatures and relative humidities. However, odd corners of those spaces, and the interiors of display cases, might have critical microclimates.

Our new museum building in Perth is air-conditioned but the design and placement of most of the windows is bad. The ground-floor gallery, where our car collection is displayed, is air-conditioned and has, in general, a good environment. However, sunlight penetrated the windows on the north-east corner during summer. A thermo-hygrograph near the front of the car displayed in that corner recorded satisfactory values. When the instrument was placed at the back of the car it measured a rise in temperature of 17 Celsius degrees, and consequent fall in R.H. of 26%, in 40 minutes. The airconditioning had very little effect on these highly critical temporal and spatial gradients in temperature and R.H. The problem was solved by installing microlouvre screens, but better building design would have avoided it.

Air-conditioning can have no effect within display cases. Many galleries are over-lit and the level of lighting within the case is usually, therefore, greater than it should be. This can cause overheating and low relative humidity. Since the lights are turned on and off each day the range in these factors may be much greater than is desirable. Garry Thomson has already dealt with the hazards of light so there is no need to say more. However, museums could be designed so that visitors move progressively from daylight into darker galleries so that their eyes become light-adapted slowly. Light-susceptible items can then be displayed in the inner, darker galleries. The Gulbenkian Museum in Lisbon has been so designed. (Allen, 1971).

Pollutants in storage and display furniture. Many modern materials, such as adhesives, contain compounds which continue to vapourise for long periods. Surface deterioration of lead artifacts from the Dutch wreck *Batavia* was found to be due to adhesive used in the construction of a show case. Lead acetate, formed on the surface, was probably caused by the release of acetic acid during the breakdown of polyvinyl acetate.

Oddy of the British Museum Research Laboratory has surveyed these hazards in a paper (Oddy, 1975) which may be consulted. A few examples of his recommendations will suffice to alert curators to the range of problems: polyvinyl acetate emulsions should not be used when lead artifacts are displayed; some brands of polyvinyl acetate glues proved harmless to copper, silver and lead, but others tarnished all three; adhesives containing ammonia are harmful to lead, silver and especially copper, and so on. Oddy also refers to problems arising from the use of some textiles for lining showcases.

Some Japanese research has shown that formaldehyde, released from adhesives used in manufacturing chipboard and plywood, can be controlled by painting the material with a urea solution. (Hojo Zenichi, 1975). In general you should be suspicious of any untested synthetic adhesive, textile or building material. As a precaution activated charcoal should be included in each showcase. It needs to be renewed regularly.

D. Tilbrooke, of our Conservation Laboratory, tested a variety of wooden materials for damaging vapours. Phenolic type compounds were present in large quantities in oregon pine, ramin ply, marine ply, meranti and jarrah in decreasing order. Formaldehyde gas was detected in veneered chipboard and ramin ply. Samples of clean copper, brass, silver and gold, were placed in jars containing a sample of oregon pine or chipboard. Incubated in a humidified atmosphere at 58^{O}C, brass began to tarnish in contact with the pine after 48 hours and with the chipboard after 82 hours. After 9 days the brass in contact with chipboard was heavily tarnished and that in contact with the pine rather more so. Copper showed signs of tarnishing after 82 hours in contact with chipboard, and after 7 days in contact with oregon pine. Silver and gold showed little change.

Last year a few insects were seen in a showcase containing colonial military uniform. The inside of the case was sprayed with a recommended dieldrin spray with a non-greasy carrier/solvent. Not long afterwards all the silver bullion thread in braids on the uniform was heavily tarnished. We have not been able to demonstrate any direct action by the spray on silver. Unfortunately chemical analyses of the bullion thread have not been completed to date. On close inspection of the costume we noticed that where braid overlapped another piece no tarnishing was visible. We therefore suspect a photochemical reaction, possibly involving vapours emanating from the showcase materials. The dieldrin spray may be implicated in this, or the observation of the tarnishing after spraying may have been coincidental.

These uniforms, by the way, are a good example of the problem of conserving and restoring complex materials. We could not use chemical treatment on the uniforms. The most effective method to remove the tarnished surface of the braid has been to use a delicate air-abrasive unit with glass beads size No. 9.

These few examples suggest that we will have to be very careful in selecting materials for showcases and storage units.

May I also warn about the use of aerosol packs, either of insecticides or other chemicals such as rust-proofing agents. *Choice*, 1976, has a survey of aerosol insecticides. Many of these leave a greasy deposit and can be tested by spraying on glass. Rapid expansion of the propellant also causes considerable condensation of water vapour close to the nozzle. If you spray rust-proofing solutions into, say, the mechanism of a gun you are in danger of promoting rust because of the condensation. It is better to use a manual spray. If the convenience of an aerosol pack is essential make sure you spray from a distance.

Existing storage and display conditions

Last year I had the opportunity to visit all the major historical collections in Australia as well as some of the smaller collections. I am disturbed by the conditions for display and storage in most cases. This is not intended to be criticism of my colleagues. They are well aware of problems but desperately short of staff and resources to overcome them. I hope that the change of Government in Canberra will not result in delays in action on the Report of the Inquiry into Museums and National Collections. The problem is a national one, requiring national initiatives and national marshalling of resources.

Curators of historical collections are acutely aware of a dilemma. All of us would be entitled to say, on sound professional grounds, that we should collect no more until conditions for storage are greatly improved. Which is the more serious dereliction of duty; to continue to collect, knowing that storage is below standard, or to stop collecting, knowing that many objects will then have no chance of being preserved? We have to go on collecting; but that will increase the backlog of conservation problems. We need to be concerned about the open-ended nature of historical collections, and we should review collecting policies nationally.

Curators of historical collections in Australia now have a fairly heavy load (no doubt curators of other collections can make a similar claim). They are expected to be expert in many areas of history and in a wide range of artifacts. They should know something, at least, about conservation requirements over this wide range of materials. Most of us are unable to inspect our collections as often as is desirable, partly due to poor storage, partly due to inadequate staff. I doubt if any historical collection in the country is fully recorded photographically. Without photographs how can the conservation of the collections be monitored?

Air-conditioning: how necessary?

Air-conditioning has three main functions: to control temperature, to control relative humidity, and to remove pollutants. Rising costs and the energy crisis may limit the use of air-conditioning in future. In determining standards for storage, and for display galleries, we may need to guard against excessive reliance on air-conditioning.

Colin Madigan said that the energy demand, for temperature control, of the air-conditioning plant for the new National Gallery equals the heating demand of 3,700 domestic dwellings. It is an irony, of which we should be aware, that increasing demand for air-conditioning will require additional generating capacity which will, in turn, lead to increased industrial air pollution. As conservationists, in the particular and general senses, we should be concerned firstly with the air outside our buildings. We should be in the forefront of movements to remove pollution from the environment.

An American expert has proposed that museums should be designed as a series of concentric elements to minimise the need for air-conditioning. Progressively tighter environmental controls would be imposed as one moved from outer elements towards the centre, through airlocks. Storage and exhibition areas, where maximum control is needed, would be the innermost elements. Higher air pressure in the centre would prevent inward leakage of less controlled air from outer elements. Corridors between elements would do double duty as insulating zones. (Douglas, 1972).

We have some evidence for the efficacy of such a system. Our costume store is the old museum strongroom in the basement of an old building. The strongroom has thick walls and is isolated by passages or other rooms from the outside masonry walls. It also has two floors above it. The environment within is close to ideal and very stable, although the room is not air-conditioned.

Our new museum building is also built concentrically, though not intentionally for environmental control. Curator's offices and laboratories occupy the perimeter for easy access to services. Inside these is a ring corridor surrounding a central store. Conditions within these stores have been found to be very nearly the same with or without the air-conditioning operating. This may say something for the quality of the air-conditioning; the climatic range in Perth is also favourable.

However, our experience supports the contention that careful building design could reduce the dependence upon air-conditioning. It may become more economical, particularly if inflation rates continue to be fairly high, to spend more on the design and construction of the building and less on the installation and maintenance of air-conditioning.

I do not suggest that we can eliminate air-conditioning but we should not look upon it as a panacea or as a means of avoiding more careful planning of buildings. I have given examples, in my discussion of microclimates, of the need to examine building plans very carefully for spaces which may not be adequately controlled by the general air-conditioning.

Concentric design would also provide for a logical flow of curating functions, from dirty reception areas through fumigation and quarantine to storage. Because the history departments at Australian museums have been sited in buildings designed for other museum functions, I know of no curator who enjoys an efficient and logical layout of his working and storage spaces. Logical layout of all working spaces must be included in any specification of standards.

I must add that I do not propose 'concentric design' as a panacea either; nor should such a general approach reduce the design of all museum buildings to a nest of concentric circles. The emphasis should be on logically *successive elements*, for example the elements might proceed downwards to underground storage.

Conclusion

Museums in Australia are moving rapidly towards higher levels of professionalism, but resources are inadequate throughout the nation. The problems will not be solved quickly. To seek national solutions to a nation-wide problem should not be dismissed as centralism. A truly federal approach requires initiatives at all levels. Without being unduly pessimistic I am sure that the display and storage areas for the major Australian historical collections will not be up to adequate, let alone ideal, standards by the end of the century. If anyone doubts this I suggest the discipline of some arithmetic. Your calculation should be based on accelerating collecting rates and should allow for the tremendous backlog already existing.

We need to re-examine our priorities and to plan staged development. Plans for development should include staffing as well as facilities. We cannot expect facilities to be raised to ideal standards in the short-term. Say, for discussion sake, we propose that by 1986 there should be some first-class storage for the nation's most precious and most susceptible relics, and that by that date all other storage should be raised to defined minimum standards. Phased development should then continue until standards of all storage and display spaces are satisfactory. We cannot accept anything less than this modest proposal.

References

Allen, W.A., 1971, The Museum in Lisbon for the Gulbenkian Collection. A New approach to Illumination, *Museums Journal*, 71: 54-58.

Anon, 1976, Aerosol Flysprays, *Choice*, 18: 112-118.

Douglas, R.A., 1972, A Commonsense Approach to Environmental Control, *Curator*, 15: 139-144.

Hojo Zenichi, 1975, Removal of Formaldehyde Odour From Plywood *Chem. Abstr.*, 82: 32704S.

Oddy, W.A., 1975, The Corrosion of Metals on Display. *Conservation in Archaeology and the Applied Arts*, IIC-N.K.F. Congress, Stockholm, IIC, London.